

MeiG SLM770A

AT Commands Manual

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Revision History

Version No.	Date	Reason for Revision
V1.0	2022-03-21	First edition
V1.1	2022-05-23	1. Modify AT+CLCK, AT+CEREG, AT+MGCFG, AT^HCSQ descriptions 2. Add support for AT^SYSINFOEX, AT+SGCELLINFOEX, AT^CELLLOCK and other functions
V1.2	2022-08-19	1. Support ATHUDATA function for setting user name and password of special network card 2. Add GPS-related commands 3. Add ECMDUP function commands 4. Support sleep function 5. Support cell information query command
V1.3	2022-10-28	1. Add voice control commands 2. Update the error code command 3. Add examples for using GPS commands 4. Corrected the inaccurate return value of AT+IPR 5. Update the AT+CSDF configuration parameters 6. Delete some unsupported functions
V1.4	2022-12-28	1. Modify chapter 2.8 table 18 active report AT command 2. Add chapter 2.10 measuring the real-time temperature of the device: AT+TEMP command 3. Add chapter 2.11 querying the ADC: AT+ADCREAD command 4. Modify chapter 6.2, description of AT+VTS parameters in Table 85 5. Add chapter 8.14 information 6. Add chapter 8.15 information 7. Modify chapter 9.4 AT+CSDF parameters 8. Add chapter 10.10 ^DCONN/^DEND parameters for successful dial-up/disconnection 9. Add chapter 16 description of error codes
V1.5	2023-03-21	1. Add chapter 10.11, query DS traffic: AT^DSFLOWQRY 2. Add chapter 10.12, DS traffic cleaning: AT^DSFLOWCLR 3. Add chapter 10.13, Network card mode configuration AT+DIALCFG
V1.6	2023-07-10	1. Add chapter 2.12, Set the active reporting port: AT+URCCFG 2. Add chapter 8.16, The default IMS bearer configuration: AT^NWCFG="ims_enable" 3. Add chapter 8.17, Get carrier name command: AT^EONS 4. Add chapter 8.8, Add GSM mode to neighboring cell query: AT^CELLINFO=2 5. Modify chapter 4.4, Returned value of AT+CNMI=?
V1.7	2023-08-01	1. Modify chapter 12.2, Added 921600 and 3000000 baud rate Settings for IPR 2. Add chapter 12.3, Serial flow control

V1.8	2023-09-05	3. Modify chapter 8.9, Extended query cell information command: AT+SGCELLINFOEX CQI instance Returned value 4. Add chapter 4.4, Provide TE with a new SMS command: AT+CNMI chapter, <bm> parameter 3, <ds> parameter 2 description 5. Modify chapter 5.6, Call transfer condition and number setting command: Returned value of AT+CCFC=0,2
		1. Modify chapter 5.4, Call hang up command: AT+CHUP description 2. Modify chapter 5.9, Hang up control command: ATH description 3. Add chapter 5.10, Call Process Status Report Command: +CLCC
V1.9	2023-09-26	1. Modify chapter 2.4, Set mobile phone function commands: AT+CFUN chapter: modify returned value of AT+CFUN=? 2. Modify chapter 2.9, Mobile phone Active status AT command: AT+CPAS chapter: modify parameter description of AT+CPAS 3. Modify chapter 2.11, querying the ADC: AT+ADCREAD chapter: modify returned value of AT+ADCREAD? and the AT+ADCREAD parameters of voltage Command 4. Add chapter 2.12, Set the active reporting port: 5. Modify chapter 3.12, Read and chapter: modify IMEI and SN command: AT+LCTSN chapter: modify returned value of AT+LCTSN=? 6. Modify chapter 4.1, Set SMS format command: AT+CMGF chapter: modify test command of AT+CMGF=? 7. Modify chapter 5.1, Mobile station calling command: ATD [<dial_string>][:] chapter: modify Command example of ATD10086; Instruction instance 8. Modify chapter 5.2, Initiating call command: ATD><str>[I][G] chapter: modify Command example of ATD>"TEST" 9. Modify chapter 5.3, Call answering command: ATA chapter: modify Command example of AT+CHUP 10. Modify chapter 5.4, Call hang command: AT+CHUP chapter: modify Command example of AT+CHUP 11. Modify chapter 6.1, Single or multiple characters DTMF Tone command: AT+VTS chapter: modify command example of AT+VTS=? 12. Modify chapter 8.14, Active reporting command for IMS registration changes: AT+CIREGU chapter: modify operation command of AT+CIREGU 13. Modify chapter 9.4, Set Time Format Command: AT+CSDF chapter: modify returned value of AT+CSDF? 14. Modify chapter 10.2, Enter the data mode AT command: AT+CGDATA chapter: modify command example of AT+CGDATA=? 15. Modify chapter 10.3, Request the GPRS server command: ATD*99# chapter: modify Command example of ATD*99#; Instruction instance 16. Modify chapter 10.6, Define the PDP context command: AT+CGDCONT chapter: modify Command example of AT+CGDCONT=? 17. Modify chapter 10.8, Display the PDP address command: AT+CGPADDR chapter: modify Command example of AT+CGPADDR=? 18. Modify chapter 10.9, Querying DNS command: AT+CGCONTRDP chapter: modify Command example of AT+CGCONTRDP=? and set the command format 19. Modify chapter 10.10, Dial command on the AP side: AT+ECMDUP chapter: modify Command example of AT+ECMDUP=?

V2.0	2023-12-15	20. Modify chapter 13.4, Supports PCM setting command: AT^CPCM chapter: modify Command example of AT^CPCM=?
		21. Modify chapter 8.13, SRVST actively reports the switch commands: AT^SRVST chapter: Modify test command of AT^SRVST=? returned value
		1. Add chapter 14.4, GPIO control command: AT+GPIO chapter
		2. Modify chapter 2.6, Report to mobile device error command: AT+CMEE chapter: Command example of AT+CMEE=? returned value
		3. Modify chapter 4.1, Set SMS format command: AT+CMGF chapter: Command example of AT+CMGF=? returned value
		4. Modify chapter 4.9, Delete SMS command: AT+CMGD chapter: Command example of AT+CMGD=? returned value
		5. Modify chapter 7.1, Device lock AT command: AT+CLCK chapter: Command example of AT+CLCK=? returned value
		6. Modify chapter 7.2, Change the password AT command: AT+CPWD chapter: Command example of AT+CPWD=? returned value
		7. Modify chapter 7.5, SIM card access restriction AT command: AT+CRSM chapter: Command example of AT+CRSM=? returned value
		8. Modify chapter 8.10, Extended Settings system configuration command: AT^SYSCFGEX chapter: Command example of at^syscfgex=? returned value
		9. Modify chapter 8.9, Extend the query cell information command: AT+SGCELLINFOEX chapter: Command example of AT+SGCELLINFOEX? returned value, add the remarks of VOLTE and IMS_ENABLE
		10. Modify chapter 8.11, Extend the query system information command: AT^SYSINFOEX chapter: Command example of AT^SYSINFOEX returned value
		11. Modify chapter 10.1, Activating and deactivating AT commands in PDP context: AT+CGACT chapter: Command example of AT+CGACT=? returned value
		12. Modify chapter 10.6, Define the PDP context command: AT+CGDCONT chapter: Command example of AT+CGDCONT? returned Value
		13. Modify chapter 10.7, Set PDP authentication command: AT^AUTHDATA chapter: Test instruction of AT^AUTHDATA=? returned value
		14. Modify chapter 10.8, Display the PDP address command: AT+CGPADDR chapter: Command example of AT+CGPADDR and AT+CGPADDR=? returned value
V2.1	2024-01-11	15. Modify chapter 2.11, Querying ADC: AT+ADCREAD chapter: Modify the return format of the AT+ADCEAD setting instruction:
		16. Modify chapter 3.1, TA's manufacturer information command: ATI chapter: Modify ATI returned value
		1. Adjust the table numbering for Table 196 "AT+GPIO Operation Commands" and all subsequent chapter tables.
		2. Add Chapter 16 "Custom AT Commands" with Section 16.1 "Command for Querying Cell Information: AT+MENG".
		3. In Chapter 8.9 "Extended Command for Querying Cell Information: AT+SGCELLINFOEX", remove

		"SIB2_PLMN_R15_INFO_PRESENT/SIB2_UPR_LAYER_IND/RESTRICT_DCNr" from the execution command: AT+SGCELLINFOEX?. 4. In Chapter 8.9 "Extended Command for Querying Cell Information: AT+SGCELLINFOEX", remove "SIB2_PLMN_R15_INFO_PRESENT/SIB2_UPR_LAYER_IND/RESTRICT_DCNr" from the parameter description of AT+SGCELLINFOEX in Table 133. 5. Add Chapter 8.18 "RRC Status Query and Active Reporting: AT^RRCSTAT".
V2.2	2024-03-26	1. Modify Chapter 8.12 "Lock Specific Frequency and Cell: AT^CELLLOCK": the return value of the command example AT^CELLLOCK? 2. Modify Chapter 8.9 "Extended Command for Querying Cell Information: AT+SGCELLINFOEX": the command example AT+SGCELLINFOEX=? 3. Modify Chapter 8.9 "Extended Command for Querying Cell Information: AT+SGCELLINFOEX": parameter descriptions of VOLTE and IMS_SMS 4. Modify Chapter 3.12 "Command for Reading and Modifying IMEI and SN: AT+LCTSN": the return value of the test command AT+LCTSN=?, and the detailed description of the <type> parameter in AT+LCTSN 5. Modify Chapter 4.9 "Command for Deleting SMS: AT+CMGD": the return value of the test command AT+CMGD=? 6. Add Chapter 10.14 "Command for Reporting DS Traffic: AT^DSFLOWRPT" 7. Modify Chapter 8.15 "Network Frequency Point Information Scanning: AT^NETSCAN": the return value of the command example AT^NETSCAN
V2.3	2025-03-19	1. Add Chapter 8.19 "Base Station Positioning Command: AT+GTGIS" 2. Add Chapter 8.20 "DHCP Address Pool Parameter Configuration: AT^MAPCFG="dhcp"" 3. Add Chapter 8.21 "Set Network Mask Function: AT^MAPCFG="wwan_subnet_mask"" 4. Add Chapter 16.2 "Command for Writing to or Reading String-Form Data in NV: +EFSRW" 5. Add Chapter 8.22 "Disable RPLMN Switch: AT^NWCFG="disable_rplmn"" 6. Modify the return result of the query command AT+GPSCFG="autogps" in Chapter 15.7.9 "Enable/Disable Automatic GNSS Operation" 7. Add comment explanations for the command example AT^CELLINFO=4 in Chapter 8.8 "Command for Querying Cell Information: AT^CELLINFO"
V2.4	2025-06-13	1. Add Chapter 8.23 "Command for Querying LTE Default Bearer Registration Information: AT^LTEATTACHINFO" 2. Add Chapter 8.24 "Command for PLMN Active Reporting Switch: AT^PLMN"
V2.5	2025-07-01	1. Modify Chapter 2.5 "Command for Setting DTE Character Set: AT+CSCS": description of the parameter "USC2" 2. Modify Chapter 2.6 "Command for Reporting Mobile Equipment Errors: AT+CMEE": default value

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1 Introduction

1.1 Scope of the Document

This document presents the AT command set supported by MeiG SLM770A module, including standard AT commands and MeiG dedicated extended AT commands. Guide users to interact with the module's commands and assist customers in applications.

1.2 Content List

This document includes the following parts:

- Chapter 1: Mainly introduce the purpose of the document, command detail and abbreviation explanation, etc.;
- Chapter 2: Introduction to general related commands;
- Chapter 3: Introduction to module information recognition commands;
- Chapter 4: Introduction to SMS commands;
- Chapter 5: Introduction to call control commands;
- Chapter 6: Introduction to DTMF function commands;
- Chapter 7: Introduction to SIM commands;
- Chapter 8: Introduction to network service commands;
- Chapter 9: Introduction to time and date commands;
- Chapter 10: Introduction to data function commands;
- Chapter 11: Introduction to sleep and wakeup related commands;
- Chapter 12: Introduction to serial port control commands;
- Chapter 13: Introduction to voice control commands;
- Chapter 14: Introduction to hardware and extension commands;
- Chapter 15: GPS related commands.

1.3 Terms and Abbreviations

Table 1 Terms and Abbreviations

Abbreviation	Description
DCE	Data communication equipment
DTE	Data terminal equipment
DTR	Data Terminal Ready
EDGE	Enhanced Data rates for GSM Evolution
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
EMC	Electromagnetic Compatibility
ESD	Electrostatic DSClcharge
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	Quadrature Phase Shift Keying
SIM	Subscriber Identity Module
UART	Universal asynchronous receiver-transmitter
USIM	Universal Subscriber Identity Module
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
WCDMA	Wideband Code Division Multiple Access
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
TD-LTE	Time Division Long Term Evolution
FDD-LTE	Frequency Division Duplexing Long Term Evolution

2 General Commands

2.1 ATO Return Data Status

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

Table 2 ATO operation command

Type	Command	Possible return results	Description
Executive 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

Using this command, can set whether the TA echoes characters received from the TE in the command state.

Table 3 ATE operation command

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

OK

Table 4 ATE parameter description

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

2.3 AT&F Restore All TA Parameters to Factory Configuration

Table 5 AT&F operation command

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

Table 6 AT&F parameter description

Command(AT&F)	Factory setting parameters
ATS0	000
ATS2	043
ATS3	013

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

2.4 AT+CFUN Set Mobile Phone Function

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

Table 7 AT+CFUN operation command

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

Table 8 AT+CFUN parameter description

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

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

2.5 AT+CSCS Set DTE Character Set Command

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

Table 9 AT+CSCS operation command

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

AT+CSCS=?	+CSCS: ("IRA","UCS2","GSM")	Parameter value list of CSCS command
	OK	

Table 10 AT+CSCS parameter description

Parameter	Value	Description
<chset>	"GSM"	GSM 7bit default character set (3GPP TS 23.038 [25])
	["IRA"]	International reference character set (ITU-T T.50[13])
	"UCS2"	Unicode Transformation Format – 2-byte

2.6 AT+CMEE Mobile Device Error Report 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 function.

Table 11 AT+CMEE operation command

Type	Command	Possible return results	Description
Set Command	AT+CMEE=[<n>]	OK	-
Query Command	AT+CMEE?	+CMEE: <n>	-
		OK	-
Test Command	AT+CMEE=?	+CMEE: (<n> value list)	-
		OK	-
Command Example	AT+CMEE=0	OK	Set "disable result code + CME ERROR: <err>, use ERROR"
	AT+CFUN=0,1	ERROR	
	AT+CMEE=1	OK	Set "enable result code + CME ERROR: <err>, use digit <err> value"
	AT+CFUN=0,1	+CME ERROR: 4	The reported error is "+CME ERROR: 4"
	AT+CMEE=2	OK	Set "enable result code + CME ERROR: <err>, use verbose mode <err> value"
	AT+CFUN=0,1	+CME ERROR: operation not supported	The reported error is "+CME ERROR: operation not supported"
	AT+CMEE?	+CMEE: 2	-
		OK	-

	+CMEE: (0-2)	
AT+CMEE=?		-
	OK	

Table 12 AT+CMEE parameter description

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

2.7 AT+MGCFG Function Switch Control Command

Table 13 AT+MGCFG operation command

Type	Command	Possible return results	Description
Set Command	AT+MGCFG=<Mgcfg_Index>[,<Mgcfg_Param1>[,<Mgcfg_Param2>[,<Mgcfg_Param3>...]]]	OK	Query command when parameter only include index; Set command when parameter include index and param
Query Command	AT+MGCFG?	OK	-
Test Command	AT+MGCFG=?	+MGCFG: 2,(0-1),(0-1) OK	Return all supported configuration index, name, number of parameters and corresponding parameter value range
Command Example	AT+MGCFG=2	+MGCFG: 2,0,0 OK	Query the configuration when index is 2, return the name and current parameter value when index is 2
	AT+MGCFG=2,1,1	OK	Enable hot swap

Table 14 AT+MGCFG parameter description

Parameter	Value	Description
<Mgcfg_Index>	1-2	Index of configuration parameter
<Mgcfg_Name>	-	Configuration parameter name
<Mgcfg_Param>	-	Configuration parameter information

Table 15 Mgcfg_Index parameter description

Index	Name	Parameter description	Value	Value description
2	sim/hotswap	<Mgcfg_Param1>: Hot swap enable switch	0-1	Disable (Default) Enable (Take effect after restart)
		<Mgcfg_Param2>: Hot swap high and low levels	0-1	LOW POLARITY HIGH POLARITY Note: if enable hotswap, the corresponding high and low levels should be 0/1 according to the hardware design (Take effect after restart)

2.8 AT^CURCEX 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 command supported unsolicited AT command is described in the following table.

Table 16 AT^CURCEX / AT^CURC operation command

Type	Command	Possible return results	Description
Set Command	AT^CURCEX=<mode>[,<report_cfg_map>]	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR<CR><LF> Or: <CR><LF> +CME ERROR: <err><CR><LF>	Fail
Query Command	AT^CURCEX?	<CR><LF>^CURCEX: <mode>[,<report_cfg_map>]<CR><LF> <CR><LF>OK<CR><LF>	-
Test Command	AT^CURCEX=?	<CR><LF>^CURCEX: (0-2)[,(0-FFFFFFFF)]<CR><LF> <CR><LF>OK<CR><LF>	(FFFFFFFF will 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
	AT^CURCEX?	^CURCEX: 2,00000102	
		OK	
	AT^CURCEX=?	^CURCEX: (0-2)[,(0-FFFFFFFF)] OK	

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

Table 17 AT^CURCEX parameter description

Parameter	Value	Description
<mode>	0-2	Control mode, integer value, with a value of 0-2. The meaning of the value is as follows: 0: turn off the unsolicited reporting of all AT commands in the following described bit table.

1: turn on the unsolicited reporting of all AT commands in the following described bit table.

2: this mode requires the parameter <report_cfg_map> to configure the unsolicited reporting of AT commands in the following described bit table.

<report_cfg_map> 0-FFFFFFFF

Hexadecimal number string, bit configure of the unsolicited reporting command. Each bit corresponds to an unsolicited AT command, as shown in the following bit table.

The value range is the hexadecimal string of 0~FFFFFFFF (input parameters without the hexadecimal leader '0x', and FFFFFFFF will increase with the increase in the number of commands that support unsolicited reporting, with a maximum length of 64 letters F), followed by the first byte, the second byte, and so on from right to left (for example, 102 is equivalent to 00000102).

The value of each bit is as follows:

0: turn off unsolicited reporting.

1: turn on unsolicited reporting.

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

bit3	bit2	bit1	bit0	Byte 1
^SIMST	^MODE	Reserved	^SRVST	
bit7	bit6	bit5	bit4	Byte 1
Reserved	Reserved	^SMMEMFULL	Reserved	
bit3	bit2	bit1	bit0	Byte 2
Reserved	Reserved	Reserved	Reserved	
bit7	bit6	bit5	bit4	Byte 2
Reserved	Reserved	Reserved	Reserved	
bit3	bit2	bit1	bit0	Byte 3
^HCSQ	Reserved	Reserved	Reserved	
bit7	bit6	bit5	bit4	Byte 3
^Reserved	Reserved	Reserved	Reserved	
bit3	bit2	bit1	bit0	Byte 4
Reserved	Reserved	Reserved	Reserved	

bit7	bit6	bit5	bit4
------	------	------	------

2.9 Mobile Active AT Commands AT + CPAS

This command only supports voice status query.

Table 19 AT+CPAS operation command

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

Table 20 AT+CPAS parameter description

Parameter	Value	Description
<pas>	0	Ready (TE can send commands to MT)
	2	Unknown (MT cannot guarantee response command)
	3	Ringing (ringing, but MT can execute TE commands)
	4	Call on (a call is ongoing, but MT can perform commands) of TE

2.10 Real-Time Temperature of Measuring Device AT+TEMP

This command is used to obtain the real-time temperature of the device. Currently, the supported devices include cpu_temp and rf_temp.

Table 21 AT+TEMP operation command

Type	Command	Possible return results	Description
Set Command	AT+TEMP	+TEMP: <sensor>,<temp> [....]	Report the temperature of each item of device
		OK	

Test Command	AT+TEMP=?	OK	
Command Example	AT+TEMP	AT+TEMP +TEMP: "cpu_temp", "18" +TEMP: "rf_temp", "28" OK	The AT command is used to query the real-time temperature of device cpu_temp, rf_temp, and report the temperature.

Table 22 AT+TEMP parameter description

Parameter	Value	Description
< cpu_temp >	Integral type	Real-time CPU temperature temperature range <-273°C~+273°C>. It is recommended to keep the CPU temperature below 95°C.
< rf_temp >	Integral type	Real-time PA temperature temperature range <-273°C~+273°C>. It is recommended to keep the PA (Power Amplifier) temperature below 105°C.

2.11 Query ADC AT+ADCREAD

Query the voltage of ADC.

Table 23 AT+ADCREAD operation command

Type	Command	Possible return results	Description
Set Command	AT+ADCREAD=<n>[,<option>,<index>,<adc_value>,<voltage>]	+ADCREAD: value	ADC query success
		OK	
		ERROR	Not support/Query failed
Query Command	AT+ADCREAD?	OK	
Test Command	AT+ADCREAD=?	+ADCREAD: (0,1)[,(0-2),(0-10),(0-1000),(0-1800)]	Support ADCREAD command
		OK	
		ERROR	Not support this AT command
Command Example	AT+ADCREAD=1	+ADCREAD: value	Return the voltage of ADC1
		OK	
		ERROR	ADC acquisition failure

AT+ADCREAD =0,0,1,314,400	OK	Set the ADC voltage mapping table for the ADC0 channel
	ERROR	Failed to set ADC voltage mapping table for the ADC0 channel
AT+ ADCREAD =0,1	1 OK	Read ADC voltage mapping table of ADC0 channel, the result is set successfully
	0 OK	Read ADC voltage mapping table for the ADC0 channel. The result is set failed
AT+ ADCREAD =0,2	OK	Delete the ADC voltage mapping table for the ADC0 channel

Table 24 AT+ADCREAD parameter description

Type	Value	Description
n	0	Query the voltage unit of ADC0 (μV)
	1	Query the voltage unit of ADC1 (μV)
option	0	Set the channel voltage mapping table
	1	Read the channel voltage mapping table set result
	2	Delete the channel voltage mapping table
index	0-10	Mapping table position
adc_value	0-1000	Adc sample value
voltage	0-2500	Adc converted voltage value
value	Voltage value	Unit
		μV

2.12 Set the Active Reporting Port: AT+URCCFG

Table 25 AT+URCCFG Operation Instructions

Type	Command	Possible return results	Description
Set Command	AT+URCCFG="urcport" [,<urc_port>].	If no <urc_port> parameters are entered, query the current configuration of "urcport"	-

		+URCCFG: "urcport", <urc_port>	
		OK	
		If < urc_port> parameters are entered and the parameters are set successfully, the following is returned OK	
		If < urc_port> parameters are entered, but the parameter setting fails, the following is returned ERROR	
Test command	AT+URCCFG=?	+URCCFG: "urcport", (list of supported <urc_port>s)	Returns all supported active reporting ports
		OK	
	AT+URCCFG="urcport", "usbat"	OK	Set the active reporting port to the AT port
	AT+URCCFG="urcport"	+URCCFG: URCPort,USBAT	Query the current active reporting port
		OK	
Command Example	AT+URCCFG=?	+URCCFG: "urcport", ("USBAT", "USB MODEM", "UART1", "CMUX 1", "CMUX2", "CMUX3", "CMUX4", "ALL")	Query the ports that are supported by AT+URCCFG. The ports supported by different platforms may not be the same, and the return strings may differ.
		OK	

Table 26 Parameters for AT+URCCFG

parameter	Valid values	illustrate
<urc_port>	String type	Set the output port for active reporting to support the following values (the ports supported by different platforms may not be the same, and the query of the test command shall prevail): "USBAT" – AT port "USBMODEM" – Modem port "UART1" – Serial port

"CMUX1" – CMUX1

"CMUX2" – CMUX2

"CMUX3" – CMUX3

"CMUX4" – CMUX4

"ALLI" – All ports

3 Module information recognition commands

3.1 ATI TA Manufacturer Information Command

Table 27 ATI operation command

Type	Command	Possible return results	Description
Executive Command	ATI	OK	TA returns the ME product information
Command Example	ATI	Manufacturer: MEIG INCORPORATED Model: SLM770A Revision: SLM770A_3.0.13_EQ102 IMEI: 869635010008467 +GCAP: +CGSM OK	-

3.2 AT+GMI TA Manufacturer ID Command

Table 28 AT+GMI operation command

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

3.3 AT+CGMI Query Manufacturer Name Command

Table 29 AT+CGMI operation command

Type	Command	Possible return results	Description
Executive Command	AT+CGMI	<manufacturer>	DCE returns the manufacturer name

		OK
Test Command	AT+CGMI=?	OK
		+CGMI: MEIG INCORPORATED
Command Example	AT+CGMI	OK
	AT+CGMI=?	OK

3.4 AT+GMM TA identifier Command

Table 30 AT+GMM operation command

Type	Command	Possible return results	Description
Executive Command	AT+GMM	+GMM: SLM770A OK	TA returns the product model; 'X' is a character in {A,B,C,I}
Test Command	AT+GMM=?	OK	-

3.5 AT+CGMM Model Query Command

Table 31 AT+CGMM operation command

Type	Command	Possible return results	Description
Executive Command	AT+CGMM	<model> OK	DCE returns the product model.
Test Command	AT+CGMM=?	OK	
Command Example	AT+CGMM	+CGMM: SLM770A OK	Return the module model.
	AT+CGMM=?	OK	

3.6 AT+GMR TA Query Version Information Command

Table 32 AT+GMR operation command

Type	Command	Possible return results	Description
Executive Command	AT+GMR	<revision>	-
		OK	
Test Command	AT+GMR=?	OK	-
Command Example	AT+GMR	+GMR: SLM770A_3.0.13_EQ102	-
		OK	
	AT+GMR=?	OK	-

3.7 AT+CGMR Query Version Information Command

Table 33 AT+CGMR operation command

Type	Command	Possible return results	Description
Executive Command	AT+CGMR	<revision>	DCE returns product firmware version information
		OK	
Test Command	AT+CGMR=?	OK	
Command Example	AT+CGMR	+CGMR: SLM770A_3.0.13_EQ102	
		OK	
	AT+CGMR=?	OK	The current version supports this command.

3.8 AT+GSN Query Product IMEI Number Command

Table 34 AT+GSN operation command

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

		OK	
Test Command	AT+GSN=?	OK	-
Command Example	AT+GSN	869635010008467 OK	-
	AT+GSN=?	OK	-

3.9 AT+CGSN Query Product IMEI Number Command

Table 35 AT+CGSN operation command

Type	Command	Possible return results	Description
Executive 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 Query Hardware Version Number Command

Table 36 AT+SFHW operation command

Type	Command	Possible return results	Description
Executive Command	AT+SFHW	HardwareVersion: <XXXXXX> OK	-Return the hardware version number
Command Example	AT+SFHW	HardwareVersion: SLM770A_MB_V1.02 OK	-Take iron tower project as an example

3.11 AT+SGSW Query Software Version Number Command

Table 37 AT+SGSW operation command

Type	Command	Possible return results	Description
Executive Command	AT+SGSW	SoftwareVersion: <XXX> InnerVersion: <XXXXXX>	
		OK	
Command Example	AT+SGSW	SoftwareVersion: SLM770A_3.0.13_EQ102 InnerVersion: SLM770A_EQ102_00B.C08000.057027_2209 01_300_C00_V13 Build_date: [Sep 1 2022 21:33:10]]	-
		OK	

3.12 AT+LCTSN Read and Modify IMEI Number and SN Number Command

Table 38 AT+LCTSN operation command

Type	Command	Possible return results	Description
Reading Command	AT+LCTSN=<option>,<type>	+LCTSN:<SN>/<IMEI>	Success
		OK	
		ERROR	Return ERROR when null
Modify Command	AT+LCTSN=<option>,<type>,<value>	AT+LCTSN=<option>,<type>,<value>	
		OK	
Test Command	AT+LCTSN=?	+LCTSN: (0-2),(5,7,11,13,15)	-
		OK	
Command Example	AT+LCTSN=1,7,"3520990017614823"	OK	
		+LCTSN:"3520990017614823"	
		OK	

	OK	
AT+LCTSN=1,5,"770ACB4AH C060200143"		
	+LCTSN:"770ACB4AHC060200 143"	
AT+LCTSN=0,5		
AT+LCTSN=2,5		
AT+LCTSN=0,5	OK	
	OK	
	ERROR	
AT+LCTSN=1,6,"B4D4B25F3 E01"	OK	
	+LCTSN:"B4D4B25F3E01"	
AT+LCTSN=0,6		
	OK	
AT+LCTSN=1,8,"1"	OK	
	+LCTSN:"1"	IMEISV<value> parameter range 0-99
AT+LCTSN=0,8		
	OK	

Table 39 AT+LCTSN parameter description

Parameter	Value	Description
<option>	0: Read	
	1: Write	
	2: Delete	
<type>	(5,7,11,13,15)	5: SN. 7: IMEI. 11: SN2. 13: SN3. 15: SN4.
<value>	String	Corresponding to the < type > string value

4 SMS related commands

4.1 AT+CMGF Short Message Format Set Command

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

Table 40 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	Query the current short message format. PDU format is default.
		OK	
	AT+CMGF=1	OK	Set the short message format as text format.
		+CMGF: (0, 1)	
	AT+CMGF=?	OK	

Table 41 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 42 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.
		AT+CSCA="+8613800210500",145	Set the SMS center address and save it in SIM card
Command Example	AT+CSCA?	+CSCA: "+8613010314500",145	The SMS center address of current SIM card is
		OK	+8613800210500
		AT+CSCA=?	-

Table 43 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: <today> 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 44 AT+CSMP operation command

Type	Command	Possible return results	Description
Set Command	AT+CSMP=[<fo>[,<vp>[,<pid>[,<dc>]]]]	OK	Success
		ERROR/+CMS ERROR: <err>	Fail
Query Command	AT+CSMP?	+CSMP:<fo>,<vp>,<pid>,<dc>	-
		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	
	AT+CSMP?	OK	
	AT+CSMP=?	OK	

Table 45 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)
<dc>	-	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 46 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 47 VPF definition

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

<dc>: 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 <dc>, 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 48 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 a text message and give it directly.
AT+CNMI?	+CNMI: 2,1,0,0,0	—
AT+CNMI=?	OK +CNMI: (0-2),(0-3),(0,2,3), (0-2),(0-1)	—
	OK	

Table 49 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: +CMTI([<alpha>],<length><CR><LF><pdu> (enable PDU mode)) or +CMTI(<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.
	[0]	No CBM indication is sent to TE.
<bm> the rule of saving received CBM depends on the data coding scheme (please refer to GSM 03.38 [2]); select the setting and value of cell broadcasting short message command +CSCB	2	The received CBM is directly sent to TE in following formats: +CBM(<length><CR><LF><pdu>(enable PDU mode) or +CBM(<sn>,<mid>,<dc>,<page>,<pages><CR><LF><data>(enable text mode))
	3	By using the non-request result code defined by <mt>=2, SMS-DELIVER SMS from category 3 can be sent directly to TE. The SMS display results in other data encoding schemes follow the definition of <mt>=1.
	[0]	No SMS-STATUS-REPORTS is sent to TE.
<ds>	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 the SMS-STATUS-REPORT is stored in the ME/TA, the indication of the memory location is routed to the TE using the unsolicited result code: +CDSI:<mem>,<index>
	[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)
<bfr>	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 50 AT+CMGL operation command

Type	Command	Possible return results	Description
	AT+CMGL	OK	Success

Executive Command		[=<stat>]	ERROR/+CMS ERROR:<err>	Fail
		+CMGL:<index>,<stat>,<[alpha]>,<length><CR><LF><pdu><CR><LF>+CMGL:<index>,<stat>,<[alpha]>,<length><CR><LF><pdu>[...]]	PDU mode (+CMGF=0), the command is executed successfully.	
		OK		
		+CMGL:<index>,<stat>,<oa/da>,<[alpha]>,<[scts]>,<[tooa/toda>,<length><CR><LF><data>[<CR><LF>+CMGL:<index>,<stat>,<da/oa>,<[alpha]>,<[scts]>,<[tooa/toda>,<length><CR><LF><data>[...]]	Text mode (+CMGF=1) and the command is executed successfully; SMS-SUBMIT and/or SMS-DELIVER	
		OK		
		+CMGL:<index>,<stat>,<fo>,<mr>,<[ra]>,<[tora]>,<scts>,<dt>,<st>[<CR><LF>+CMGL:<index>,<stat>,<fo>,<mr>,<[ra]>,<[tora]>,<scts>,<dt>,<st>[...]]	SMS-STATUS-REPORT	
		OK		
		+CMGL:<index>,<stat>,<fo>,<ct>[<CR><LF>+CMGL:<index>,<stat>,<fo>,<ct>[...]]	SMS-COMMAND	
		OK		
		+CMGL: (<stat> value list)	-	
Test Command	AT+CMGL=?	OK		
Command Example	AT+CMGF=1 AT+CMGL="REC READ"	+CMGL:0,"REC READ", "+861376192888",,"13/08/02,13:29:58+32" Hello	List all short messages in current storage area (SIM card) in text format	
		+CMGL:1,"REC READ", "+861376192888",,"13/08/02,13:30:21+32" Hello again		
		OK		
		+CMGL: "REC UNREAD","REC READ", "STO UNSENT","STO SENT","ALL"		
		AT+CMGL=?	OK	Once the new short message list is read, these short messages will be marked as the read short messages.

Table 51 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-DSClcharge-Time: "yy/MM/dd,hh:mm:ss±zz", in short messages with this format, characters represent year (last 2 digits), month, date, hour, minute, second and time zone. For example: 6th of May 1995,22:10:00 GMT+2 hours equal to "95/05/06,22:10:00+08".
<fo>	-	Depend on this command or result code of this command: GSM 03.40 SMS-DELIVER, SMS-SUBMIT short messages (default value: 17) or first 8 digits of integer SMS-COMMAND short message (default value: 2)
<length>	-	Integer value; in text mode (+CMGF=1), the character represents <data>(or <deata>) short message text length; 8-digit real TP data unit length (i.e.: 8-digit character in RP layer SMSC address will not be included in this length)
<ct>	-	Integer GSM 03.40 TP-Command-Type(default value: 0)
<da>	-	TP-Destination-Address address—value field in integer GSM 03.40; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>

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

4.6 AT+CMGR Short Message Reading Command

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

Table 52 AT+CMGR operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGR= <index>	OK	Success
		+CMS ERROR: <err>	Fail
		+CMGR:<stat>,<[alpha]>,<length> <CR><LF><pdu>	Use PDU mode(+CMGF=0) and this command is executed successfully
		OK	
		+CMGR:<stat>,<oa>,<[alpha]>,<scts> <[,<tooa>,<fo>,<pid>,<dc>,<sca>,<	Use text mode (+CMGF=1) and this

		<tosca>,<length>]<CR><LF><data>	command is executed successfully; SMS-DELIVER
		OK	
		+CMGR:<stat>,<da>,<alpha>][,<toda>,<fo>,<pid>,<dc>,<vp>],<sca>,<tosca>,<length>]<CR><LF><data>	Use text mode (+CMGF=1) and this command is executed successfully; SMS-SUBMIT
		OK	
		+CMGR:<stat>,<fo>,<mr>,<ra>],<tora>],<scts>,<dt>,<st>	Use text mode (+CMGF=1) and this command is executed successfully; SMS-STATUS-REPORT
		OK	
		+CMGR:<stat>,<fo>,<ct>[,<pid>,<mn>],<da>],<toda>],<length><CR><LF><cdata>]	Use text mode (+CMGF=1)and this command is executed successfully; SMS-COMMAND
		OK	
Test Command	AT+CMGR=?	OK	-
Command Example		AT+CPMS="SM"	
		+CPMS: 11,50,0,23,11,50	
		AT+CPMS="SM"	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+CMGF=1	
		AT+CMGR=2	
		+CMGR: "STO UNSENT","13681737903",test	
		OK	
		+CMGR: 1,,25	
		0891683108200105F0040D91683106718481F700000180203103122305C8329BFD06	Read the short message with PDU format. This short message is in <index>=2 area in ME.
		OK	
	AT+CMGR=?	OK	

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

Table 53 AT+CMGR parameter description

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

4.7 AT+CMGS Short Message Sending Command

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

Table 54 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 ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Successful sending Text mode (+CMGF=1) Failed sending
	AT+CMGS=<length><CR> PDU to send <ctrl-Z/ESC>	+CMGS:<mr>[,<ackpdu>] OK ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Successful sending 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
			Send PDU short message (refer to GSM 04.11 and 03.40) 25--length of PDU string of short message 0011000D91683106718481 F70008000A00480065006C 006C006F--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 55 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 <tda>
<pdu>	-	As for SMS: GSM 03.40 TPDU, hexadecimal, follow GSM04.11 SC address; ME/TA converts all 8-digit characters in TP data unit into hexadecimal figure which includes 2 IRA characters (such as: 8-digit character with integer 42 as 2-digit figure (2A, i.e. IRA50 and 65) is sent to TE). As for CBS: GSM 03.41 TPDU with hexadecimal format is used

<length>	-	Integer value; in text mode (+CMGF=1), <data>(or <deata>) short message text length represented by character; in PDU mode (+CMGF=0), 8-digit real TP data unit length (i.e.: 8-digit character in RP layer SMSC address will not be included in this length, maximum PDU length is 155)
<mr>	-	Integer GSM 03.40 TP-Message-Reference
<scts>	-	Time—character (please refer to <dt>) GSM 03.40 TP- Service-Centre-Time-Stamp
<dt>	-	Time—character GSM 03.40 TP-DSClcharge-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 56 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 57 Basic elements of SMS 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 Adress	2-12	Originator SME address
DA	Destination Adress	2-12	Destination SME address
PID	Protocol Identifier	1	SM treatment mode by SMSC
DCS	Data Coding Scheme	1	Coding scheme of user data (UD)
SCTS	Service Center Time Stamp	7	Time stamp of SMSC receiving short message

VP	Validity Period	0,1,7	Validity period of short message in SMSC
UDL	User Data Length	1	User data segment length
UD	User Data	0-140	SM data

4.8 AT+CMGW Memory Short Message Writing Command

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

Table 58 AT+CMGW operation command

Type	Command	Possible return results	Description
Executive Command	AT+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR>	+CMGW: <index> OK	Text mode (+CMGF=1) Successful writing
	text is entered <ctrl-Z/ES C>	ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed writing
	AT+CMGW=<length>[,<stat>]<CR>	+CMGW: <index> OK	PDU mode (+CMGF=0) Successful writing
	PDU is given <ctrl-Z/ESC>	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 59 AT+CMGW parameter description

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

4.9 AT+CMGD Short Message Deletion Command

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

Table 60 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)	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"	OK	OK
	AT+CMGD=1		Delete the <index>=1 short message
	AT+CPMS="SM"	OK	Delete all short messages in SIM card, including short message which is read, not read, sent and not sent
	AT+CMGD=1,4		
	AT+CMGD=?	OK	(0,1,3)--there is short message in storage area
		+CMGD: (0,1,3),(0-4)	0,1,3

Table 61 AT+CMGD parameter description

Parameter	Value	Description
<index>	0~255	Integer; value within address code range supported by the associated memory
	-	Delete short message specified by <index>
	0	Delete short message specified by <index>
	1	Delete all read short messages in memory
<delflag>	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 62 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 function
Test Command	AT+CPMS=?	+CPMS:(<mem1> value list),(<mem2> value list),(<mem3> value list) OK	—
		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
		+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,SM"),("ME,SM"),("ME,SM")	-
	OK	

Table 63 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	"ME"	Storage area with ME module
	"SM"	Storage area of SIM card
<mem2> Memory for writing, storing and sending short messages. It can be set by two following AT commands: AT+CMSS and AT+CMGW	"ME"	Storage area of module
	"SM"	Storage area of SIM card
<mem3> If there is no router in TE, the received short message will be stored in this memory	"ME"	Storage area of module
	"SM"	Storage area of SIM card
<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.

4.11 +CMTI Short Message Arrival Indication Command

This command shows that the new short message arrives.

Table 64 +CMTI operation command

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

Table 65 +CMTI parameter description

Parameter	Value	Description
<mem>	"SM"	UIM
	"ME"	NV
<index>		Storage position, i.e. index value

4.12 +CDSI New Short Message State Report Arrival Indication Command

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

Table 66 +CDSI operation command

Type	Command	Possible return results	Description
Executive Command		+CDSI:<mem>,<index>	Successfully receive a short message state report
Command Example	AT+CMGF=1	+CMGS:468	The setting needs the short message state report (i.e. short message return receipt)
	AT+CSCS="IRA"	OK	
	AT+CSMP=49,,0,0		
	AT+CNMI=2,1		
	AT+CMGS="189****7363"	+CMTI:"ME",0	

> GOOD[CTRL+Z]

+CDSI:"ME",42

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 67 +CDSI parameter description

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

4.13 AT+CNMA New Short Message Confirmation Command

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

Table 68 AT+CNMA operation command

Type	Command	Possible return results	Description
Executive Command	AT+CNMA[=<n>[,<leng>th>[<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	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
		OK	

		Notify that the network side has received the short message
AT+CNMA=?	OK	Support this function

Table 69 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 buffer 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 70 AT+CMSS operation command

Type	Command	Possible return results	Description
Set Command	AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr>[,<scts>]	Text mode (+CMGF=1) Successful sending
		OK	
		ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed sending
		+CMSS: <mr>[,<ackpdu>]	PDU mode (+CMGF=0) Successful sending

		OK	
		ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Failed sending
Test Command	AT+CMSS=?	OK	-
Command Example	AT+CMSS=1	+CMSS: 122	Send the stored short message 1. The number of receiver is
		OK	13761928888.
	AT+CMSS=1,"13761928888"	+CMSS: 123	Send the stored short message 1 and change the receiving number as
		OK	13761928888.
	AT+CMSS=?	OK	—

Table 71 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 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 72 AT+CMGC operation command

Type	Command	Possible return results	Description
Set Command	AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR>	+CMGC: <mr>[,<scts>] OK	Text mode (+CMGF=1) Successful sending

	text is entered <ctrl-Z/ESC>	ERROR/+CMS ERROR: <err>	Text mode (+CMGF=1) Failed sending
	AT+CMGC=<length> < CR>PDU is given <ctrl-Z/ESC>	+CMGC: <mr>[,<ackpdu>] OK ERROR/+CMS ERROR: <err>	PDU mode (+CMGF=0) Successful sending PDU mode (+CMGF=0) Failed sending
Test Command	AT+CMGC=?	OK	-
Command Example	AT+CMGF=0 AT+CSCS="IRA" AT+CSMP=,,0,0 AT+CNMI=2,1 AT+CMGC=25 >0011000D916831067 184 81F70008000A004800 650 06C006C006F <ctrl-Z/ESC> AT+CMGC=?	+CMGC: 124 OK	Send a PDU short message. The received number and the sending content shall be sent after conversion by PDU coding tool, and there shall be no carriage return at the end of data.

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

Table 73 AT+CMGC parameter description

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

<pid>	-	Integer GSM 03.40 TP-Protocol-Identifier (default value: 0)
<da>	-	"Address—value" field in GSM 03.40 GSM 03.40 TP-Destination-Address; convert BCD value (or default GSM letter format character) into the character in currently selected TE character set (please refer to +CSCS command in TS 07.07); address type given by <toda>
<scts>	-	Use "time--character string" GSM 03.40 TP-Service-Centre-Time-Stamp (please refer to<dt>

5 Call control

5.1 ATD[<dial_string>][;] Mobile Station Main Calling

Command

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

Table 74 ATD operation command

Type	Command	Possible return results	Description	Remark
Executive 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 to a non-voice call succeeds, the TA switches to the data state. Note: <text> is returned only when the ATX parameter is set to greater than 0.	
Command Example	ATD10086;	OK	If the connection is successful and the call is a voice call, OK is returned..	
		ATD10086;		
		OK	-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.	
		+CLCC: 1,0,2,0,0,"10086",129,"", 0,0	Other cases are same with this.	
		+CLCC: 1,0,3,0,0,"10086",129,"", 0,0		

Table 75 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 76 ATD><str>[I][G] operation command

Type	Command	Possible return results	Description
Executive Command	ATD><str>[I][G];[;]	ERROR/+CME ERROR: <err>	Error relates to ME function
		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 +CLCC: 1,0,2,0,0,"10086",129,"", 0,0	Find the user in telephone directory and the current number is successfully dialed.

SIGNALIND:1

+NWTPEIND:34

SIGNALIND:5

^MODE: 3, 3

ERROR

This user is not found in the
telephone directory.**Table 77** 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 = 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 78 ATA operation command

Type	Command	Possible return results	Description
Executive 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
		ERROR/+CME ERROR:<err>
		Return this error in on-line command mode
		OK
Command Example	RING ATA	CONNECT +CLCC:1,0,0,0,"+8613761928888", 129,"",
		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 79 AT+CHUP operation command

Type	Command	Possible return results	Description
Executive 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	Successful hanging up
		+CALLDISCONNECT: 0	

AT+CHUP is only used to hang up voice calls.

5.5 AT+CLIP Caller Identification Display Command

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

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

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

Table 80 AT+CLIP operation command

Type	Command	Possible return results	Description
Executive Command	AT+CLIP=<n>	OK	-
		+CLIP: <n>,<m>	
Query Command	AT+CLIP?	OK	-
		ERROR/+CME ERROR: <err>	
Test Command	AT+CLIP=?	+CLIP: (<n> value list)	-
		OK	
Command Example	AT+CLIP =1	OK	
		+CLIP: 0,1 OK RING	NO caller ID
	AT+CLIP?	+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 81 AT+CLIP parameter description

Parameter	Value	Description
<n> Display state of result code set or displayed in TA	[0]	Disable
	1	Enable

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

5.6 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 82 AT+CCFC operation command

Type	Command	Possible return results	Description
Set Command	AT+CCFC= <reason>,<mode>,<number> [,<type>,<class>,<subaddr> [,<satype>,<time>]]]]]	OK	-
		+CCFC:<status>,<class1>,<number>,<type>[,<subaddr>,<satype>[,<time>]]][<CR><LF> +CCFC:<status>,<class2>,<number>,<type>[,<subaddr>,<satype>[,<time>]]][...]	<mode>=2 and the command successfully executes. If <mode>=2, <reason> cannot be 4 or 5
		OK	
		ERROR/+CME ERROR: <err>	Fail

Test Command	AT+CCFC=?	+CCFC: (<reason> value list)	-
		OK	
	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.
Command Example	AT+CCFC=0,4	OK	Delete the unconditional forwarding setting
	AT+CCFC=0,2	+CCFC: 0,7 OK	Query again, indicating that the deletion is successful
	AT+CCFC=?	+CCFC: (0,1,2,3,4,5) OK	-

Table 83 AT+CCFC parameter description

Parameter	Value	Description
<reason>	0	Unconditional
	1	Busy
	2	No response
	3	Not accessible
	4	All call forwarding (please refer to GSM 02.30 [19])
	5	All condition call forwarding (please refer to GSM 02.30 [19])
<mode>	0	Disable
	1	Enable
	2	State query
	3	Registration
	4	Deletion

<number>	-	Character; telephone number of call forwarding address; its format shall meet the regulation of <type>
<type>	-	Integer 8-digit byte address type (please refer to section 10.5.4.7 in GSM 04.08 [8]); when the dialing character string includes international access code character "+", the default value is 145; in other situations, the default value is 129
<subaddr>	-	Character; format of character sub-address specified by <satype>
<satype>	-	Integer 8-digit byte sub-address type (please refer to section 10.5.4.8 in GSM 04.08 [8]); default value: 128
<classx> Business type	1	Voice (telephone business)
	2	Data (refer to all bearing business; in case of <mode>=2, if TA doesn't support 16, 32,64 and 128, this parameter only represents some bearing businesses)
	4	Fax
	7	Default
	8	Short message
	16	Synchronous data circuit
	32	Asynchronous data circuit
	64	Special packet access
<time>	128	Special PAD access
	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

5.7 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 84 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			Start the call waiting
	AT+CCWA=1,1	OK	Establish communication with 10086
	ATD10086;	+CCWA: "13601748187",128,1	
			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 85 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

5.8 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 86 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 +CLCC: 1,0,1,0,0,"13601748187",129 +CLCC: 2,1,0,0,0,"13601748187",128,"TEST"	The user 13601748187 calls Hold the first channel and connect the second channel
	AT+CLCC		At this time, CLCC displays 2-way call
	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 87 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)

5.9 ATH Hanging up Control Command

This command is only used to hanging up the PPP dial.

Table 88 ATH operation command

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

Table 89 ATH parameter description

Parameter	Value	Description
<n>	0	Terminate the communication

5.10 Call Process Status Report Command: +CLCC

When the device is on a call, the device will report the command in +CLCC format.

Table 90 +CLCC Report Command

Type	Command	Possible return results	Description
Report Command	+CLCC:	+CLCC:<id>,<idr>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]]	
Test command	AT+CLCC=?	+CLCC: OK	
Command Example	ATD10086;	ATD10086; OK +CLCC: 1,0,2,0,0,"10086",129,"",0,0	

Table 91 + CLCC Parameter Description

parameter	Description
<id>	Link ID, value [0-17]
<idr>	Call direction, 0 initiated calls, 1 incoming calls
<stat>	Value [0-6], 0 is active, 1 is held, 2 is dialing (MO Call), 3 is alerting (MO Call), 4 is incoming(MT Call), 5 is waiting(MT Call), 6 is offering(MT Call)
<mode>	Value [0-9], 0 is voice, 1 is data, 2 is fax, 3 is voice followed by data, voice mode, 4 is alternating voice/data, voice mode, 5 is alternating voice/fax, voice mode, 6 is voice followed by data, data mode, 7 is alternating voice/data, data mode, 8 is alternating voice/fax, fax mode, 9 is unknow
<mpty>	Value [0,1], 0 is call, is not one of multiparty (conference) call parties, 1 is call, is one of multiparty (conference) call parties
<number>	for the number
<type>	type of address octet in integer format (refer TS 24.008 subclause 10.5.4.7) 129 Dialing string without international access code "+" 145 Dialing string includes international access code character "+"
<alpha>	string type alphanumeric representation of corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS

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 92 AT+VTS operation command

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

Table 93 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>	The tone interval within 1/10 second. The value ranges from 0 to 1000 in ims and from 300 to 600 in non-ims

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 94 AT+VTD operation command

Type	Command	Possible return results	Description
Set Command	AT+VTD=<duration>	OK	
		ERROR/+CME ERROR:<err>	
Test Command	AT+VTD=?	+VTD: <duration> OK	
Command Example	AT+VTD=?	+VTD: (300-600) OK	

Table 95 AT+VTD parameter description

Parameter	Description
<duration>	Unit of duration tone: 1/1000s. Range: 300-600; default value: 300ms. If the duration is shorter than the minimum duration specified by the network, the actual duration time is the time specified by the network.

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 96 AT+CLCK operation command

Type	Command	Possible return results	Description
Executive 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"	+CLCK: 1	Enable SIM card PIN code locking
		OK	
	AT+CLCK="SC",0,"1234"	+CLCK: 0	Disable SIM card PIN code locking
		OK	
	AT+CLCK=?	+CLCK: ("PS", "SC", "AO", "OI", "OX", "AI", "IR", "AB", "AG", "AC", "FD", "PN", "PU", "PP", "PC") OK	

Table 97 AT+CLCK parameter description

Parameter	Value	Description
	"AO"	Disable all outgoing calls

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

64	Special packet access
128	Special PAD access

7.2 AT+CPWD Password Modification AT Command

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

Table 98 AT+CPWD operation command

Type	Command	Possible return results	Description
Executive Command	AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK	Success
		ERROR/+CME ERROR: <err>	Fail
Test Command	AT+CPWD=?	+CPWD: (<fac>,<pwdlength>) value list	Success
		OK	
		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: ("PS",16),("SC",16),("AO",16),("OI",16),("OX",16),("AI",16),("IR",16),("AB",16),("AG",16),("AC",16),("FD",16),("PN",16),("PU",16),("PP",16),("PC",16),("ZM",16),("P2",16)	-
		OK	

Table 99 AT+CPWD parameter description

Parameter	Value	Description
<fac> Value currently adopted in this manual	"AO"	Disable all outgoing calls
	"OI"	Disable all international outgoing calls
	"OX"	Disable all international outgoing calls, except for the home country
	"AI"	Disable all incoming calls

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

7.3 AT^CPIN Extended PIN Management AT Command

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

Table 100 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_t imes>,<pin_times>,<puk2_tim es>,<pin2_times>	-
		ERROR/+CME ERROR: <err>	-

Test Command	AT^CPIN=?	OK	-
	AT^CPIN="1234"	OK	Input the PIN code
		^CPIN: READY,3,10,3,10,3	NOTE: PIN code is canceled No need of PIN code
		OK	
		^CPIN: SIM PIN,3,10,3,10,3	Input the PIN code
Command Example	AT^CPIN?	OK	
		^CPIN: SIM PUK,10,10,0,10,3	NOTE: the query is locked by PUK PIN code is locked. PUK code is required
		OK	
	AT^CPIN=?	OK	This version support this command

Table 101 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)
	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
<code>	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 102 AT+CPIN operation command

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

AT+CPIN=?

OK

This version supports this command.

Table 103 AT+CPIN parameter description

Parameter	Value	Description
<pin>	-	Original password (character), such as: PIN code or locking/unlocking password of SIM card, such as: SIM-PUK or PH-SIM PUK
<new pin>	-	New password (character type)
<code>	READY	ME needs no password
	SIM PIN	ME is waiting for providing the PIN code of SIM card
	SIM PUK	ME is waiting for providing the PUK code of SIM card
	PH-SIM PIN	ME is waiting for providing the password from phone to SIM card
	PH-FSIM PIN	ME is waiting for providing the phone-first SIM card password
	PH-FSIM PUK	ME is waiting for providing the phone-first SIM card locking/unlocking password
	SIM PIN2	ME is waiting for providing SIM PIN2 (it is recommended that <code> only carries out authentication failure of PIN2 in using this command last time (such as: +CME ERROR: 17); after authentication failure, if wrong PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
	SIM PUK2	ME is waiting for providing SIM PUK2 (it is recommended that <code> only carries out authentication failure of PUK2 in using this command last time (such as: +CME ERROR: 18); after authentication failure, if wrong PUK2 or new PIN2 is inputted again, it is recommended that ME doesn't lock this operation)
	PH-NET PIN	ME is waiting for providing network personalization password
	PH-NET PUK	ME is waiting for providing network personalization locking/unlocking password
	PH-NETSUB PIN	ME is waiting for providing network sub-set personalization password
	PH-NETSUB PUK	The network is waiting for providing network personalization locking/unlocking password
	PH-SP PIN	ME is waiting for service supplier personalization password
	PH-SP PUK	ME is waiting for service supplier personalization locking/unlocking

PH-CORP PIN	ME is waiting for corporation personalization password
PH-CORP PUK	ME is in waiting

7.5 AT+CRSM SIM Card Access Limitation AT Command

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

Table 104 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,""	242 is the command code of SIM card state query (refer to GSM 11.11)
		OK	
	AT+CRSM=?	(176,178,192,214,220,242),(120-37-28599),(0-255),(0-255),(0-255),<data>,<pathid>	-
		OK	

Table 105 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 106 AT+CNUM operation command

Type	Command	Possible return results	Description
Executive Command	AT+CNUM	+CNUM:[<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF>]	Success
		+CNUM:[<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] OK	
		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 107 AT+CNUM parameter description

Parameter	Value	Description
<alphax>	-	Related to <numberx>, optional, letter and figure mixing character string. The character set shall be that selected by "TE character set selection" command +CSCS.
<numberx>	-	Character phone number specified by <typex>
<typex>	-	Integer 8-digit byte address type (please refer to section 10.5.4.7 in GSM 04.08 [8])
<speed>	-	Please refer to AT+CBST
<service> Phone number related business	0	Asynchronous Modem
	1	Synchronous Modem
	2	PAD access (asynchronous)
	3	Packet access (synchronous)
	4	Voice
<itc> Information transmission capability	5	Fax
	0	3.1kHz
	1	UDI

7.7 AT^CARDMODE SIM or USIM Card Query Mode

Table 108 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 109 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 110 AT+ CIMI operation command

Type	Command	Possible return results	Description
Executive Command	AT+CIMI	<IMSI>	<IMSI> queried IMSI number
		OK	
		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.
		460110585049401	Return to current IMSI number
Command Example	AT+CIMI	OK	
	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 111 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 112 AT^SIMST operation command

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

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

Table 113 AT^SIMST parameter description

Parameter	Value	Description
<n>	0-1	0: Disable
		1: Enable (default)
<simstatus>	Integer type, sim card status	
	0	SIM card status is invalid
	1	SIM card status is valid
	2	CS INVALID
	3	PS INVALID
	4	PS CS INVALID
	255	SIM card does not exist
<sim_lock>	0	disable
	1	enable

7.11 SMS Memory Full Active Reporting Function

^SMMEMFULL

Table 114 AT^SMMEMFULL operation command

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

Table 115 AT^SMMEMFULL parameter description

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

8 Network service

8.1 AT+CREG Network Registration Information Command

The set command mainly controls +CREG active report event.

If $\langle n \rangle = 1$, when the network registration state changes, report +CREG: $\langle \text{stat} \rangle$.

If $\langle n \rangle = 2$, when the cell information changes, report +CREG: $\langle \text{stat} \rangle, \langle \text{lac} \rangle, \langle \text{ci} \rangle$.

The read command returns current registration status $\langle \text{stat} \rangle$, and the position information $\langle \text{lac} \rangle$. $\langle \text{ci} \rangle$ is only reported only in case of $\langle n \rangle = 2$.

In CDMA mode:

If $\langle n \rangle = 2$, $\langle \text{lac} \rangle$ and $\langle \text{ci} \rangle$ return values are CDMA $\langle \text{sid} \rangle, \langle \text{nid_bid} \rangle$:

+CREG: $\langle n \rangle, \langle \text{stat} \rangle, [\langle \text{sid} \rangle], [\langle \text{nid_bid} \rangle], [\langle \text{AcT} \rangle]$

Note: there is no underline between nid and bid.

Table 116 AT+CREG operation command

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

	OK	non-requested result code + CREG: <stat>"
AT+CREG=?	+CREG:(0-3)	-
	OK	

Table 117 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
	11	Attached to access RLO, when <act> indicates E-UTRAN</act>
<lac>	-	Position area number
<ci>	-	Cell ID, four-byte hexadecimal GERAN/UTRAN/E-UTRAN network ID
<AcT>		Data access technology of service network
	0	GSM
	1	GSM Compact

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

8.2 AT+CGREG GPRS Network Registration Status

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

Table 118 AT+CGREG operation command

Type	Command	Possible return results	Description
Set Command	AT+CGREG=[<n>]	OK	-
		ERROR/+CME ERROR: <err>	Fail
Query Command	AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>],[<AcT>],[<rac>],[<cause_type>,<reject_cause>]]	-
Test Command	AT+CGREG=?	OK	-
		+CGREG:(<n> value list)	-
Command Example	AT+CGREG=1	OK	-
	AT+CGREG?	+CGREG: 1,1	-

	OK	
	+CGREG: (0-2)	
AT+CGREG=?		-
	OK	

Table 119 AT+CGREG parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unrequested result code +CGREG:
	1	Enable the network registration non-request result code
	2	Enable the network registration and location information non-request result code +CGREG: <stat>[,<lac>,<ci>]
<stat>	0	Not registered; ME doesn't search the new operator of registration business
	1	Registered, local network
	2	Not registered, but ME is searching the new operators for registered services
	3	Registration rejected
	4	Unknown
	5	Registered, roaming
<lac>	-	Character; 2-byte hexadecimal position area code (for example, 00C3 is equivalent to 195 in decimal)
<ci>	-	Character; 4-byte hexadecimal cell number
[<AcT>]	0	GSM
	1	GSM Compact
	2	UTRAN
	3	GSM w/EGPRS
	4	UTRAN w/HSDPA
	5	UTRAN w/HSUPA
	6	UTRAN w/HSDPA and HSUPA
	7	EUTRAN
	8	AUTO
	9	MAX (Invalid value)

<cause_type>	0	Show the cause value of <reject_cause> containing one MM. Refer to appendix G in 3GPP TS24.008[8].
	1	Show the special cause of <reject_cause> containing the manufacturer
<reject_cause>		Integer; include the cause of registration rejection. This type is defined by <cause_type>.

8.3 AT+CEREG LTE Network Registration State Command

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

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

Table 120 AT+CEREG operation command

Type	Command	Possible return results	Description
Executive 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	-
	AT+CEREG=1	OK	-
Command Example	AT+CEREG?	+CEREG: 2,1,"91D5","90C3301",7	-
		OK	-
		+CEREG: 1,1	-
	AT+CEREG=?	OK	-
		+CEREG: (0-3)	-
		OK	-

Table 121 AT+CEREG operation command parameter description

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

8.4 AT+HCSQ Signal Strength Query and Report Command

This command queries and reports the signal strength of current service network. If MT is registered in multiple networks in different service modes, query the signal strength of network in different modes. No matter whether MT is registered in network, this command can query this signal strength or allow MT active report.

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

Table 122 AT^HCSQ operation command

Type	Command	Possible return results	Description
Set Command	AT^HCSQ=<n>,<m>	OK	-
		ERROR	Fail
Query Command	AT^HCSQ?	^HCSQ: <n><m><sysmode>[,<value1>[,<value2>[,<value3>[,<value4>]]]]	-
		OK	
Test Command	AT^HCSQ=?	^HCSQ: (<n> value list,<m> value list)	-
		OK	
Command Example	AT^HCSQ?	^HCSQ: 2,0,"LTE",63,20,68,151	-
		OK	
	AT^HCSQ=2	OK	Enable the active report (report if the signal quality change is higher than 2dB)
		^HCSQ: 2,0,"LTE",63,32,68,171	
	AT^HCSQ?	OK	

Example

Table 123 AT^HCSQ active report operation command

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

Parameter

Table 124 AT^HCSQ parameter description

Parameter	Value	Description
<n>	0,2	0: no active report of extended signal quality, if <n> is 0, <m> parameter is invalid, <n> is 0 by default. 2: when the signal quality change is higher than 2dB, actively report the extended signal quality. If the mode switches, only staying in the cell, the active report is enabled.
<m>	0~20	0: no time limit for reporting the extended signal quality; 1~20: minimum interval of two signal quality reports, unit: S Optional parameter, 0 by default.
<sysmode>	"NOSERVICE"	NOSERVICE mode
	"GSM"	GSM/GRPS/EDGE mode
	"WCDMA"	WCDMA/HSDPA/HSPA mode
	"LTE"	LTE mode

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

Table 125 AT^HCSQ parameter description

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

Defined values

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

0	rssi < -110 dBm		
1	-110 dBm	rssi < -109 dBm	
2	-109 dBm	rssi < -108 dBm	
:	:	:	:
61	-50 dBm	rssi < -49 dBm	

62	-49 dBm	rssl < -48 dBm
63	-48 dBm	rssl
99	not known or not detectable	

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

0...7 as RXQUAL values in the table in 3GPP TS 45.008 [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/lo < -24 dB	
1	-24 dB	Ec/lo < -23.5 dB
2	-23.5 dB	Ec/lo < -23 dB
:	:	:
47	-1 dB	Ec/lo < -0.5 dB
48	-0.5 dB	Ec/lo < 0 dB
49	0 dB	Ec/lo

255 not known or not detectable

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

0	rsrq < -19.5 dB
1	-19.5 dB rsrq < -19 dB
2	-19 dB rsrq < -18.5 dB
:	: : :
32	-4 dB rsrq < -3.5 dB
33	-3.5 dB rsrq < -3 dB
34	-3 dB rsrq

255 not known or not detectable

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

0	rsrp < -140 dBm
1	-140 dBm rsrp < -139 dBm
2	-139 dBm rsrp < -138 dBm
:	: : :
95	-46 dBm rsrp < -45 dBm
96	-45 dBm rsrp < -44 dBm
97	-44 dBm rsrp

255 not known or not detectable

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

0	snr < -20 dBm
1	-20 dBm snr< -19.8 dB
2	-19.8 dBm snr< -19.6 dB
:	: : :

249	29.6 dB	snr< 29.8 dB
250	29.8 dBm	rsrp < 30 dB
251	30 dB	snr
255	not known or not detectable	

8.5 AT+COPS Operator Selection Command

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

Table 126 AT+COPS operation command

Type	Command	Possible return results	Description
Executive Command	AT+COPS=[<mode>[,<format>[,<oper>[,<AcT>]]]]	OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME function
Query Command	AT+COPS?	+COPS: <mode>[,<format>,<oper>[,<AcT>]]	-
		OK	
		ERROR/+CME ERROR:<err>	Error relates to ME function
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?	+COPS: 0,0,"CHINA MOBILE CMCC",7	Use long characters to indicate the current network operator

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

Table 127 AT+COPS parameter description

Parameter	Value	Description
<mode>	[0]	Automatic (<oper> field can be neglected)
	1	Manual (<oper> field can be neglected)
	2	Log off from registration network
	3	Only set <format>(for query command +COPS?); not try to register or log off(<oper> field can be neglected); this value is not applicable to return result of query command.
	4	Manual/automatic(<oper> field cannot be neglected); if the manual selection is in failure, enter the automatic selection mode (<mode>=0)
<format>	[0]	Long character (adopt the letter and figure format), maximum 16 characters
	1	Short character (adopt the letter and figure format), maximum 8 characters
	2	Figure <oper>
<oper>	-	Character; <format> represents letter and figure mixing type or figure type of this character string; the figure type represents GSM position area identifier number (please refer to section 10.5.1.3 in GSM 04.08 [8]). This number includes one 3-digit BCD national code (meet the ITU-T E.212 Annex A [10] standard) and one 2-digit BCD network code. The latter one is related to management.

<stat>	0	Unknown
	1	Available
	2	Current
	3	Disable
<Act>	0	GSM
	1	GSM compact
	2	UTRAN
	3	GSM w/EGPRS (see NOTE1)
	4	UTRAN w/HSDPA (see NOTE2)
	5	UTRAN w/HSUPA (see NOTE2)
	6	UTRAN w/HSDPA and HSUPA (see NOTE2)
	7	E-UTRAN
	8	EC-GSM-IoT (A/Gb mode) (see NOTE 3) Note: 3GPP TS 44.018[156] specifies EC-SCH INFORMATION message, if this message exists, it represents that the service cell supports EC-GSM-IoT.
	9	E-UTRAN (NB-S1 mode) (see NOTE 4) Note: 3GPP TS 36.331[86] specifies the system information block, provides the information that whether the service cell supports NB-IoT, corresponding to E-UTRAN (NB-S1 mode).

8.6 AT+CSQ Signal Quality AT Command

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

Table 128 AT+CSQ operation command

Type	Command	Possible return results	Description
Executive Command	AT+CSQ	+CSQ: <rss>,<ber>	-
		OK	-
		ERROR/+CME ERROR:<err>	Error relates to ME functionality
Test Command	AT+CSQ=?	+CSQ: (<rss> value list),(<ber> value list)	-
		OK	-

Command Example	AT+CSQ	+CSQ: 27,59	-
		OK	
		+CSQ: (0-31,99),(0-7,99)	
		OK	
	AT+CSQ=?	TDSCDMA returns are different with others: +CSQ: (100-191,199),(0-7,99)	-
	OK		

Table 129 AT+CSQ parameter description

Parameter	Value	Description
<rss>	0	$\leq -113\text{dBm}$
	1	-111dBm
	2~30	$-109 \sim -53\text{dBm}$
	31	$\geq -51\text{dBm}$
	99	Unknown or unpredictable
<ber>	0	BER < 0,2 %
	1	0,2 % < BER < 0,4 %
	2	0,4 % < BER < 0,8 %
	3	0,8 % < BER < 1,6 %
	4	1,6 % < BER < 3,2 %
	5	3,2 % < BER < 6,4 %
	6	6,4 % < BER < 12,8 %
	7	12,8 % < BER
	99	Unknown or unpredictable

8.7 ^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 130 AT^MODE operation command

Type	Command	Possible return results	Description
Executive 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 131 ^MODE active report operation command

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

Table 132 AT^MODE parameter description

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

Table 133 ^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+
9	LTE mode	51	DC HSUPA
		71	FDD LTE
11	TDS mode	72	TDD LTE
		61	TD-SCDMA

8.8 AT^CELLINFO Cell Information Query Command

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

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

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

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

Table 134 AT^CELLINFO operation command

Type	Command	Possible return results	Description
		OK	-

Set Command	AT^CELLINFO=<MODE>	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>,<rsqi>,<rsrp>,<rsrq>,<sinr>,<snr>,<ue_category>,<pathloss>,<cqi>,<tx_power>,<tm>,<qci>,<volte>,<ims_sms>,<sib2_plmn_r15_info_present>,<sib2_upr_layer_ind>,<restrict_dcnr><CR><LF><CR><LF>OK<CR><LF> WCDMA mode: <CR><LF>^CELLINFO:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<psc>,<NodeB>,<cell_id>,<lac_id>,<band>,<dl_channel>,<ul_channel>,<rsqi>,<ecio>,<scir>,<rscp><CR><LF><CR><LF>OK<CR><LF> GSM mode (The current version does not support) <CR><LF>^CELLINFO:<curr_mode>,<mcc>,<mnc>,<global_cell_id>,<lac_id>,<channel>,<band>,<rsqi>,<bsic><CR><LF><CR><LF>OK<CR><LF>	The same to +sgcellinfoex function
Command Example	AT^CELLINFO=2	LTE mode: ^CELLINFO: "intra","LTE",<earfcn>,<pcid>,<rsrq>,<rsrp>,<rsqi>,<sinr>,<idle_mode>,<srxlev>,<squal>,<rank>,<cell_resele_priority>,<s_non_intra_search>,<threshold_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>,<rsqi>,<sinr>,<idle_mode>,<srxlev>,<squal>,<rank>,<cell_resele_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_resele_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_reselect_priority>,<thresh_gsm_high>,<thresh_gsm_low>,<ncc_permitted>...

...

OK

WCDMA mode:

^CELLINFO:

"intra","WCDMA",<uarfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<rxagc>,<psc>,<rsrp>,<ecio>,<set>,<rank>

...

"inter","WCDMA",<uarfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<rxagc>,<psc>,<rsrp>,<ecio>,<set>,<rank>

...

"irat","LTE",<earfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<priority>,<pcid>,<rsrp>,<rsrq>,<s_rxlev>

...

"irat","GSM",<arfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<bsic>,<rssi>,<rank>,<s_rxlev>

...

OK

GSM mode:

^CELLINFO:

"intra","GSM",<arfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<bsic>,<rssi>,<rank>,<s_rxlev>,<mcc>,<mnc>,<lac>,<cellid>,<c1>,<c2>,<c31>,<c32>

...

"inter","GSM",<arfcn>,<s_intra_search>,<s_inter_search>,<s_search_RAT>,<bsic>,<rssi>,<rank>,<s_rxlev>,<mcc>,<mnc>,<lac>,<cellid>,<c1>,<c2>,<c31>,<c32>

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>,<scid_id>,<freq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>,<rssi>,<sinr> ^CELLINFO: "SCC",<ul_configured>,<scell_state>,<scid_id>,<freq>,<dl_bandwidth>,<band>,<pci>,<rsrq>,<rsrp>,<rssi>,<sinr> Current net not support CA: +CME ERROR: service option not supported Not configure CA: +CME ERROR: Ca service deconfigured No service: +CME ERROR: no network service
Command Example	AT^CELLINFO=4	^CELLINFO: "curr_mode","tx_info",<tx_is_in_traffic>,<tx_power>,<prach>,<pucch>,<pusch>,<srs>,<pa_gain_state> ^CELLINFO: "curr_mode","chain_1",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","chain_2",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","chain_3",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","chain_4",<is radio_tuned>,<rx_power>,<ecio>,<rsrp/rscp>,<sinr>,<phase> ^CELLINFO: "curr_mode","layer_1",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_2",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_3",<uplink>,<downlink> ^CELLINFO: "curr_mode","layer_4",<uplink>,<downlink>

Table 135 AT^CELLINFO parameter description

Parameter	Description
<MODE>	Command mode. 1: Service cell information 2: Neighbour cell information 3: CA cell information
<earfcn>	LTE frequency point information
<pcid>	LTE physical cell id
<rsrq>	LTE Reference Signal Receiving Quality
<rsrp>	LTE Reference Signal Receiving Power
<rssi>	Signal strength
<sinr>	The ratio of signal to interference plus noise cannot be obtained in the neighboring area, and "-" is displayed.
<idle_mode>	Judge whether it is idle mode. If it is idle mode, the following parameters are invalid except for <last_idle_search_timestamp> and <last_idle_meas_timestamp>.
<srxlev>	Suitable receive level
<squal>	Suitable receive quality
<rank>	Rank of the cell
<cell_resel_priority>	Cell reselection priority
<s_non_intra_search>	Different system measurement threshold
<thresh_serving_low>	Different system measurement threshold
<thresh_serving_low>	Service cell reselection threshold
<threshX_low>	Low threshold of target cell
<threshX_high>	High threshold of target cell
<s_intra_search>	Same frequency cell reselection threshold
<Q_rxlevmin>	The minimum received power of the camping cell
<Q_qualmin>	Minimum reception quality of the camped cell
<last_idle_search_timestamp>	Last idle mode search time
<last_idle_meas_timestamp>	Last idle mode measurement time
<uarfcn>	WCDMA uarfcn information
<psc>	WCDMA Primary scrambling code
<rsrp>	WCDMA signal coverage strength

<ecno>	Received power
<s_inter_search>	Inter-frequency frequency threshold
<s_search_RAT>	Different system frequency threshold
<rxagc>	Receiver automatic gain control on the interfrequency neighbor
<ecio>	Signal quality
<arfcn>	GSM frequency
<band_1900>	Is it 1900 band
<cell_id_valid>	Is <bsic_id> valid
<bsic_id>	Base station identity code ID
<set>	Interfrequency cell type
<thresh_gsm_high>	GSM high receiving threshold
<thresh_gsm_low>	GSM low receiving threshold
<ncc_permitted>	GSM NCC allowed
<bsic>	Base station identification code
<s_rxlev>	GSM cell suitable receive level
ul_configured	Indicated whether UL CA is enabled on this cell or not.
scell_state	State of the secondary cell. 0 - Deconfigured, 1 - Configured and deactivated, 2 - Configured and activated
scc_id	SCC ID of the secondary cell for LTE.
lte_bandwidth	LTE bandwidth, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
dl_bandwidth	LTE bandwidth in CA mode, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, ATresult 100 is 20MHz
curr_mode	Current network mode
tx_is_in_traffic	Whether the device is in communication 1: The device is in communication 0: When the device is not in communication, tx_power is invalid
tx_power	Transmit power. It is the maximum of all UL channel TX power. The tx_power value is only meaningful when the device is in traffic. Company: 1/10 dBm
prach	Physical Random Access Channel Tx power. The prach value is only meaningful when the device is in traffic. Company: 1/10 dBm

pucch	Physical Uplink Control Channel Tx power.The pucch value is only meaningful when the device is in traffic. Company: 1/10 dBm
pusch	Physical Uplink Shared Channel Tx power.The pusch value is only meaningful when the device is in traffic. Company: 1/10 dBm
srs	Sounding Reference Signal Tx power.The valid value of this parameter cannot be obtained at present (- 32768 is an invalid value)
pa_gain_state	Power amplifier gain state
is radio_tuned	Whether the Rx is tuned to a channel. 0. The radio is not tuned, delayed or invalid values are set depending on each technology 1. The radio is tuned, instantaneous values are set for the signal information fields.
rx_power	Received power. The rx_power value is only meaningful when the device is in traffic. Company: 1/10 dBm
phase	Current phase in degrees. Range: 0.00 to 360.00.
uplink	Uplink modulation
downlink	Downlink modulation
SIB2_PLMN_R15_INFO_PRESEN	Currently registered PLMN supports EN-DC mode (0: not supported, 1: supported)
SIB2_UPR_LAYER_IND	The current cell supports EN-DC mode (0: not supported, 1: supported)
RESTRICT_DCNR	Indicates whether to restrict the addition of NR, 0-no restriction; 1-restriction
MCC	Plastic. Mobile device country code
MNC	Plastic. Mobile device network code
lake	Character: 2-byte hexadecimal location area code (e.g., 00C3 is equivalent to 195 in decimal system)
Cellid	Character type; 2-byte hexadecimal cell number
C1	Integer. The reference standard when selecting a cell
C2	Integer. Reference criteria for community re-election
C31	Integer. GPRS Signal Level Threshold Standard
C32	Integer. Standard parameters for cell queuing. Used to select cells among cells of the same priority

8.9 AT+SGCELLINFOEX Cell Information Extended Query Command

Table 136 AT+SGCELLINFOEX operation command

Type	Command	Possible return results	Description
Executive Command	AT+SGCELLINFOEX?	4G: at+sgcellinfoex +SGCELLINFOEX: CURR_MODE: LTE DUPLEX MODE: TDD LTE MCC:460 MNC:00 GLOBALCELL 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: 0: - TX_POWER: 3 TM: 1 QCI: 9 VOLTE: 1 IMS_SMS: 1	
		OK	
Executive Command	AT+SGCELLINFOEX	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

4G:
<CR><LF>+SGCELLINFOEX:<curr_mode>,<duplex_m
ode>,<mcc>,<mnc>,<global_cell_id>,<physical_cell_id
>,<eNBID>,<cell_id>,<tac_id>,<band>,<lte_bandwidth
>,<dl_channel>,<ul_channel>,<rssi>,<rsrp>,<rsrq>,<si
nr>,<snr>,<ue_category>,<pathloss>,<cqi>,<tx_powe
r>,<tm>,<qci>,<volte>,<ims_sms>,<sib2_plmn_r15_inf
o_present>,<sib2_upr_layer_ind>,<restrict_dcnr><CR>
<LF><CR><LF>OK<CR><LF>

Example:

at+sgcellinfoex
+SGCELLINFOEX: LTE,FDD
LTE,460,11,38848275,141,151751,19,9537,5,25,2452
,20452,-71,-99,-15,93,-1,16,255,-,-,3,-,1,-,0,0,0

OK

Executive AT+SGCELLI
Command NFOEX

WCDMA mode:

<CR><LF>+SGCELLINFOEX:<curr_mode>,<mcc>,<mn
c>,<global_cell_id>,<psc>,<NodeB>,<cell_id>,<lac_id>
,<band>,<dl_channel>,<ul_channel>,<rssi>,<ecio>,<sir
>,<rscp><CR><LF><CR><LF>OK<CR><LF>

Example:

at+sgcellinfoex
+SGCELLINFOEX:
WCDMA,460,01,203244337,483,3101,17201,47901,1
,10663,9713,-53,-3,255,-55

OK

GSM mode (current version not support)

<CR><LF>+SGCELLINFOEX:<curr_mode>,<mcc>,<mn
c>,<global_cell_id>,<lac_id>,<channel>,<band>,<rssi>
,<bsic><CR><LF><CR><LF>OK<CR><LF>

Test Command	AT+SGCELLINFOEX=?	OK	Success
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Table 137 AT+SGCELLINFOEX parameter description

Parameter	Value	Description
CURR_MODE	-	System format: No service: "NO SERVICE" GSM service: "GSM" CDMA service: "CDMA" WCDMA service: "WCDMA" TD-SCDMA service: "TD-SCDMA" LTE service: "LTE" EVDO service: "EVDO" 1xEVDO service: "HYBRID" 1xLTE service: "1XLTE"
DUPLEX MODE	FDD LTE or TDD LTE	LTE duplex mode
MCC	-	Mobile Country Code, composed of 3 digits, unique way to identify the country of mobile user, (China: 460) ;
MNC	-	Mobile network number (such as: CMCC: 00; China Unicom: 01)
GLOBAL CELL ID	Decimal value	GCI value in LTE mode
eNBID	Decimal value	Base station identifier (eNodeB-ID)
CELL_ID	Decimal value	Cell ID
PHYSICAL_CELL_ID	Decimal value	LTE physical cell ID
TAC_ID	Decimal value	Track Area Code, position area code
BAND	-	Frequency band
LTE_BANDWIDTH	-	LTE bandwidth, the AT result value is 5 times of the real bandwidth. For example: AT result 6 is 1.4MHz, AT result 100 is 20MHz
BANDWIDTH	-	LTE registration bandwidth
DL CHANNEL	-	Downlink channel
UL CHANNEL:	-	Uplink channel
RSSI	- 120.0dBm~0dBm	Received signal strength
RSRP	-44dBm~-140dBm	LTE reference signal receiving power

RSRQ	-20.0dB~-3.0dB	LTE reference signal receiving quality
SINR	-	Signal to interference plus noise ratio
UE CATEGORY	-	LTE carrier frequency
PATHLOSS	-	Path loss in connection mode
SNR	-	Signal to noise ratio
CQI	Not realized, reserved	Channel quality indication
TX_POWER	-	Maximum transmission power in UL channel
TM		Antenna transmission mode
QCI	Not realized, reserved	Qos class identifier in LTE
VOLTE	0~1	volte (0: not support, 1: support,)
IMS_SMS	0~1	ims short message (0: not support, 1: support)
SUB_CARRIER_SPACING	-	Sub-carrier wave spacing
FR_TYPE	0~1	Frequency band classification 0: sub6G; 1: mm wave
NodeB_ID	-	Base station identifier
SIR	-	Signal to interference ratio
RSCP	-	Signal coverage strength
PSC	-	Primary scrambling code
ECIO	-	Signal quality
-		Invalid parameter, temporary does not support

8.10 AT^SYSCFGEX Extension Setting System Configuration Command

Table 138 AT^SYSCFGEX operation command

Type	Command	Possible return results	Description
Set Command	AT^SYSCFGEX=<acqorder>[,<b and>[,<roam>[,<srvdomain>[,<lteband 1-64bit>[,<lteband 65-128bit>[,[,<change_duration>]]]]]	OK	

Query Command	AT^SYSCFGEX?	^SYSCFGEX: <acqorder>,<band>,<roam>,<srvidomain>,<lteband1-64bit>,<lteband 65-128bit>,,,<change_duration>
		OK
Test Command	AT^SYSCFGEX=?	at^syscfgex=(acqorder ranges), (GU bands), (roam ranges), (srvidomain ranges), (lteband 1-64bit), (lteband 65-128bit),,, (change_duration ranges)
		OK
	at^syscfgex="03"	OK
	at^syscfgex="00",200000D400000,1,2,1E200000084,0	OK
Command Example	at^syscfgex?	at^syscfgex? ^SYSCFGEX: "00",200000D400000,1,2,1E20000084,0,,,1
		OK
	at^syscfgex=?	^SYSCFGEX: ("00","02","03","99"),(200000D400000),(0,3,4),(0-3),(1E2000000095),(0),(),(),(0-1)
		OK

Table 139 AT^SYSCFGEX parameter description

Parameter	Description
<acqorder>	Network access sequence, character string. Value: "00", "99" or combination of following parameters. "00": automatic mode; "01": GSM; "02": WCDMA; "03": LTE; "99": no change
<band>	2/3G Band setting: 80: GSM DCS 1800 band 100: GSM Extended GSM (E-GSM) 900 band (900 MHz)

200: GSM Primary GSM (P-GSM) 900 band
 10000: GSM 450 band (450 MHz)
 20000: GSM 480 band (480 MHz)
 40000: GSM 750 band (750 MHz)
 80000: GSM 850 band (850 MHz)
 100000: GSM Railways (R-GSM) 900 band (900 MHz)
 200000: GSM PCS band (1900 MHz)
 400000: WCDMA_I_IMT_2000 (WCDMA IMT EUROPE JAPAN & CHINA 2100 MHz)
 800000: WCDMA_II_PCS_1900 (WCDMA US PCS 1900 band)
 1000000: WCDMA_III_1700 (WCDMA Europe and China DCS 1800 band)
 2000000: WCDMA_IV_1700 (WCDMA US 1700 band WCDMA_IV_1700)
 4000000: WCDMA_V_850 (WCDMA US 850 band)
 8000000: WCDMA_VI_800 (WCDMA Japan 800 band)
 10000000000000: WCDMA_VII_2600 (WCDMA Europe 2600 band)
 20000000000000: WCDMA_VIII_900 (WCDMA Europe and Japan 900 band)
 40000000000000: WCDMA_IX_1700 (WCDMA Japan 1700 band)
 200000000000000: 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)
 20000000000000: WCDMA_VIII_900 (WCDMA Europe and Japan 900 band)
 Note:
 "All" can be used to restore full band support

<roam>	roam function not support
	0: enable roam (enable domestic and international roam)
	1: enable domestic roam, disable international roam
	2: disable domestic roam, enable international roam
	3: disable roam (disable domestic and international roam)
4: no change	

<srvidomain>	0: CS only
	1: PS only
	2: CS and PS
	3: no change

<lteband 1-64bit>	LTE band corresponds to two customized bit bits, 1-64bit bits, and its parameters are in hexadecimal format. For example, the values of the following parameters or the superimposed values of each parameter are displayed.	
	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.	

8000000000000000 (CM_BAND_PREF_NO_CHANGE) : frequency band not changed

LTE band value corresponding to binary bit,
for example: this parameter is 800D5,

Support these bands:

B1: 1

B3: 4

B5: 10

B7: 40

B8: 80

B20: 80000

B1 + B3 + B5 + B7 + B8 + B20:800D5

remark:"all"parameter recover all lte bands, this parameter must be set with
<lteband 65-128bit>together, otherwise response error.

<lteband 65-128bit>	LTE frequency band selection, 65-128bit remark: "all"parameter recover all the bands.
<change_duration>	Set whether to save the parameters after power-off 0: do not save when power-off 1: save when power-off (ASR has not implemented this function, only the band is saved by default after power-off)

8.11 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 140 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 141 AT^SYSINFOEX parameter description

Parameter	Description
<srv_status>	System service state. 0: No service; 1: Limited service; 2: Valid service; 3: Limited regional service; 4: Power saving and deep sleep state.
<srv_domain>	System service domain. 0: No service; 1: CS service only; 2: PS service only; 3: PS+CS service; 4: Settle in the cell but not adhered or registered; 5: CS+VoLTE service; 6: VoLTE service only;
<roam_status>	Roaming state 0: Non-roaming state; 1: Roaming state;
<sim_state>	SIM card state. 0: SIM card state invalid; 1: SIM card state valid; 2: SIM invalid in CS; 3: SIM invalid in PS; 4: SIM invalid in PS and CS;
<lock_state>	SIM card LOCK state. (This mark position is reserved as later stage simlock, at present, it is fixed as 0) 0: Disable simLock function; 1: Enable simLock function
<sysmode>	System format: 0: NO SERVICE; 1: AMPS 2: CDMA 3: GSM 4: EVDO 5: WCDMA 6: GPS 7: GW 8: WLAN 9: LTE 10: GWL 11: TD-SCDMA 14: HYBRID

	15: 1XLTE 16: NO CHANGE
<sysmode_name>	Character string presentation of the system format. This parameters returns the current system mode name in character string form. Its value is corresponding to command parameter. Character string in <sysmode> value, for example <sysmode> = 5, <sysmode_name>=WCDMA.
<submode>	0 NO SERVICE 1 GSM 2 PRS 3 DGE 11 IS95A 12 IS95B 13 CDMA2000 1X 14 EVDO Rel0 15 EVDO RelA 16 EVDO RelB 17 HYBIRD CDMA20001X 18 HYBRID (EVDO Rel0) 19 HYBRID (EVDO RelA) 20 HYBRID (EVDO RelB) 31 EHRPD 41 WCDMA 42 HSDPA 43 HSUPA 44 HSDPA and HSUPA 45 HSDPA+ 46 HSDPA+ and HSUPA 47 DCHSDPA+ 48 DCHSDPA+ and HSUPA 49 QAM64 HSDPA+ and HSUPA 50 QAM64 HSDPA+ 51 DCHSDPA+ and DCHSUPA 61 TD-SCDMA 62 TD HSDPA 63 TD HSUPA 64 TD HSPA 65 TD HSPA+ 71 FDD LTE 72 TDD LTE
<submode _name>	System sub-mode. This parameter returns the current network sub-mode name in form of character strings. Its value is corresponding to the character string of the second parameter <submode> of this command, such as <submode> = 71, <submode _name> = FDD LTE.

8.12 AT^CELLLOCK Lock to the Specific Frequency and Cell

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

1. CELLLOCK command is used for locking arfcn/cell on the specific RAT (WCDMA/LTE) Only when UE camp on this RAT, it will work. (Can be used in conjunction with the SYSCFGEX command to lock to the corresponding RAT).
2. If the specific RAT has been on locking state and you want to make another locking operation on this RAT, you would have to make sure the following locking operation with the same lock type, i.e. it must be on unlocking state before you lock to another arfcn/cell on the same RAT. Different RAT operation has no this limitation.
3. You can use locking/unlocking function for each one RAT separately, or you can unlock all RATs through one operation, but you should not lock arfcns/cells on different RAT through one operation.
4. It is strongly recommended to enable the function of locking LTE cells/frequency points in flight mode (at+cfun=0), and then exit the flight mode (at+cfun=1) to make it effective, otherwise there may be abnormalities. Unlocking the LTE cell/frequency point requires restarting the terminal to take effect.
5. After locking a specific frequency point or cell, the UE will not be able to meet the requirements of the mobility protocol and cannot reselect or switch to a new cell.

Table 142 AT^CELLLOCK operation command

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

		^SYSCFGEX: ("00","01","02","03","99"),("GU bands"),(0-3),(0-3),("LTE 1-64bit bands"),("LTE 65-128bit bands"),,,(0-1)	
Command Example	AT^CELLLOCK?	^CELLLOCK: 1,3,0,100 OK	Query current lock cell settings
	AT^CELLLOCK=?	CELLLOCK: (0-1),("02","03"),(0-1),("arfcn"),("pci") OK	Enable: 0-1 Rat: WCDMA/LTE Lock_type: 0-1
	AT^CELLLOCK=1,"03",1,1300,343	OK	Lock to LTE earfcn=1300, pci=343 cell
	AT^CELLLOCK=0	OK	Unlock all locked cells

Table 143 AT^CELLLOCK parameter description

Parameter	Value	Description
<enable>	0-1	There is no default value. Locking a specific cell is related to the environment. If you lock to a cell that is not in the environment, you will not be able to camp on the network. 0: disable cellock function 1: enable cellock function
<rat>	"02"/02/2 "03"/03/3	There is no default value. Integer and string type are all supported; "02"/02/2: WCDMA "03"/03/3: LTE
<lock_type>	0-1	There is no default value. 0: lock onto arfcn 1: lock onto cell
<arfcn>	Depend on <rat>	There is no default value. The downlink frequency to be locked by the user, the value of the frequency is related to the RAT
<pci/psc>	Depend on <rat>	There is no default value. The LTE physical layer cell ID to be locked by the user. The value depends on the RAT: WCDMA: Primary scramble code, currently not support LTE pci: 0~503

8.13 SRVST Actively Reports the Switch Command AT^SRVST

Actively report switch instruction to ^SRVST.

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

Table 144 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>	
Test Command	AT^SRVST=?	OK ^SRVST: (0,1)	
Proactive reporting		OK ^SRVST: <service_status>	
Command Example	AT^SRVST=1	OK	
	AT^SRVST?	^SRVST: 1,0	
		OK	
	Proactive reporting	^SRVST: 2	

Table 145 AT^SRVST parameter description

Parameter	Value	Description
<enable>	(0,1)	^SRVST active reporting switch: 0: disables SRVST active reporting 1: enable SRVST active reporting. Default value.
<service_status>	0	No service
	1	Restricted service
	2	Effective service
	3	Limited regional service
	4	Power saving and deep sleep

8.14 Command to Report Ims Registration Changes

AT+CIREGU

Actively report switch command for +CIREGU.

When the IMS registration status changes, the service type is automatically reported.

Table 146 AT+CIREGU operation command

Type	Command	Possible return results	Description
Actively Report		+CIREGU: <reg_info>	
Actively Report	Actively Report	+CIREGU: 1	

Table 147 AT+CIREGU parameter description

Parameter	Value	Description
< reg_info >	(0,1)	0: IMS not registered 1: IMS registered

8.15 Network Frequency Information Scan AT^NETSCAN

Table 148 AT^NETSCAN operation command

Type	Command	Possible return results	Description
Set Command	AT^NETSCAN=<mode>[,<band>]	^NETSCAN: <FREQ>,<RSRP>,<RSRQ>,<PCI>,<TAC>,<Cell ID>,<cell Bar> OK or ERROR/+CME ERROR: <err>	If the band value is set to 0, search for all bands
Query command	AT^NETSCAN?	OK	
Test command	AT^NETSCAN=?	^NETSCAN: (0-3),(1-69) OK	
Command Example	AT^NETSCAN=3	^NETSCAN:"CHINA MOBILE","CMCC","46000" 1,"2G", Freq: 50, RSSI: -80, bsic: 33, LAC: 37107, rxLev: 30, c1: 85, CellID: 22542, cellBar: 0	The return example is a reference

	2, "2G", Freq: 46, RSSI: -83, bsic:53, LAC: 37107, rxLev: 27, c1: 85, CellID: 22543, cellBar: 0	result, specific
	3, "2G", Freq: 612, RSSI: -96, bsic: 12, LAC: 37107, rxLev: 14, c1: 84, CellID: 20704, cellBar: 0	search situation
	4, "4G", Freq: 38950, RSRP: -81, RSRQ: -7, PCI: 65, TAC: 37107, CellID: 151678215, cellBar: 0	depends on the actual
	5, "4G", Freq: 3590, RSRP: -94, RSRQ: -7, PCI: 464, TAC: 37107, CellID: 164672589, cellBar: 0	network
	6, "4G", Freq: 1300, RSRP: -85, RSRQ: -5, PCI: 342, TAC: 37107, CellID: 165891186, cellBar: 0	
	7, "4G", Freq: 36275, RSRP: -97, RSRQ: -12, PCI: 314, TAC: 37107, CellID: 184620324, cellBar: 0	
	^NETSCAN: "CHINA MOBILE", "CMCC", "46000"	
	1, "4G", Freq: 38950, RSRP: -98, RSRQ: -7, PCI: 65, TAC: 37107, CellID: 151678215, cellBar: 0	
AT^NETSCAN=2, 40	^NETSCAN: "460 15", "460 15", "46015"	
	1, "4G", Freq: 38950, RSRP: -98, RSRQ: -7, PCI: 65, TAC: 37107, CellID: 151678215, cellBar: 0	
	OK	
AT^NETSCAN=?	^NETSCAN: (0-3), (1-69)	
	OK	

Table 149 AT^NETSCAN parameter description

Parameter	Description
<mode>	Access technology 0: GSM 1: UMTS 2: LTE 3: ALL RAT
<band>	Set the band for scanning frequency 【GSM supported parameters】 1: GSM900 2: GSM1800 3: GSM850 4: GSM1900 【WCDMA supported parameters】 1: WCDMA_I_IMT_2000(WCDMA IMT EUROPE JAPAN & CHINA 2100 MHz) 2: WCDMA_II_PCS_1900(WCDMA US PCS 1900 band) 3: WCDMA_III_1700(WCDMA Europe and China DCS 1800 band) 4: WCDMA_IV_1700 (WCDMA US 1700 bandWCDMA_IV_1700) 5: WCDMA_V_850(WCDMA US850 band)

- 6: WCDMA_VI_800(WCDMA Japan 800 band)
7: WCDMA_VII_2600(WCDMA Europe 2600 band):
8: WCDMA_VIII_900(WCDMA Europe and Japan 900 band)

【LTE supported parameters】

If set parameter 1 to 69, set the frequency band supported by the terminal. If the frequency band is not supported by the terminal, +CME ERROR: 50 is displayed

<FREQ>	Frequency point
<RSRP>	rsrp signal value
<RSRQ>	Signal quality rsrq
<PCI>	PCI of cell
<TAC>	Position code
<Cell ID>	Global cell id
<cell Bar>	Whether the cell is bar

8.16 The Default IMS Bearer Configuration:

AT^NWCFG="ims_enable".

This command is used to enable/disable ims, and it needs to be restarted after the AT is delivered to take effect.

Table 150 AT^NWCFG="ims_enable" operating command

Type	Command	Possible return results	Description
Set Command	AT^NWCFG="ims_enable" [,<switch>]	If the optional parameter <switch> is ignored, the current IMS status is queried, and the result is as follows: ^NWCFG: "ims_enable", <switch> OK If you set the current configuration with optional parameters, the result returns: OK or ERROR/+CME ERROR: <err>	
Query command	AT^NWCFG="ims_enable"	^NWCFG: "ims_enable", <switch> OK	

Test command	AT^NWCFG=?	^NWCFG: "ims_enable",(0,1) OK	
	AT^NWCFG="ims_enable",1	OK	Enable IMS
Command Example	AT^NWCFG="ims_enable"	^NWCFG: "ims_enable",1 OK	
	AT^NWCFG=?	^NWCFG: "ims_enable",(0,1) OK	

Table 151 AT^NWCFG="ims_enable" parameter description

Parameter	Valid values	Description
switch	0-1	0: Disable ims 1: Enable ims

8.17 Get Carrier Name Command: AT^EONS

Note: Currently, only carrier name query is implemented.

Table 152 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_con d>,<spn>] OK or +CME ERROR: <err>	Note: When the < type > is 1/2/3/4, the command format supports AT^EONS=<type> or AT^EONS=<type> <plmn_id> without < plmn id> returns the information of the current registered network. The AT returns the carrier name encoding according to the character set set by the current CSCS (Qualcomm defaults to "IRA", if "IRA" cannot be represented, you need to set it to "UCS2". character set, the query result is UCS2). When the < type > is set to 5, the command format supports AT^EONS=<type> or AT^EONS=<type>, <

plmn_name_len >, and uses the default value without plmn_name_len

Test Command	AT^EONS=?	^EONS: (list of supported<type>)
		The "IRA" character set indicates: ^eons: 1,46000,"CHINA MOBILE","CMCC",0,"CMCC"
	at^eons=1	OK The "UCS2" character set indicates: ^eons: 1,46000,"004300480049004E00410020004D004F00420049004C0045","0043004D00430043",0,"0043004D00430043"
		OK
		The "IRA" character set indicates: ^eons: 2.46000,"","",0,"CMCC"
		OK
Instruction routines	at^eons=2	The "UCS2" character set indicates: ^eons: 2.46000,"","",0,"0043004D00430043"
		OK
		The "IRA" character set indicates: ^eons: 3.46000,"","",0,"CMCC"
		OK
	at^eons=3	The "UCS2" character set indicates: ^eons: 3.46000,"","",0,"0043004D00430043"
		OK
	at^eons=4	The "IRA" character set indicates: ^eons: 4,46000,"CHINA MOBILE","CMCC",0,"CMCC"

	OK The "UCS2" character set indicates: ^eons: 4,46000,"004300480049004E00410020004D004F00420049004C0045", "0043004D00430043",0,"0043004D00430043"
	OK The "IRA" character set indicates: at^eons=5 ^eons: 5.46000,"CMCC", ""
at^eons=5	OK The "UCS2" character set indicates: ^eons: 5.46000,"0043004D00430043", ""
	OK

Table 153 AT^EONS parameter description

Parameter	Illustrate
<type>	1: The automatic mode name display rule According to the 3GPP protocol name, the priority is displayed as follows: The network name stored in the EFPNN file corresponding to the EFOPL in the USIM application Network name information in MM/GMM/EMM Information Information stored in the list of internal network names of the terminal 2: Query the network name in MM/GMM/EMM Information 3: Query the network name stored in the EFPNN file corresponding to the EFOPL in the USIM application 4: Query the information stored in the internal network name list of the terminal 5 : The name of the automatic length limit mode is displayed <plmn_name1> displayed as a table 148 <plmn_name1> description of processing logic <plmn_name2> returns an empty string <spn_cond> and < SPN > are not included Remark:

the <type> is set to 1, 2, 3, 4:

- The supported command format is AT+EONS=<type> or AT+EONS=<type><plmn_id>, if the <plmn_id> does not contain it, the current registered network information is returned.
- In the return value, <plmn_name1> represents the long name, the <plmn_name2> represents the short name, showing that the maximum number of 128 16 custom characters (32 valid characters) is reported for both, if there are more than 128 characters, only the first 128 characters are reported, If the <plmn_name1> or <plmn_name2> query is empty, an empty string is reported.
- In the return value, <spn_cond> and <spn> if the EFSPNfile is not empty in the SIM card, the spn information is displayed, otherwise the return is empty.

the < type> is set to 5:

- The supported command formats are: AT+EONS=<type> or AT+EONS=<type>,,<plmn_name_len>
If the <plmn_name_len> does not contain, the default value is used.
- Does not include <spn_cond> or <spn> in the return value.

<plmn_id>	Register with plmn_id
<plmn_name_len>	Integer type, default value 20, length 1-32
<plmn_name1>	Operator's long name, type of string, if the format is UCS2 encoded hexadecimal, the maximum length is plmn_name_len times 4 If the < type> is 5, this field is displayed in Table 148 <plmn_name1> Logic Description
<plmn_name2>	Carrier short name, string type, If the format is UCS2 coded in hexadecimal, the maximum length is plmn_name_len multiplied by 4 When the <type> is 5, this field returns an empty string
<spn_cond>	For details about the b1b2 display rule, please refer to the <Display Condition> in the definition of EFSPN in 3GPP TS 31.102
<spn>	spn name

Note: UCS2 Encoding The hexadecimal string is converted according to the UCS2 character header encoding, For example, the UCS2 encoding of the character 'A' is "0041".

Table 154 <plmn_name1> description of the processing logic

If the long name exists and is no longer than <plmn_name_len>		
	(non-roaming or registered PLMN is in EFSPDI or B2 is 0) and EFSPN is valid, spn is displayed	(Roaming and registering PLMN is not in EFSPDI) Either B2 is 1 or EFSPN is invalid, the plmn name is displayed
plmn_name1	SPN	plmn long name

If the short name exists and is no longer than <plmn_name_len>

	(non-roaming or registered PLMN is in EFSPDI or B2 is 0) and EFSPN is valid, spn is displayed	(Roaming and registering PLMN is not in EFSPDI) Either B2 is 1 or EFSPN is invalid, the plmn name is displayed
plmn_name1	SPN	plmn long name
Other Cases:		
	(non-roaming or registered PLMN is in EFSPDI or B2 is 0) and EFSPN is valid, spn is displayed	(Roaming and registering PLMN is not in EFSPDI) Either B2 is 1 or EFSPN is invalid, the plmn name is displayed
plmn_name1	SPN	"MCC MNC"

As shown above, the priority of the plmn name is as follows:

1. USIM application under EFOPL, the network name information stored in the corresponding EFPNN file.
2. MM/GMM/EMM Information about the name of the network.
3. Information stored in the list of internal network names of the terminal.
4. Register the PLMN ID of the network.

If the long name and short name of the current priority are invalid, that is, they do not exist or exceed the maximum supported length, the company goes to the next priority to obtain the name.

8.18 RRC Status Query and Active Reporting: AT^RRCSTAT

Table 155 AT^RRCSTAT operation command

Type	Command	Possible return results	Description
Set Command	AT^RRCSTAT=<enable>	OK or ERROR/+CME ERROR: <err>	Note: Set whether the active reporting of ^RRCSTAT is enabled.
Query Command	AT^RRCSTAT?	^RRCSTATE: <enable>,<rrc_status>	
Test Command	AT^RRCSTAT=?	^RRCSTAT: (0,1)	
Reporting Command		^RRCSTAT: <rrc_status>	If active reporting is enabled, it will be reported actively

when the RRC connection status changes.

Command Example	AT^RRCSTAT=1	OK
	AT^RRCSTAT?	^RRCSTAT: 1,1
	AT^RRCSTAT=?	^RRCSTAT: (0,1)
	Reporting command	^RRCSTAT: 0

Table 156 AT^RRCSTAT parameter description

Parameter	Description
<enable>	Indicates whether active reporting is enabled: 0: Disable rrc_status active reporting 1: Enable rrc_status active reporting
<rrc_status>	RRC connection status: 0: RRC status is in non-connected state; 1: RRC status is in connected state; 2: RRC status is in INACTIVE state; 3: RRC status is invalid;

Note: When a RRCSTAT query command is received in a non-LTE environment, the modem will directly return an error.

8.19 Base Station Positioning Command: AT+GTGIS

Table 157 AT+GTGIS operation command

Type	Command	Possible return results	Description
Set Command	AT+GTGIS	OK	
	=<mode>,<key>,[,<longitude>],[,<latitude>]	or ERROR/+CME ERROR: <err>	
Test Command	AT+GTGIS=?	+GTGIS: (1-2),(key)[,longitude][,latitude]	
Reporting Command		OK +GTGIS: "longitude_latitude",rode: "rode" +GTGIS:	

Command Example		"province city street street_num"
	AT+GTGIS=1,"0008f5028ec aca4089d227279483fc35"	OK
	AT+GTGIS=?	+GTGIS: (1- 2),(key)[,longitude][,latitude]
		ok
	Reporting command	+GTGIS: SERVER ERROR or +GTGIS: "108.8683757,34.1950396",ro ad:" Zhangba 4th Road Auxiliary Road" +GTGIS: "Near Digital China Xi'an Science and Technology Park, Zhangba 4th Road Auxiliary Road, Yanta District, Xi'an City, Shaanxi Province"
	AT+GTGIS=2,"0008f5028ec aca4089d227279483fc35", "108.8683757", "34.195039 6"	OK
	AT+GTGIS=?	+GTGIS: (1- 2),(key)[,longitude][,latitude]
		ok
	Reporting command	+GTGIS: SERVER ERROR or +GTGIS: "country":"China","province":"S haanxi Province","city":"Xi'an City","district":"Yanta District","street":"Zhangba 4th Road","street number":"No. 36" +GTGIS: "Digital China Xi'an Science and Technology Park, No. 36 Zhangba 4th Road, Zhangba Sub-district, Yanta District, Xi'an City, Shaanxi Province"

Table 158 AT+GTGIS parameter description

Parameter	Valid values	Description
<mode>	1	Base station positioning
	2	Latitude and longitude positioning
<key>	string	Server key value
<longitude>	string	Longitude information
< latitude>	string	Latitude information

8.20 DHCP Address Pool Parameter Configuration :

AT^MAPCFG="dhcp"

DHCP address pool parameter configuration.

Table 159 AT^MAPCFG="dhcp" operation command

Type	Command	Possible return results	Description
Set Command	AT^MAPCFG="dhcp",<enable_dhcp>[,<gateway>[,<dhcp_start_ip>[,<dhcp_end_ip>[,<netmask>[,<lease_time>]]]]]	OK or ERROR/+CME ERROR:<err>	
Query Command	AT^MAPCFG="dhcp"	^MAPCFG: "dhcp",<enable_dhcp>,<gateway>,<dhcp_start_ip>,<dhcp_end_ip>,<netmask>,<lease_time>	
Test Command	AT^MAPCFG=?	OK ^MAPCFG: "dhcp",(0-1),(gateway),(dhcp_start_ip),(dhcp_end_ip),(netmask),(lease_time)	
Command Example	AT^MAPCFG="dhcp",1,192.168.200.1,192.168.200.2,192.168.200.254	OK	
	AT^MAPCFG="dhcp",1,192.168.200.1,192.168.200.2,192.168.200.254,255.255.255.0,3600	OK	

```

^MAPCFG:
"dhcp",1,192.168.200.1,192.168.200.
2,192.168.200.254,255.255.255.0,36
00

OK

```

Table 160 AT^MAPCFG="dhcp" parameter description

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

8.21 Set the Network Mask Function:

AT^MAPCFG="wwan_subnet_mask"

Network mask function configuration.

Table 161 AT^MAPCFG="wwan_subnet_mask" operation command

Type	Command	Possible return results	Description
Set Command	AT^MAPCFG="wwan_subnet_mask"[[,<mode>][,<address>]]	If the optional parameters [[,<mode>][,<address>]] are omitted, the current network mask configuration will be queried. ^MAPCFG: "wwan_subnet_mask",<mode> OK or ^MAPCFG: "wwan_subnet_mask",<mode>,<"address">	
		OK If optional parameters are included, the current configuration will be set. OK or ERROR/+CME ERROR: <err>	
Test Command	AT^MAPCFG=?	^MAPCFG: "wwan_subnet_mask",(1-3),("address")	

Command Example		
		OK
	AT^MAPCFG="wwan_subnet_mask",1	OK
	AT^MAPCFG="wwan_subnet_mask"	^MAPCFG: "wwan_subnet_mask ",1
	AT^MAPCFG="wwan_subnet_mask",3,"255.255.255.0"	OK
Command Example	AT^MAPCFG="wwan_subnet_mask",3,"255.255.255.0"	OK
	AT^MAPCFG="wwan_subnet_mask"	^MAPCFG: "wwan_subnet_mask ",3,"255.255.255.0"
		OK

Table 162 AT^MAPCFG="wwan_subnet_mask" parameter description

Parameter	Valid values	Description
mode	1-3	1: Minimum type 2: ABC type 3: Static fixed address
address	Ip address	Mask IP address

8.22 Disable RPLMN Switch: AT^NWCFG="disable_rplmn"

Using the setting command, the storage of RPLMN can be disabled or enabled, and it takes effect immediately.

Table 163 AT^NWCFG="disable_rplmn" operation command

Type	Command	Possible return results	Description
Set Command	AT^NWCFG="disable_rplmn",[<setting>]	If the optional parameter <setting> is omitted, the current status of whether the RPLMN function is disabled will be queried. ^NWCFG: "disable_rplmn", <setting>	-
		OK If optional parameters are included, the current configuration will be set. OK	
		ERROR/+CME ERROR:<err>	

Test Command	AT^NWCFG=?	^NWCFG: "disable_rplmn",(0,1)	
			-
Command Example	AT^NWCFG="disable_rplmn",1	OK	
		^NWCFG: "disable_rplmn",1	
Command Example	AT^NWCFG="disable_rplmn"	OK	
		OK	

Table 164 AT^NWCFG="disable_rplmn" parameter description

Parameter	Valid values	Description
<setting>	0~1	0: Do not disable RPLMN 1: Disable RPLMN

8.23 Command for Querying LTE Default Bearer Registration

Information: AT^LTEATTACHINFO

This command is used to query the registration information of the LTE default bearer, and currently can obtain the network-assigned IP type and APN name.

Table 165 AT^LTEATTACHINFO operation command

Type	Command	Possible return results	Description
Query Command	AT^LTEATTACHINFO?	^LTEATTACHINFO: <ip_type>,<apn> OK	–
Test Command	AT^LTEATTACHINFO=?	OK	–
Command Example	AT^LTEATTACHINFO=?	OK	Support this AT command
	AT^LTEATTACHINFO?	^LTEATTACHINFO: 0,3gwap	
		OK	
Instructions for use			

Table 166 AT^LTEATTACHINFO parameter description

Parameter	Valid values	Description
<ip_type>	0~2	0 - IPV4 1 - IPV6 2 - IPV4V6
<apn>	string	APN name during LTE registration

8.24 Command for the PLMN Active Reporting Switch:

AT^PLMN

Command for the ^PLMN active reporting switch:

If the ^PLMN command enables active reporting, the PLMN will be actively reported after the camping network changes.

Table 167 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>	
Test Command	AT^PLMN=?	OK ^PLMN: (0,1)	
Reporting Command	--	OK ^PLMN: <mcc>,<mnc>	
Command Example	AT^PLMN=1	OK	Setting routine
		^PLMN: 1,460,10	
	AT^PLMN?	OK	Query routine
	Reporting command	^PLMN: 460,01	Active reporting routine

Table 168 AT^PLMN parameter description

Parameter	Valid values	Description
-----------	--------------	-------------

<enable>	(0,1)	PLMN active reporting switch: 0: Active reporting is disabled (default value). 1: Active reporting is enabled
<mcc>	--	Mobile Country Code (MCC)
<mnc>	--	Mobile Network Code (MNC)

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 169 AT+CTZU operation command

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

Table 170 AT+CTZU parameter description

Parameter	Value	Description
<fun>	[0]	Disable the automatic time zone updating

1

Enable the automatic time zone updating, default value

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

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

9.2 AT+CTZR Time Zone Report Function Command

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

Table 171 AT+CTZR operation command

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

Table 172 AT+CTZR parameter description

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

9.3 AT+CCLK Real-Time Clock Command

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

Table 173 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 querying. Otherwise, the time zone will not be displayed. The default time zone is 00.
		OK	
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"	Query the current time
		OK	

AT+CCLK=? OK

Table 174 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

Note: 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 175 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?	+CSDF: 255,1	
		OK	
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: 255,1	Query the time format of current setting
	OK	
AT+CSDF=?	+CSDF: (1-255),(1-2)	-
	OK	

Table 176 AT+CSDF parameter description

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

10 Data

10.1 AT+CGACT PDP Context Activation and Deactivation AT Command

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

Table 177 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"	OK (Set PDP context)	
	AT+CGACT=1,1	OK (PDP activation)	-
	AT+CGACT=0,1	OK (PDP deactivation)	
	AT+CGACT?	+CGACT: 1,0	-
	AT+CGACT=?	OK +CGACT: (0,1), (1-16) (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 178 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.25ter 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 179 AT+CGDATA operation command

Type	Command	Possible return results	Description
Set Command	AT+CGDATA=[<L2P>, [<cid> [,<cid> [...]]]]	CONNECT	If the communication establishes successfully, MT

Test Command	AT+CGDATA=?		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
		+CGDATA: (<L2P> value list)	-
Command Example	AT+CGDATA=?	OK	
		+CGDATA: (""), (1-8)	The layer 2 protocol used between TE and MT is "PPP"
	AT+CGDATA="PPP",1	CONNECT	-

Table 180 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 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 181 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 A	Then, close the opened serial port, exit the data state and return to NO CARRIER. Then, SSCOM can normally send other AT commands.

Table 182 ATD*99# parameter description

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

10.4 +++ Data Mode to Command Mode Switching

Command

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

Table 183 +++ operation command

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

10.5 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 184 CONNECT operation command

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

	<h_comp>s),(list of="" supported<br=""></h_comp>s),(list> 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		
AT+CGDCONT?	+CGDCONT: +CGDCONT: 1,"ipv4v6","3gnet","",0,0,0,0,0 +CGDCONT: 8,"IPV4V6","IMS","",0,0,0,1,0,1 -		
	OK		
AT+CGDCONT=1	OK	delete <cid>	
AT+CGDCONT=1,"IP","CMNET"	OK	APN is CMNET, PDP type is IP	
Command Example	+CGDCONT: (0-15),"IP",,(0-3),(0-4),(0,1),(0,1),(0-2),(0,1) +CGDCONT: (0-15),"IPV6",,(0-3),(0-4),(0,1),(0,1),(0-2),(0,1) AT+CGDCONT=? +CGDCONT: (0-15),"IPV4V6",,(0-3),(0-4),(0,1),(0,1),(0-2),(0,1) +CGDCONT: (0-15),"PPP",,(0-3),(0-4),(0,1),(0,1),(0-2),(0,1) OK		

Table 186 AT+CGDCONT parameter description

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

	2	RFC114 (only applicable to SNDCP)
	3	RFC2507
	4	RFC3095 (applicable for PDCP only)
	Other values are reserved	
<IPv4AddrAlloc>	0	IPv4 address allocation through NAS signalling
	1	IPv4 address allocated through DHCP
<request_type>	0	PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific)
	1	PDP context is for emergency (bearer) services
	2	PDP context is for new PDP context establishment
	3	PDP context is for handover from a non-3GPP access network
	4	PDP context is for handover of emergency (bearer) services from a non-3GPP access network
<P-CSCF_discovery>	0	Preference of P-CSCF address discovery not influenced by +CGDCONT
	1	Preference of P-CSCF address discovery through NAS signalling
	2	Preference of P-CSCF address discovery through DHCP
<IM_CN_Signalling_Flag_Ind>	0	UE indicates that the PDP context is not for IM CN subsystem-related signalling only
	1	UE indicates that the PDP context is for IM CN subsystem-related signalling only
<NSLPI>	0	indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT.
	1	indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority".
<securePCO>	0	Security protected transmission of PCO is not requested
	1	Security protected transmission of PCO is requested
<IPv4_MTU_discovery>	0	Preference of IPv4 MTU size discovery not influenced by +CGDCONT
	1	Preference of IPv4 MTU size discovery through NAS signalling
<Local_Addr_Ind>	0	indicates that the MS does not support local IP address in TFTs

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

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

10.7 AT^AUTHDATA PDP Authentication Set Command

Table 187 AT^AUTHDATA operation command

Type	Command	Possible return results	Description
Set Command	AT^AUTHDATA=<cid>,<auth_type>,<PLMN>,<password>,<username>	OK	PLMN temporarily does not support the configuration
Query Command	AT\$AUTHDATA?	\$AUTHDATA: <cid>,<auth_type>,<password>,<username>,<PLMN>	PLMN temporarily does not support the configuration
Test Command	AT^AUTHDATA=?	OK ^AUTHDATA: (cid),(0-3),("plmn"),("Password"),("User Name")	The CID value adapts to the baseline
Command Example	AT^AUTHDATA=1,1,46000,123456,test	OK	
	AT^AUTHDATA?	^AUTHDATA: 1,1,"123456","test",""	
		OK	

Table 188 AT^AUTHDATA parameter description

Parameter	Value	Description
<cid>	list	Int type (The list values match 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

10.8 AT+CGPADDR PDP Address Display Command

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

Table 189 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), (PDP_addr)	-
		OK	
Command Example	AT+CGPADDR	+CGPADDR: 1, "11.112.214.87", "36.8.132.113.11.19.92.48.0.0.0.0.0.0.1"	Display current IP address
		OK	
	AT+CGPADDR=?	+CGPADDR: 1,8	-
		OK	

Table 190 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>.

10.9 AT+CGCONTRDP DNS Query Command

Table 191 AT+CGCONTRDP operation command

Type	Command	Possible return results	Description
Set Command	AT+CGCONTRDP=[<p_cid>]	[+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[, <DNS_sec_addr> [,<P-CSCF_prim_addr>[,<PCSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>]]]]]]] [<CR><LF>+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask> [,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<PCSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>]]]]]]] [...]]	
		OK	
		ERROR/+CME ERROR:<err>	
Test Command	AT+CGCONTRDP=?	+CGCONTRDP: (p_cid list) OK	
Command Example	AT+CGCONTRDP=?	+CGCONTRDP: (1,8) OK	

Table 192 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

10.10 AT+ECMDUP AP Side Dial Command

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

Table 193 AT+ECMDUP operation command

Type	Command	Possible return results	Description
Set command	AT+ECMDUP=<pdpid>,<action>[,<pdp_type>[,<APN>[,<username>[,<passwd>[,<auth_type>]]]]]	<CR><LF>OK<CR><LF>	-
		<CR><LF>ERROR/+CME ERROR: <err><CR><LF>	Fail
Query command	AT+ECMDUP?	<CR><LF>+ECMDUP: <pdpid>,<status>,"IPV4",<status>,"IPV6"<CR><LF><CR><LF>OK<CR><LF>	-
Test command	AT+ECMDUP=?	<CR><LF>+ECMDUP: (list of supported <pdpid>s),(list of supported <action>s),(list of supported <pdp_type>s),<APN>,<username>,<password>,(list of supported <auth_type>s)<CR><LF><CR><LF>OK<CR><LF>	-

Command example		+ECMDUP: 1,1,"IPV4",0,"IPV6"	
	AT+ECMDUP?	OK	-
	AT+ECMDUP=1,1	OK ^DCONN: 1,1,"IPV4"	
	AT+ECMDUP=1,0	OK ^DEND: 1,0,"IPV4"	
	AT+ ECMDUP=?	+ECMDUP: (1-15),(0-1),(0-2),(apn),(username),(password),(1-2)	
		OK	

Table 194 AT+ ECMDUP parameter description

Parameter	Description
<pdpid>	Integer value. PDP context identifier. The value can be 1-8
<action>	Integer value to set the connection state. The values are as follows: 0: The connection is disconnected. 1: The connection is established.
<pdp_type>	The value can be: 0: indicates IPV4 dialing 1: indicates IPV6 dialing 2: indicates IPV4V6 dialing
<APN>	String type, access point name, 0 ~ 99byte.
<username>	String type, user name, 0 ~ 200byte.
<passwd>	String type, password, 0 ~ 200byte.
<auth_type>	Integer value. Authentication protocol. The values are as follows: 1: PAP. 2: CHAP.
<status>	Integer type, indicating dial-up status, the value is as follows: 0: The number is not dialed 1: The number has been dialed

Table 195 ^DCONN/^DEND dial-up successful/disconnection parameter description

Type	Report command	Report command example
Dial-up report	^DCONN: < pdpid >,< status >,<pdp_type>	^DCONN: 1,1,"IPV4"
Disconnect report	^DEND: < pdpid >,< status >,<pdp_type>	^DEND: 1,0,"IPV4"

Parameter	Description
<pdpid>	Integer value, PDP context identifier, supported 1 to 8
<status>	Integer value to set the connection status. The values are as follows: 0: disconnect the connection. 1: establishes connection.
<pdp_type>	Dial type. The value can be: IPV4 dial IPV6 dial IPV4V6 dial

10.11 AT^DSFLOWQRY To Query the DS Traffic

If the current state is online_data, the current dial-up connection time and traffic, as well as the total dial-up connection time and traffic since the startup are queried. Otherwise, the system queries the last dial-up connection time and traffic generated, and the total dial-up connection time and traffic since the startup. (This command query depends on AT^DSFLOWRPT=1 Enable traffic statistics-to be developed).

Table 196 AT^DSFLOWQRY operation command

Type	Command	Possible return results	Description
Query command	^DSFLOWQRY(?)	^DSFLOWQRY: <last_ds_time>,<last_tx_flow>,<last_rx_flow>,<total_ds_time>,<total_tx_flow>,<total_rx_flow>	
		OK Error case: +CME ERROR: <err> For example: ^DSFLOWQRY: 592,478,0,592,645c,3c0f	
Test command	^DSFLOWQRY=?	OK Switching off the traffic statistics: +CME ERROR: operation not allowed	
		OK	

Table 197 AT^DSFLOWQRY parameter description

Parameter	Value	Description
<last_ds_time>	0x0000_0000~0xFFFF_FFFF	An 8-digit hexadecimal number, indicating the last DS connection time, expressed in seconds.
<last_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	16-bit hexadecimal number, indicating the last DS sent traffic, in bytes.
<last_rx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	16-bit hexadecimal number, indicating the last DS received traffic, in bytes.
<total_ds_time>	0x0000_0000~0xFFFF_FFFF	An 8-digit hexadecimal number, indicating the cumulative connection time of the DS, in seconds.
<total_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number representing the amount of transmitted traffic accumulated by DS in bytes.
<total_rx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	16-bit hexadecimal number, indicating the accumulated received traffic of the DS, in bytes.

10.12 AT^DSFLOWCLR DS Traffic Cleaning

Clear DS traffic to zero, including DS current DS connection time, DS sent traffic, DS received traffic, DS accumulated connection time, DS accumulated send traffic, and DS accumulated receive traffic (see ^DSFLOWQRY and ^DSFLOWRPT for details).

Table 198 AT^DSFLOWCLR operation command

Type	Command	Possible return results	Description
Set command	^DSFLOWCLR	OK	

10.13 AT+DIALCFG Network Card Mode Configuration

Use this command to switch the network adapter mode configuration.

Table 199 AT+DIALCFG operation command

Type	Command	Possible return results	Description
Set command	AT+ DIALCFG =<mode>,<n>	OK	Success
Query command	AT+ DIALCFG =<mode>	+DIALCFG: "DIALMODE",0	There is only one mode parameters, for a query command
Test command	AT+ DIALCFG =?	+DIALCFG: "DIALMODE",(0-1) OK	-
Command example	AT+ DIALCFG ="DIALMODE",0	OK	Set the network card mode and IP address to the public network

Table 200 AT+DIALCFG parameter description

Parameter	Value	Description
<n>	0	Network card mode
	1	Routing mode

10.14 Command for Reporting DS Traffic: AT^DSFLOWRPT

When the active reporting enable switch is turned on and the MT is in the online_data state, the active reporting message will be reported every default 2 seconds (users can set the reporting period). The reported content includes the current DS connection time, current sent traffic, current received traffic, total connection time, total sent traffic, total received traffic, current sending rate, and current receiving rate. Currently, traffic statistics are based on cid, with the first channel counted by default.

Table 201 AT^DSFLOWRPT operation command

Type	Command	Possible return results	Description
Set Command	^DSFLOWRPT=<oper>[,<time>[,<cid>]]	OK Error conditions: +CME ERROR: <err>	
Query Command	^DSFLOWRPT?	^DSFLOWRPT: <oper>,<time><cid> OK	

		For example: ^DSFLOWRPT: 1,2,1
		OK
Test Command	^DSFLOWRPT=?	^DSFLOWRPT: (0,1),(time),(1-42,"all")
		OK
Reporting Command		^DSFLOWQRY: <last_ds_time>,<last_tx_flow>, <last_rx_flow>,<total_ds_time>,<total_tx_flow>,<total_rx_flow>,<tx_rate>,<rx_rate> For example ^DSFLOWRPT: 14,1d98,0,14,1d98,0,d3,0

Table 202 ^DSFLOWRPT description of setting parameters

Parameter	Value	Description
<oper>	0: Traffic statistics function disabled 1: Traffic statistics function enabled	When <oper> is 0, traffic cannot be queried or actively reported.
<time>	Set the periodic reporting interval 0: Active reporting function disabled	When <time> is 0, traffic can only be queried via AT^DSFLOWQRY.
<cid>	1-42: Set the cid for active reporting all: Set active reporting of traffic for all dial-up cids	Setting the string "all" enables active reporting of traffic for all dial-up cids.

Table 203 ^DSFLOWRPT description of active reporting parameters

Parameter	Value	Description
<last_ds_time>	0x0000_0000~0xFFFF_FFFF	An 8-bit hexadecimal number, representing the connection time of the last DS, in seconds.
<last_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the sent traffic of the last DS, in bytes.
<last_rx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the received traffic of the last DS, in bytes.
<total_ds_time>	0x0000_0000~0xFFFF_FFFF	An 8-bit hexadecimal number, representing the cumulative connection time of DS, in seconds.
<total_tx_flow>	0x0000_0000_0000_0000~0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the cumulative sent traffic of DS, in bytes.

<total_rx_flow>	0x0000_0000_0000_0000~ 0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the cumulative received traffic of DS, in bytes.
<tx_rate>	0x0000_0000_0000_0000~ 0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the current sending rate, in bytes per second.
<rx_rate>	0x0000_0000_0000_0000~ 0xFFFF_FFFF_FFFF_FFFF	A 16-bit hexadecimal number, representing the current receiving rate, in bytes per second.

11 Enable/Disable Sleep Function

11.1 AT+WAKEUPCFG Sleep Function Enabling Command

This command can enable or disable the module dormancy function.

Table 204 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	The pull pin sleep function is enabled

Table 205 AT+WAKEUPCFG parameter description

Parameter	Value	Description
<n>	0	The pull pin sleep function is disabled
	1	The pull pin sleep function is enabled

12 Serial port control command

12.1 AT&D DTR Use State Command

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

Table 206 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 207 AT&D parameter description

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

12.2 AT+IPR TE-TA Data Rate Fixing Command

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

Table 208 AT+IPR operation command

Type	Command	Possible return results
Set Command	AT+IPR=<rate>	OK
		ERROR/ +CME ERROR <err>
Query Command	AT+IPR?	+IPR: <rate>

		OK	
Test Command	AT+IPR=?	+IPR: rate value list	-
		OK	
Command Example	AT+IPR?	+IPR: 115200	The current baud rate is 115200
		OK	
	AT+IPR=9600	OK	Set the baud rate into 9600
	AT+IPR=?	+IPR: (300,1200,4800,9600,14400,19200,38400,57600,115200,128000,230400,460800,921600,3000000)) OK	Note: The debug serial port cannot be printed at 3000000 baud rate

Table 209 AT+IPR parameter description

Parameter	Value	Description
<rate>	300	The values represent the fixed baud rates, default: 115200
	1200	
	4800	
	9600	
	14400	
	19200	
	38400	
	57600	
	[115200]	
	128000	
	230400	
	460800	

12.3 Serial Flow Control Command: AT+IFC

Using this command, you can set the serial port flow control switch, and after the setting is successful, the power failure will not be saved.

table 210 AT+IFC operation commands

Type	Command	Possible return results	Description
Set Command	AT+IFC=<dce_by_dte>,<dte_by_dce>	OK	-
		ERROR/ +CME ERROR <err>	The error is related to the ME feature
Query command	AT+IFC?	+IFC: <dce_by_dte>,<dte_by_dce>	-
		OK	-
Test command	AT+IFC=?	+IFC: < dce_by_dte> value list, <dte_by_dce> value list	-
		OK	-
Command Example	AT+IFC?	+IFC: 2,2	Flowthroning is turned on
		OK	
	AT+IFC=2.2	OK	Turn on flow throttling
		+IFC: (0-2),(0-2) OK	-

table 211 The AT+IFC parameters are described in detail

parameter	Valid values	Description
< dce_by_dte >	0	0: None
	2	2: RTS flow control
<dte_by_dce>	0	0: None
	2	2: CTS flow control

13 Voice control

13.1 AT+CLVL Speaker Volume Control Command

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

Table 212 AT+CLVL operation command

Type	Command	Possible return results	Description
Set Command	AT+CLVL=<level>	OK	-
		ERROR	Fail
Query Command	AT+CLVL?	+CLVL: 3	Fail
		OK	
Test Command	AT+CLVL=?	+CLVL: (0-100)	-
		OK	
Command Example	AT+CLVL=1	OK	-

Table 213 AT+CLVL parameter description

Parameter	Value	Description
<level>	0-100	Set different volume levels

13.2 AT+CMIC Mic Volume Control Command

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

Table 214 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 215 AT+CMIC operation command

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

13.3 AT+CMUT Support Mute Setting Command

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

Table 216 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	Fail
		ERROR	
Test Command	AT+CMUT=?	+CMUT: (<n> value list)	-
		OK	
		+CMUT: (0-1)	
Command Example	AT+CMUT=?	OK	-
		OK	
	AT+CMUT=0	OK	-
	AT+CMUT?	+CMUT: 0	-
		OK	

Table 217 AT+CMUT parameter description

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

13.4 AT^CPCM Support PCM Setting Command

This command can set the pcm mode.

Table 218 AT^CPCM operation command

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

Table 219 AT^CPCM parameter description

Parameter	Value	Description
< mode >	0	MASTER_PRIM mode (default) clk2.048 syn 8k
	1	MASTER_AUX mode (no support)
	2	SLAVE mode
<format>	0	linear (default)
	1	u-law (no support)
	2	a-law (no support)
<clock>	0	2.048MHz(default value (sample = 0))/4.096MHz(sample = 1)
	1	1.024 MHz(sample = 0)/ 2.048MHz (sample = 1)
	2	512k Hz(sample = 0)/ 1.024 MHz(sample = 1)
	3	256k Hz(sample = 0)/ 512k (sample = 1)
	4	2.048MHz(same as parameter 0)/4.096MHz(same as parameter 0)
<frame>	0	short frame (default)
	1	long frame (no support)
<offset>	0	Offset cleared (default) SYN and CLK synchronize rising edge alignment
	1	Short synchronization offset (no supported) In primary PCM mode, synchronization starts at the last quarter of the CLK rising edge
	2	Long synchronization offset settings (no support) aux PCM mode, synchronization in CLK rose along the 1/4 cycle after launch
< sample >	0	8k (default)
	1	16k
< num_slots >	1-2	Slot (default value is 1)
< slot_map0 >	1-16	Slot_map value default value is 1 (no support)
< slot_map1 >	2-16	Effective when num_slots = 2 (no support)

14 Hardware control extension commands

14.1 AT+WDISABLEEN Hardware W_Disable Pin Control

Command

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

Table 220 AT+WDISABLEEN operation command

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

Table 221 AT+WDISABLEEN parameter description

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

14.2 AT+RESET Module Reset Command

Table 222 AT+RESET operation command

Type	Command	Possible return results	Description
Executive 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 223 AT+POWEROFF operation command

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

14.4 GPIO Control Command: AT+GPIO

This command is used to control the GPIO level of the module, including the GPIO of the PMU and BB chips. You can set the level of multiple GPIOs at a time, but the GPIO type must be the same at one time.

table 224 AT+GPIO operation command

Type	Directives	Possible return results	Illustrate
Set Command	AT+GPIO= <type>,<gpio_num>,<gpio_value>[[,<gpio_num>,<gpio_value>] [...]]	<CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or <CR><LF> +CME ERROR: <err><CR><LF>	-
Query command	AT+GPIO= <type>,<gpio_num>	< CR><LF>+GPIO: <type>,<gpio_num>,<gpio_value> <CR><LF> <CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or	

Test command	AT+GPIO=?	<CR><LF> +CME ERROR: <err><CR><LF>	-
		<CR><LF>+GPIO: <0.1>,(gpio num),<0.1><CR><LF>	
Test command	AT+GPIO=?	<CR><LF>OK<CR><LF> or <CR><LF>ERROR<CR><LF> or <CR><LF> +CME ERROR: <err><CR><LF>	-
Command Example	Set the GPIO_6 on the AP to low	OK	-
	AT+GPIO=1,6,0		
	Set the GPIO_6 on the AP to low and the GPIO_8 to high	OK	
	AT+GPIO=1,6,0,8,1	+GPIO: 1,6,0	
Command Example	Query the GPIO_6 level status on an AP	OK	
	AT+GPIO=1.6		

table 225 The AT+GPIO parameters are described in detail

Parameter	Description
<type>	GPIO: PMU or AP 0 PMU 1 AP
< gpio_num >	The GPIO number on the chip
< gpio_value >	GPIO output level 0 Set GPIO to Low 1 Set GPIO to High

Attribute	Description
Power-off and save	N
PIN	N

15 GPS related commands

15.1 AT+GPSRUN GPS Start Command

Table 226 AT+ GPSRUN operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSRUN	OK	
		ERROR/+CME ERROR: <err><CR><LF>	Fail
Test Command	AT+ GPSRUN =?	+GPSRUN OK	

15.2 AT+GPSSTOP GPS Stop Command

Table 227 AT+ GPSSTOP operation command

Type	Command	Possible return results	Description
Set Command	AT+ GPSSTOP	OK	
		ERROR/+CME ERROR: <err><CR><LF>	Fail
Test Command	AT+ GPSSTOP =?	+ GPSSTOP OK	

15.3 AT+GPSLOC Obtain Location Data

Table 228 AT+ GPSLOC operation command

Type	Command	Possible return results	Description
Test Command	AT+ GPSLOC=?	+ GPSLOC OK	
Query Command	AT+ GPSLOC	+GpsLoc: <utc_time>,<latitude>,<nors>,<longitude>,<eorw>,<hdop>,<altitude>,<fixmode>,<cog>,<speed>,<date>,<satellites_num>	
		OK	

15.4 AT+GPSGNMEA Obtain NMEA Data

Table 229 AT+ GPSGNMEA operation command

Type	Command	Possible return results	Description
Test Command	AT+GPSGNMEA=?	+ GPSGNMEA:(0-6)	
		OK	
Query Command	AT+GPSGNMEA=<TYPE>	\$GNGGA,,,,,0,00,99.99,,,,,*56	NMEA data
		OK	

Table 230 AT+GPSGNMEA parameter description

Parameter	Value	Description
< TYPE > Type of NMEA data	0	RMC
	1	GGA
	2	GSA
	3	GPGSV
	4	GBGSV
	5	GLGSV
	6	GAGSV

15.5 AT+GPSSTATE Get the GPS Operating Status

Table 231 AT+GPSSTATE operation command

Type	Command	Possible return results	Description
Test Command	AT+GPSSTATE=?	+ GPSSTATE?	
		OK	
Query Command	AT+GPSSTATE?	+ GPSSTATE: 0	Disable GPS
		OK	
		+ GPSSTATE: 1	Enable GPS
		OK	

15.6 AT+GPSDEL Hot and Cold Restart

Table 232 AT+GPSDEL operation command

Type	Command	Possible return results	Description
Test Command	AT+GPSDEL=?	+ GPSDEL:(0-2)	
		OK	
Set Command	AT+GPSDEL=<type>	OK	

Table 233 AT+GPSDEL parameter description

Parameter	Value	Description
< TYPE > Type of data	0	Cold restart
	1	Warm restart
	2	Hot restart

15.7 AT+GPSCFG Parameter Configuration Commands

This command is used to query and configure GNSS settings, including the output of the NMEA port, NMEA output type, and GNSS configuration.

Table 234 AT+ GPSCFG operation command

Type	Command	Possible return results	Description
Test Command	AT+GPSCFG=?	+GPSCFG: "outport", (0-1) +GPSCFG: "nmeasrc", (0-1) +GPSCFG: "gpsnmeatype", (0-63) +GPSCFG: "glonassnmeatype", (0-1) +GPSCFG: "galileonmeatype", (0-1) +GPSCFG: "beidoumeatype", (0-63) +GPSCFG: "gnnmeatype", (0-31) +GPSCFG: "gnssconfig", (0-3) +GPSCFG: "autogps", (0-1)	
		OK	

15.7.1 Configure GNSS Satellite Types

Table 235 GNSSCONFIG operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="gnssconfig",<type>	OK	Initial value: 3
Query Command	AT+GPSCFG="gnssconfig"	+GPSCFG:"gnssconfig",<type> OK	

Table 236 GNSSCONFIG parameter description

Parameter	Value	Description
< TYPE > Type of data	0	GPS+SBAS+QZSS
	1	BDS
	2	GPS+GLONASS+GALILEO+SBAS+QZSS
	3	GPS+BDS+GALILEO+SBAS+QZSS

15.7.2 Configure the Output Port of the NMEA Statement

Before the configuration output to the NMEA port, the NMEA port must be opened externally;
Before closing the NMEA port externally, you must configure to close the NMEA port first.

Table 237 OUTPORT operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="outport",<type>	OK	Initial value: 0 (configuration power-off loss)
Query Command	AT+GPSCFG="outport"	+GPSCFG:"outport",<type> OK	

Table 238 OUTPORT parameter description

Parameter	Value	Description
< TYPE >	0	Close the NMEA port
Type of data	1	Output to NMEA port

15.7.3 Enable/Disable the Get NMEA Command

Set whether to enable the AT+GPSCNMEA command.

Table 239 NMEASRC operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="nmeasrc",<type>	OK	Initial value: 1
Query Command	AT+GPSCFG="nmeasrc"	+GPSCFG:"nmeasrc",<type> OK	

Table 240 NMEASRC parameter description

Parameter	Value	Description
< TYPE >	0	Disable obtain NMEA data function
Type of data	1	Enable obtain NMEA data function

15.7.4 Configure the GPS NMEA Data Output Type

Table 241 GPSCNMEATYPE operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="gpsnmeatype",<type>	OK	Initial value: 63
Query Command	AT+GPSCFG="gpsnmeatype"	+GPSCFG:"gpsnmeatype",<type> e> OK	

Table 242 GPSNMEATYPE parameter description

Parameter	Value	Description
< TYPE > Type of data	0 DISABLE	Configure the NMEA output type corresponding to GPS. If you want to print a statement separately, run AT+GPSCFG="gpsnmeatype",0, and then set it.
	1 GGA	
	2 RMC	
	4 GSV	
	8 GSA	
	16 VTG	
	32 GLL	

15.7.5 Configure the BEIDOU NMEA Data Output Type

Table 243 BEIDOUNMEATYPE operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="beidounmeatype",<type>	OK	Initial value: 63
Query Command	AT+GPSCFG="beidounmeatype"	+GPSCFG: "beidounmeatype",<type> OK	

Table 244 BEIDOUNMEATYPE parameter description

Parameter	Value	Description
< TYPE > Type of data	0 DISABLE	Configure the NMEA output type corresponding to GPS. If you want to print a statement separately, run AT+GPSCFG=" beidounmeatype",0, and then set it.
	1 GGA	
	2 RMC	
	4 GSV	
	8 GSA	
	16 VTG	
	32 GLL	

15.7.6 Configure the GLONASS NMEA Data Output Type

Table 245 GLONASSNMEATYPE operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="glonassnmeatype",<type>	OK	Initial value: 1
Query Command	AT+GPSCFG="glonassnmeatype"	+GPSCFG:"glonassnmeatype",<type> OK	

Table 246 GLONASSNMEATYPE parameter description

Parameter	Value	Description
< TYPE > Type of data	0 DISABLE 1 GSV	Configure the NMEA output type corresponding to GPS. If you want to print a statement separately, run AT+GPSCFG=" glonassnmeatype",0, and then set it.

15.7.7 Configure the GALILEO NMEA Data Output Type

Table 247 GALILEONMEATYPE operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="galileonmeatype",<type>	OK	Initial value: 1
Query Command	AT+GPSCFG="galileonmeatype"	+GPSCFG:"galileonmeatype",<type> OK	

Table 248 GALILEONMEATYPE parameter description

Parameter	Value	Description
< TYPE > Type of data	0 DISABLE 1 GSV	Configure the NMEA output type corresponding to GPS. To print a statement separately, run AT+GPSCFG="galileonmeatype",0 and then set it.

15.7.8 Configure the GN NMEA Data Output Type

Table 249 GNNMEATYPE operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="gnnmeatype",<type> >	OK	Initial value: 31
Query Command	AT+GPSCFG="gnnmeatype"	+GPSCFG:"gnnmeatype" ",<type> OK	

Table 250 GNNMEATYPE parameter description

Parameter	Value	Description
< TYPE > Type of data	0	DISABLE
	1	GGA
	2	RMC
	4	GSA
	8	VTG
	16	GLL

Configure the NMEA output type corresponding to GPS.
If you want to print a statement separately, run AT+GPSCFG=" gnnmeatype",0, and then set it.

15.7.9 Enable/Disable Automatic GNSS Running

Table 251 AUTOGPS operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="autogps",<type>	OK	Initial value: 0. The configuration takes effect after the restart
Query Command	AT+GPSCFG="autogps"	+GPSCFG:"autogps",<type> OK	

Table 252 AUTOGPS parameter description

Parameter	Value	Description
< TYPE >	0	Disable the GNSS automatic running function
Type of data	1	Enable GNSS automatic running function

15.8 Example

15.8.1 GPS Run Command

AT+GPSRUN

OK

15.8.2 GPS Stop Command

AT+GPSSTOP

OK

15.8.3 Obtaining Location Data

AT+GPSLOC

+GpsLoc:061636.00,3411.766990,N,10851.859940,E,7.100000,351.400000,A,0.000000,0.000000,261022,7

OK

15.8.4 Obtaining NMEA Data

AT+GPSGNMEA=0

\$GNRMC,062058.00,A,3411.92276,N,10851.83163,E,0.569,,261022,,,A,V*1F

OK

AT+GPSGNMEA=1

\$GNGGA,061947.00,3411.91583,N,10851.83112,E,1,22,0.87,350.4,M,,M,,*59

OK

AT+GPSGNMEA=2

\$GNGSA,A,3,33,,,,,,,,,2.56,1.16,2.28,3*0C

OK

AT+GPSGNMEA=3

\$GPGSV,4,1,15,10,82,162,29,22,37,297,34,24,15,049,26,25,43,119,29,0*67

\$GPGSV,4,2,15,31,33,231,28,01,03,326,33,12,33,075,30,21,14,306,,0*6B

\$GPGSV,4,3,15,23,46,145,17,32,58,331,23,194,44,120,24,42,38,132,,0*5B

\$GPGSV,4,4,15,50,34,127,,40,21,247,,41,41,220,,0*51

OK

AT+GPSGNMEA=4

\$GBGSV,5,1,17,06,69,317,26,08,44,185,30,13,56,205,28,16,69,344,33,0*7D

\$GBGSV,5,2,17,19,67,343,30,38,33,176,33,39,67,003,34,02,43,220,,0*79

\$GBGSV,5,3,17,03,50,177,25,07,10,170,31,09,59,281,,10,05,180,,0*76

\$GBGSV,5,4,17,20,50,105,25,22,17,310,22,36,37,203,23,37,26,044,24,0*77

\$GBGSV,5,5,17,60,38,223,35,0*49

OK

AT+GPSGNMEA=5

OK

AT+GPSGNMEA=6

\$GAGSV,1,1,03,33,09,196,34,04,,,30,27,,,33,0*45

OK

15.8.5 Obtaining GPS State

AT+GPSSTATE=?

+GPSSTATE?

OK

AT+GPSSTATE?

+GPSSTATE: 1

OK

15.8.6 Hot and Cold Restart

AT+GPSDEL=?

+GPSDEL:(0-2)

OK

AT+GPSDEL=0

OK

AT+GPSDEL=1

OK

AT+GPSDEL=2

OK

15.8.7 Parameter Configuration Commands

15.8.7.1 Configure GNSS Satellite Types

AT+GPSCFG="gnssconfig",1

OK

AT+GPSCFG="gnssconfig"

+GPSCFG:"gnssconfig",1

OK

15.8.7.2 Configure the NMEA Statement Output Port

AT+GPSCFG="outport",1

OK

AT+GPSCFG="outport"

+GPSCFG:"outport",1

OK

15.8.7.3 Enable/Disable the Get NMEA Command

AT+GPSCFG="nmeasrc",1

OK

AT+GPSCFG="nmeasrc"

+GPSCFG:"nmeasrc",1

OK

15.8.7.4 Configure the GPS NMEA Data Output Type

AT+GPSCFG="gpsnmeatype",1

OK

AT+GPSCFG="gpsnmeatype"

+GPSCFG:"gpsnmeatype",63

OK

15.8.7.5 Configure the BEIDOU NMEA Data Output Type

AT+GPSCFG="beidounmeatype",1

OK

AT+GPSCFG="beidounmeatype"

+GPSCFG:"beidounmeatype",63

OK

15.8.7.6 Configure the GLONASS NMEA Data Output Type

AT+GPSCFG="glonassnmeatype",1

OK

AT+GPSCFG="glonassnmeatype"

+GPSCFG:"glonassnmeatype",1

OK

15.8.7.7 Configure the GALILEO NMEA Data Output Type

AT+GPSCFG="galileonmeatype",1

OK

AT+GPSCFG="galileonmeatype"

+GPSCFG:"galileonmeatype",1

OK

15.8.7.8 Configure the GN NMEA Data Output Type

AT+GPSCFG="gnnmeatype",1

OK

AT+GPSCFG="gnnmeatype"

+GPSCFG:"gnnmeatype",31

OK

15.8.7.9 Enable/Disable Automatic GNSS Running

AT+GPSCFG="autogps",1

OK

AT+GPSCFG="autogps"

+GPSCFG:"autogps",1

OK

16 Custom AT Command

16.1 Command for Querying Cell Information: AT+MENG

This command is a custom project for Newland. Based on the AT^CELLINFO command, a new AT+MENG command is added to query information about the current serving cell and neighboring cells.

Note: For general AT commands, please refer to 8.8 Command for querying cell information: AT^CELLINFO.

Table 253 AT+MENG operation command

Type	Command	Possible return results	Description
Set Command	AT+MENG="servingcell"	LTE Network standard: +MENG: "servingcell", <state>,"LTE",<is_tdd>,<MCC>,<MNC>,<cellID>,<PCI>,<EARFCN>,<freq_band_in d>,<UL_bandwitch>,<DL_bandwitch>,<TAC>,<RSRP>,<RSRQ>,<RSSI>,<srxlev>	
		OK WCDMA Network standard: +MENG: "servingcell", <state>,"WCDMA",<MCC>,<MNC>,<LAC>,<cellID>,<UARFCN>,<PSC>,<RAC>,<RSCP>,<ecn0>,-,-,-,-,-	
		OK GSM Network standard: +MENG: "servingcell", <state>,"GSM",<MCC>,<MNC>,<LAC>,<cellID>,<BSIC>,<ARFCN>,<GSM_band>,<srxlev>,<TX_power>,<rla>,<DRX>,<c1>,<c2>,<GPRS_support>,-,-,-,-,-,-,-," -"	
Set Command	AT+MENG="neighbourcell"	O LTE Network standard: +MENG: "neighbourcell intra", "LTE",<EARFCN>,<PCI>,<RSRP>,<RSRQ>,-,-,<srxlev>,<cell_resele_priority>,<s_non_intra_search>,<thresh_serving_low>,<s_intra_search>	-

```
[...]  
+MENG: " neighbourcell inter",  
"LTE",<EARFCN>,<PCI>,<RSRP>,<RSRQ>  
,-,,<srxlev>,<thresh_low>,<thresh_high>  
>,<cell_resel_priority>  
[...]  
+MENG: " neighbourcell",  
"GSM",<ARFCN>,<cell_resel_priority>,<th  
resh_GSM_high>,<thresh_GSM_low>,<N  
CC_permitted>,<GSM_band>,<BSIC>,<rx  
lev>  
[...]  
+MENG: " neighbourcell",  
"WCDMA",<UARFCN>,<cell_resel_priorit  
y>,<threshX_high>,<thresh_low>,<PSC>,  
<CPICH_recip>,<CPICH_ecn0>,<srxlev>  
[...]
```

OK

WCDMA Network standard:

```
+MENG: " neighbourcell",  
"WCDMA",<UARFCN>,<srxqual>,<PSC>,  
<RSCP>,<ecn0>,<set>,-,<srxlev>  
[...]  
+MENG: " neighbourcell",  
"GSM",<BSIC>,<RSSI>,<rxlev>,<rank>  
[...]  
+MENG: " neighbourcell",  
"LTE",<EARFCN>,<PCI>,<RSRP>,<RSRQ>  
,<srxlev>  
[...]
```

OK

GSM Network standard:

```
+MENG: " neighbourcell",  
"GSM",<MCC>,<MNC>,<LAC>,<cellID>,<  
BSIC>,<ARFCN>,<rxlev>,<c1>,<c2>,<c31>  
>,<c32>  
[...]  
+MENG: " neighbourcell",  
"WCDMA",<UARFCN>,<PSC>,<RSCP>,<e  
cn0>  
[...]  
+MENG: " neighbourcell",  
"LTE",<EARFCN>,<PCI>,<RSRP>,<RSRQ>  
[...]
```

OK

Test Command	AT+MENG=?	+MENG: "servingcell ", " neighbourcell "
		OK
	AT+MENG="servingcell"	+MENG: "servingcell","NOCONN","LTE","FDD",460 ,01,5A29C0B,465,1650,3,5,5,DE10,-69,- 5,-65,21, 51
		OK
Command Example	AT+MENG="servingcell"	+MENG: "servingcell","NOCONN","WCDMA",460,0 1,D5D5,8054BBF,10633,457,10,-72,- 5,-,-,-,-
		OK
	AT+MENG="servingcell"	+MENG: "servingcell","NOCONN","GSM",460,00,5 50B,D89,35,59,2,- 82,0,8,0,21,131,1,-,-,-,-,-,-,-,-,-
		OK

Table 254 AT+MEENG operation command

Parameter	Description
<cell_type>	- String type. Different types of cell information. "servingcell": Information of 2G/3G/4G serving cells "neighbourcell": Information of 2G/3G/4G neighboring cells "3gcomm": Information of 3G serving cells, 2G neighboring cells, and 3G neighboring cells under the WCDMA network standard - Neighboring cell information 3: Carrier aggregation cell information;
<state>	- String type. UE status. "SEARCH": The UE is searching for a network but has not yet found a suitable 2G/3G/4G cell. "LIMSRV": The UE is camped on a cell but has not yet registered on the network. "NOCONN": The UE is camped on a cell, has registered on the network, and is in idle mode. "CONNECT": The UE is camped on a cell, has registered on the network, and is in a call.
<RAT>	String type. Access standard. Including "2G", "3G" and "4G".
<is_tdd>	String type. Communication mode. "TDD": Time Division Duplex mode "FDD": Frequency Division Duplex mode
<MCC>	Integer. Mobile Country Code (MCC)

<MNC>	Integer. Mobile Network Code (MNC)
<cellID>	Hexadecimal format. Cell ID. This parameter specifies a 16-bit (GSM), 28-bit (UMTS) or 32-bit (LTE) cell ID. Range: 0~0xFFFFFFFF.
<PCI>	Integer. Physical Cell Identifier (PCI). Range: 0~503.
<EARFCN>	Integer. E-UTRA Absolute Radio Frequency Channel Number (ARFCN). Range: 0~65535 (if extended frequency bands are supported, the value range of this parameter for extended bands is 65536~70645).
<freq_band_ind>	Integer. E-UTRA frequency band
<UL_bandwidth>	Integer. Uplink bandwidth. 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz
<DL_bandwidth>	Integer. Downlink bandwidth. 0 1.4 MHz 1 3 MHz 2 5 MHz 3 10 MHz 4 15 MHz 5 20 MHz
<TAC>	Hexadecimal format. Tracking Area Code (TAC). Range: 0~0xFFFFFFFF.
<RSRP>	Integer. Reference Signal Received Power (RSRP). Unit: dBm.
<RSRQ>	Integer. Reference Signal Received Quality (RSRQ). Unit: dB.
<RSSI>	Integer. Received Signal Strength Indicator (RSSI). Unit: dBm.
<SINR>	Integer. Signal to Interference plus Noise Ratio (SINR). Range: -20~30; Unit: dB.
<srxlev>	Integer. Cell Selection Receive Level Value. Unit: dB. (Refer to 3GPP 25.304/3GPP 36.304) Hexadecimal format. Two-byte Location Area Code (LAC) of the scanned cell (e.g., 00C1 is equal to 193 in decimal). Range: 0~0xFFFF.
<UARFCN>	Integer. UTRA Absolute Radio Frequency Channel Number (UARFCN). Range: 712~10838.
<PSC>	Integer. Primary Scrambling Code (PSC). Range: 0~511.
<RAC>	Integer. Routing Area Code (RAC). Range: 0~255.
<RSCP>	Integer. Received Signal Code Power (RSCP).
<ecno>	Integer. EC/NO (Energy per Chip over Noise Spectral Density) is the ratio of the received energy per PN chip to the total received power spectral density, which is related to the channel. Unit: dB.
<BSIC>	Integer. Base Station Identity Code (BSIC). Range: 0~63.

<ARFCN>	Integer. Absolute Radio Frequency Channel Number (ARFCN). Range: 0~1023.
<GSM_band>	Integer. GSM Frequency Band. 0 DCS1800 1 PCS1900 2 GSM900 "- " Other GSM frequency bands
<rxlev>	Integer. Cell Receive Level Value. Range: 0~63; Unit: dB. Subtracting 111 from this parameter value can convert it to a value in dBm.
<TX_power>	Integer. Transmit Power.
<rla>	Integer. Minimum Access Level.
<DRX>	Integer. Discontinuous Reception Cycle Length.
<c1>	Integer. Reference Criterion for Cell Selection.
<c2>	Integer. Reference Criterion for Cell Reselection.
<GPRS_support>	Integer. Whether the current cell supports GPRS. 0: Does not support GPRS 1: Supports GPRS
<cell_resel_priority>	Integer. Cell Reselection Priority. Range: 0~7.
<s_non_intra_search>	Integer. Threshold for Controlling Non-Cofrequency Search
<thresh_serving_low>	Integer. <srxlev> threshold used by the UE on the serving cell when reselecting to a lower-priority RAT/frequency. Unit: dB.
<s_intra_search>	Integer. Measurement Trigger Threshold for Intrafrequency Cell Reselection.
<threshX_low>	Integer. Low-Priority Cell Reselection Threshold. The suitable receive level value of the evaluated low-priority cell must be greater than this value. Range: 0~31; Unit: 2 dB.
<threshX_high>	Integer. High-Priority Cell Reselection Threshold. The suitable receive level value of the evaluated high-priority cell must be greater than this value. Range: 0~31; Unit: 2 dB.
<thresh_GSM_high>	Integer. Reselection Threshold for High-Priority Layers.
<thresh_GSM_low>	Integer. Reselection Threshold for Low-Priority Layers.
<NCC_permitted>	Integer. Bitmask specifying whether to report neighboring cells using a specific Network Color Code.
<CPICH_rscp>	Integer. CPICH/PCCPCH Received Signal Code Power (RSCP). RSCP is transmitted as an integer in the range of -120 dBm to -25 dBm in UMTS FDD/TDD messages. According to 3GPP 25.133, this value is encoded as an integer between -5 and 99.
<CPICH_ecno>	Integer. Ratio of the received energy per PN chip of the Common Pilot Channel to the total received power spectral density at the UE antenna connector.
<srxqual>	Integer. Cell Selection Receive Quality. Valid only for FDD. Unit: dB.
<set>	Integer. 3G Neighboring Cell Setting.

	0/2: Synchronous Neighbor Set 1: Active Neighbor Set 3: Asynchronous Neighbor Set
<rank>	Integer. Cell Rank of Inter-RAT Reselection Neighbors.
<c31>	Integer. GPRS Signal Level Threshold Criterion.
<c32>	Integer. Cell Queuing Criterion Parameter. Used for selecting cells among those with the same priority.

16.2 Command for Filling in or Reading String-Form Data in NV +EFSRW

This AT command is solely used for writing to or reading string data from the NV file odm_custom_parameter.nvm in the 770A project for the customer "Data Transmission - Botan".

Table 255 AT+EFSRW operation command

Type	Command	Possible return results	Description
Set Command	AT+EFSRW=<mode>,<reserved>,<filename>[,<string>]	OK or ERROR	-
Query Command	AT+EFSRW?	ERROR	-
Test Command	AT+EFSRW=?	+EFSRW: (0-1),(0-1),, OK	-
Test Command	AT+EFSRW=1,0,"odm_custom_parameter.nvm","1A2C3B4Z"	OK	
	AT+EFSRW=0,0,"odm_custom_parameter.nvm"	+EFSRW: 1A2C3B4Z OK	

Table 256 AT+EFSRW operation command

Parameter	Value	Description
< mode >	0-1	0: Read NV file data 1: Write data to NV file
< reserved >	0-1	Reserved for future development only
< filename >	"odm_custom_parameter.nvm"	NV file created for customer data transmission - Botan, used to store string data

< string >	A string consisting of uppercase and lowercase letters and Arabic numerals with a maximum length of 2000	String data to be stored
------------	--	--------------------------

17 Error code

Table 257 Error code

Error code value	Description
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
48	hidden key required
49	EAP method not supported
50	Incorrect parameters
51	Parameter length error for all Auth commands
52	Temporary error for all auth cmds
100	unknown
103	Illegal MS
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
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
151	VBS/VGCS not supported by the network
152	No service subscription on SIM

153	No subscription for group ID
154	Group Id not activated on SIM
155	No matching notification
156	VBS/VGCS call already presen
157	Congestion
158	Network failure
159	Uplink busy
160	No access rights for SIM file
161	No subscription for priority
162	operation not applicable or not possible
163	Group Id prefixes not supported
164	Group Id prefixes not usable for VBS
165	Group Id prefix value invalid
170	IMSSRV failure
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index

322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
501	WIFI labtool return error
502	BT labtool return error
503	FM labtool return error
504	MRD file already exist
505	MRD file with same version already exist
506	MRD file with newer version already
507	MRD authorization failure
508	(U)SIM PUK blocked