



HUAWEI MG323 Series Wireless Module

AT Command Interface Specification

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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
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02	2012-10-27	10.14	Updated section 10.14 AT^FTPCMD - Command for Enabling File Transmission
		11	Added the text feature mode of SMS
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		2.5	Updated section 2.5 ATV–Command for Setting the Formats of ME Responses
		2.8	Updated section 2.8 AT+CFUN–Command for Setting the Work Mode
		2.9	Updated section 2.9 AT^SMSO–Command for System Shutdown
		2.13	Updated section 2.13 AT^SCFG–Extended Command for Setting



Document Version	Date	Chapter	Descriptions
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		4.2	Updated section 4.2 AT&C–Command for Setting the DCD Usage State
		4.5	Added section 4.5 AT^HRIM– Command for Setting the RI Usage State
		4.6	Updated section 4.6 AT+IPR–Command for Setting the Baud Rate of the DTE-DCE
		4.7	Added section 4.7 AT+ICF–Command for Setting the Character Frame Format
		7.11	Updated section 7.11 ATO–Command for Switching Command Mode to Data Mode
		7.21	Updated section 7.21 ^CEND– Command for Call Ending Indication
		8.8	Updated section 8.8 AT^MONI–Command for Querying the Cell Information in Idle and Dedicated Modes
		9.1	Updated section 9.1 AT+CGDCONT–Command for Defining the PDP Context
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		17.6	Updated section 17.6 ^AUDEND–Command for Reporting the End of Audio Playback
		17.7	Updated section 17.7 AT^AUDREC–Command for Audio Recording Command
		17.10	Added section 17.10 AT^AUDIOCFG–Command for Configuring Tone Volume Level
		17.11	Added section 17.11 AT^KEYTONE–Command for Playing Local DTMF Key Tone
		17.12	Added section 17.12 AT^ECHOPARA–Commands for Configuring Echo-Related Settings
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		19.1	Updated List of Effects on AT Commands Imposed by SIM PIN
		19.2	Updated List of URC Commands



Scope

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1 Overall Description

This chapter briefly describes the contents and organization of this document and focuses on the basic knowledge of AT command interfaces.

Please read the release note released with the firmware software before using MG323/MG323-B module and this document.

1.1 Content Description

This document describes the AT command interface specification that is supported by Huawei terminal product MG323/MG323-B module. This document describes certain AT commands (implemented by terminal devices) of international standards such as 3GPP TS 27.007 3d0, 3GPP TS 27.005 320, and ITU-T V.250 according to the requirements of terminal devices. In addition, this document describes the proprietary AT command interfaces that are implemented by terminal devices. These proprietary AT command interfaces help implement a certain function.

This document does not describe the interfaces that have been defined by standards or implemented by the mobile terminal (MT) but are not required by the MG323/MG323-B. The description of AT command interfaces covers only the data packets of interfaces and the methods and processes for the terminal equipment (TE) and the MT to use interfaces, excluding the contents that are not directly related to interfaces. In addition, this document describes only the AT command interfaces falling within the range of Rm interfaces between the TE and MT, excluding the AT command interfaces falling within the range of Um interfaces between the MT and IWF.

1.2 Product Description

The MG323/MG323-B provides one external UART interface and supports functions such as SMS, phone book management, data service, and embedded TCP/UDP.

1.3 Instructions for Use

You are not advised to use various parameter values that are not described in this document or not supported currently as described in this document.

The AT command parameters described in the following chapters are in two formats: <> and [], which are described as follows:

- <...> The parameter inside these angle brackets is mandatory. The <> does not exist in a command.
- [...] The parameter inside these square brackets is optional. The [] does not exist in a command or a response.
- <CR> Carriage return character. For details, see the description in S3.
- <LF> Line feed character.

For details, see the description in S4.

When an AT command is sent, the characters contained in the name and parameters (excluding SMSs, phone book, and operator name) of the AT command are case insensitive. All the characters contained in the result returned by the AT command must be in upper case (excluding SMSs, phone book, and operator name).

When an AT command is sent, string parameters can be placed inside quotation marks or not. The strings in the result returned by the AT command are placed inside quotation marks.

1.4 Overview of AT Command Interfaces

1.4.1 Description of AT Commands

An AT command controls the rules for interaction between the TE such as PC and MT such as MS. Figure 1-1 shows the interaction between the TE and MT.

Figure 1-1 Interaction between the TE and MT

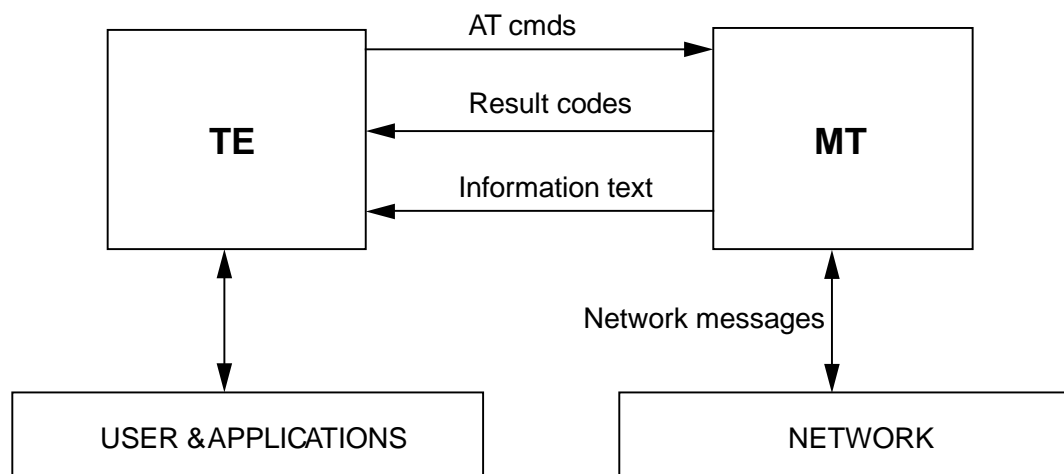
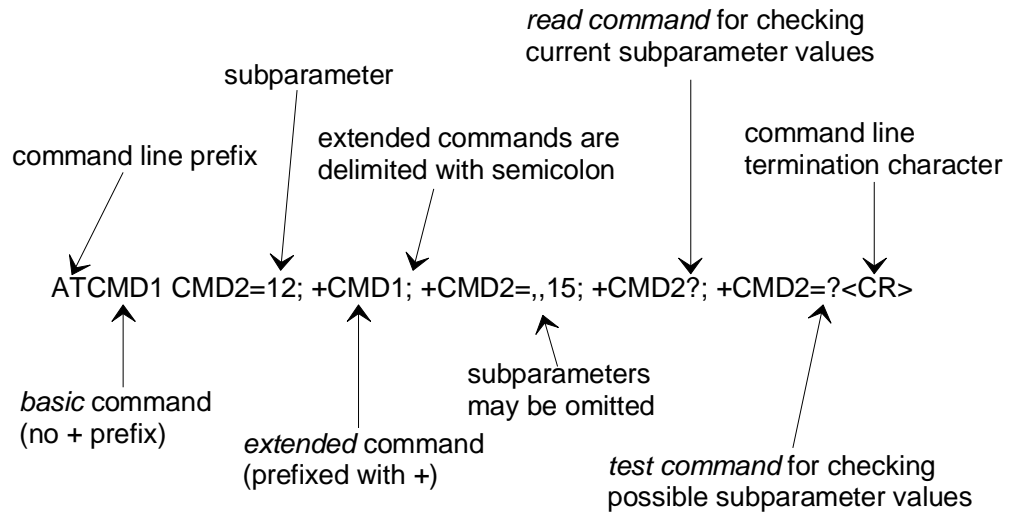


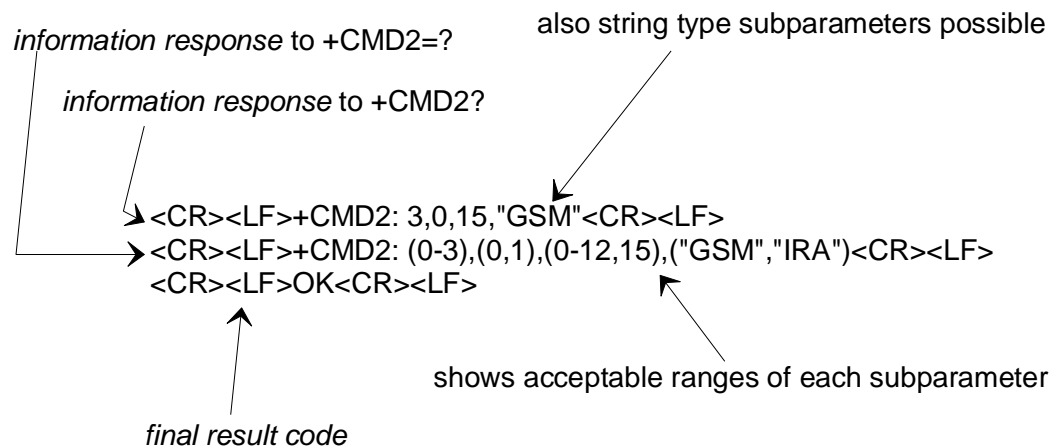
Figure 1-2 shows the basic organization format of the AT command line.

Figure 1-2 Basic organization format the AT command line



The returned value of the AT command consists of two parts: response message and result codes. Figure 1-3 shows an example of returned value of the AT command.

Figure 1-3 An example of returned value of the AT command



1.4.2 Types of AT Commands

AT commands are categorized into three types: basic commands, S register commands, and extended and vendor-defined commands.

A basic command starts with a single letter or with the & symbol plus a single letter. Table 1-1 describes the format of a basic command.

Table 1-1 Format of a basic command

Command Format	Description
<command>[<number>]	In the command format, <command> indicates a single letter (A–Z) or the & symbol plus a single letter. In the command format, <number> indicates a decimal number with one digit or multiple digits. The digit 0 in the forefront of <number> can be ignored.
Notes: <ul style="list-style-type: none">• If a basic command that is allowed to contain <number> does not contain <number>, the default value of <number> is used in the command.• If a basic command that is not allowed to contain <number> contains <number>, "Operation not allowed" is returned.	

An S register command consists of the letter S and a decimal number, which is called the parameter number of the register. An S register command can be in the format of read command and set command. Table 1-2 describes the format of an S register command.

Table 1-2 Format of an S register command

Command Format		Description
Read command	S<parameter number>?	Returns the ASCII code of characters currently saved in the S register. The ASCII code is expressed by a 3-digit decimal number. The digit 0 is added in the front of the number in case of insufficient digits.
Set command	S<parameter number>=<value>	Replaces the characters saved in the S register with the characters related to the value of <value>.
Note: If the parameter number of the register is not identified, this indicates that the command does not exist. In this case, ERROR is returned.		

All extended commands start with the + symbol. Vendor-defined commands start with a special symbol such as ^ and %. In this document, all vendor-defined commands start with the ^ or \ symbol. Extended and vendor-defined commands are further categorized into action commands and parameter commands. Table 1-3 describes the types and formats of extended and vendor-defined commands.

An action command refers to a command that performs a specific action in addition to interacting with the local parameters of the MS, including AT+CPBR and AT+CMGS. An action command may or may not contain parameters. Action commands are categorized into execution (set) command and test command. A parameter command refers to a command that interacts with the local parameters of the MS only, certain of which may affect the execution of action commands. Parameter commands are categorized into set command, read command, and test command.

Table 1-3 Types and formats of extended and vendor-defined commands

Command Type	Command Format		Description
Action command	Execution (Set) command	Contains no parameter: <name> Contains one parameter: <name>[=<value>] Contains multiple parameters: <name>[=<compound_value>]	In the command format, <compound_value> indicates multiple parameters that are separated by a comma. A parameter having a default value can be omitted from the command. In this case, the default value is used instead.
		Note: If all parameters are omitted, the = symbol following <name> should be omitted. If <name> is not identified, this command does not exist. In this case, the ERROR is returned. When <name> is identified, if a command that is not allowed to contain parameters contains parameters or a command that is allowed to contain parameters contains more parameters than the defined ones, "Operation not allowed" is returned.	
	Test command	<name>=?	A test command is executed to query the parameter range.
		Note: If the MS fails to identify <name>, the MS returns ERROR. If the MS can identify <name> and the contents returned by the command do not contain parameters, the MS returns OK. If the contents returned by the command contain parameters, the MS returns the available value range of each parameter, and then returns OK.	
Parameter command	Set command	Contains one parameter: <name>[=<value>] Contains multiple parameters: <name>[=<compound_value>]	A set command is executed to set parameters. In the command format, <compound_value> indicates multiple parameters that are separated by a comma. A parameter with a default value can be omitted from the command. In this case, the default value is used instead.



Command Type	Command Format		Description
		Note: If all parameters are omitted, the = symbol following <name> should be omitted. If <name> is not identified, this command does not exist. In this case, ERROR is returned. When <name> is identified, if a command that is not allowed to contain parameters contains parameters or a command that is allowed to contain parameters contains more parameters than the defined ones, "Operation not allowed" is returned.	
	Read command	<name>?	A read command is executed to read the current value of a parameter.
	Test command	<name>=?	A test command is executed to check the parameter range.
		Note: If the MS fails to identify <name>, the MS returns ERROR. If the MS can identify <name> and the contents returned by the command do not contain parameters, the MS returns OK. If the contents returned by the command contain parameters, the MS returns the value range of each parameter, and then returns OK.	

1.4.3 Abort Attributes of AT Commands

Abort means that the TE sends an instruction to abort a command when the command is being executed. An abort instruction must be sent before a command is completely executed. Therefore, the abort instruction is valid for a command whose execution consumes certain time; however, not all commands of this kind can be aborted. Whether a command can be aborted depends on the abort attribute of the command. Each AT command has its abort attribute, which is alternative. That is, the command is either abortive or not abortive. Abortive commands include certain basic commands and execution commands of action commands. Within 125 ms after the abortive commands are sent, no abort request is accepted. After 125 ms and before the commands are completely executed, if the module receives any character sent by the TE, the commands are aborted immediately.

Abortive commands are as follows:

- ATD*99#
- ATD*98#
- ATD*****, CSD data service command
- AT+CLCK
- AT+COPS commands (excluding AT+COPS=?)
- AT^MONI
- AT^MONP
- AT^SMONG



1.4.4 Rules for Running AT Commands

1. Each command line contains only one AT command and ends with a carriage return character. In principle, users are not allowed to run S3/S4 format modification commands. This rule is applicable to the communication between the MT and TE programs.
2. To increase the readability and regularity of command and response formats, in addition to the original interfaces specified in standards and protocols, all new interfaces must observe the following rule: No space is added to the end of commands such as the AT^XXX:<arg0>,<arg1> commands, or added to the end of the ^ symbol, colon, and comma. No redundant space is added ahead of or to the end of a command. This rule is applicable to the communication between the MT and TE programs.
3. For an uninterruptible AT command, after sending the AT command, the TE must wait until the MT responds to the AT command before sending the second AT command. Otherwise, the second AT command sent by the TE is not executed.
4. Unless otherwise stated, all default codes between the TE and MT follow the format of GSM 7 bit Default Alphabet. For details, see section 6 in the 3GPP TS 23.038 protocol. The @ character is still transmitted as 0x00 of the 7bit coding on interfaces. Therefore, the MT and TE must be able to process the character. The MT passes the carriage return character (<CR>) and line feed character (<LF>) in a string as spaces to the TE.
5. A string refers to a byte stream that is placed inside double quotation marks, excluding the quotation marks or commas.
6. A string used by the TE to send a command cannot contain the combination of quotation marks and commas (confusing a parameter with a string). The current version does not support escape character. The code value of a data format in the UCS2 coding is reported as characters. For example, if the UCS2 code of a Chinese character is 0x553a, the 553a is reported.
7. A possible response sent by the MT to the TE consists of Information text and Result code, in which Information text is optional and Result code is mandatory. The format of a possible response is controlled by the ATV command. For details, see the description of the ATV Command. In this document, all possible responses listed in tables follow the ATV1 format.

1.5 Organization of This Document

This document consists of 19 chapters, covering the following contents:

Chapter	Description
Chapter 1 Overall Description	The contents and organization of this document and the basic knowledge of AT command interfaces.
Chapter 2 Commands for Configuration	The AT commands used to configure the basic data of the module.
Chapter 3 Commands for Status Control	The AT commands used to control the status of the module.



Chapter	Description
Chapter 4 Commands for Serial Port Control	The AT commands used to control the serial ports of the module.
Chapter 5 Commands for Security Control	The AT commands used to control the security of the module.
Chapter 6 Commands for Identification	The AT commands used to query the identification information about the module.
Chapter 7 Commands for Call Control	The AT commands used to control the calls on the module.
Chapter 8 Commands for Network Services	The AT commands related to the network services of the module.
Chapter 9 Commands for Data Services	The AT commands related to the data services of the module.
Chapter 10 Commands for Internet Services	The AT commands related to the Internet services of the module.
Chapter 11 Commands for Short Messages	The AT commands related to the short messages of the module.
Chapter 12 Commands for STK Interface	The AT commands related to the SIM card of the module.
Chapter 13 Commands for the SIM Card	The AT commands related to the SIM card of the module.
Chapter 14 Commands for the Phone Book	The AT commands related to the phone book of the module.
Chapter 15 Commands for Unstructured Supplementary Service Data	The AT commands related to unstructured supplementary service data.
Chapter 16 Commands for Hardware Control	The AT commands used to control the hardware of the module.
Chapter 17 Commands for Audio Control	The AT commands used to control the audio of the module.
Chapter 18 Other Commands	Other auxiliary commands.
Chapter 19 Appendix	Appendix.



2 Commands for Configuration

This chapter describes the AT commands that allow external applications to configure the basic data of the module.

2.1 AT&F-Command for Restoring Factory Settings

The AT&F command restores the module to factory settings.

Execution command AT&F[<value>]

Function Restores the related parameters to factory settings.

Response <CR><LF>OK<CR><LF>

Parameter description

<value>: integer; AT&F is equivalent to AT&F0.

0: Restores the current settings for AT commands to the factory settings.

Table 2-1 List of factory settings for AT&F

Factory Settings for AT Commands	
Commands for configuration	
ATQ	<n>=0
ATV	<value>=1
AT+CFUN	<fun>=1
AT+CMEE	<errMode>=0
AT+CSCS	<chset>="GSM"
AT^SCFG	<tcpIrt>="3", <tcpMr>="10", <tcpOt>="6000", <tcpWithUrc>="on"



Factory Settings for AT Commands	
AT^PWROFFCFG	<duration>=1
Commands for status control	
AT+CMER	<mode>=0, <keyp>=0, <disp>=0, <ind>=0, <bfr>=0
AT+CIND	<mode>=1
Commands for serial port control	
AT\Q	<n>=0
AT&C	<value>=1
AT&D	<value>=2
AT&S	<value>=0
ATE	<value>=1
Commands for network services	
AT+COPS	<format>=0
AT+CREG	<n>=0
Commands for the GPRS	
AT+CGREG	<n>=0
AT+CGSMS	<service>=3
ATS7	<n>=060
AT+CBST	<speed>=7, <name>=0, <ce>=1
AT+CRLP	<iws>=61, <mws>=61, <T1>=78, <N2>=6
AT+CR	<mode>=0
AT+CRC	<mode>=0
Commands for short messages	
AT+CMGF	<mode>=0
AT+CNMI	<mode>=0, <mt>=0, <bm>=0, <ds>=0, <bfr>=1
AT+CSMS	<service>=0
Command for the phone book	
AT+CPBS	<storage>="SM"
Other commands	
ATS3	<n>=013
ATS4	<n>=010
ATS5	<n>=008



2.2 AT&V-Command for Querying the Current Configuration

The AT&V command queries the current configuration of the module. The display of certain configuration items depends on whether the PIN code is unlocked.

Execution command	AT&V[<value>]
Function	Queries the current parameter configuration.
Response	<CR><LF>ACTIVE PROFILE:<CR><LF>list of active profile<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<value>: integer; AT&V is equivalent to AT&V0.

0: Sequence number of the profile (default value).

Table 2-2 List of query results for AT&V

Examples of Results Returned by the &V Command	
PIN Locking	PIN Unlocking
ACTIVE PROFILE: E1 Q0 V1 &C1 &D2 &S0 \Q0 S3:013 S4:010 S5:008 S7:060 +CBST: 7,0,1 +CRLP: 61,61,78,6 +CR: 0 +IPR: 115200 +CMEE: 2 +CGSMS: 1 OK	ACTIVE PROFILE: E1 Q0 V1 &C1 &D2 &S0 \Q0 S3:013 S4:010 S5:008 S7:060 +CBST: 7,0,1 +CRLP: 61,61,78,6 +CR: 0 +CRC: 0 +CMGF: 0 +CNMI: 0,0,0,0,1 +IPR: 115200 +CMEE: 2 +CSMS: 0,1,1,1 +CREG: 0,1 +COPS: 0,0,"CC 460 NC 09" +CGSMS: 3 OK



2.3 AT&W-Command for Storing the Current Configuration

The AT&W command stores the current configuration of the module in the profile. The ATZ command restores the settings. When the AT&W command is used to store the current configuration information, if you restart the module without modifying the configuration information, the configuration of the module after restart is the configuration information stored by using the AT&W command.

Execution command	AT&W[<value>]
Function	Stores the current parameter configuration.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<value>: integer; AT&W is equivalent to AT&W0.

0: Sequence number of the profile (default value).

Table 2-3 List of commands and parameters that can be stored by AT&W

AT Commands	
Commands for configuration	
ATQ	<n>
ATV	<value>
ATE	<value>
AT+CMEE	<errMode>
Commands for serial port control	
AT\Q	<n>
AT&C	<value>
AT&D	<value>
AT&S	<value>
ATE	<value>
Commands for network services	
AT+COPS	<format>
AT+CREG	<n>

AT Commands	
Commands for call control	
AT+CBST	<speed>, <name>, <ce>
AT+CRLP	<iws>, <mws>, <T1>, <N2>
ATS7	<n>
AT+CR	<mode>
AT+CRC	<mode>
Commands for short messages	
AT+CMGF	<mode>
AT+CNMI	<mode>, <mt>, <bm>, <ds>
AT+CSMS	<service>
Other commands	
ATS3	<n>
ATS4	<n>
ATS5	<n>

2.4 ATQ-Command for Controlling the Return of Execution Results

The ATQ command controls whether to return the execution results to the TE.

Execution command	ATQ[<n>]
Function	Controls the return of execution results.
Response	<ul style="list-style-type: none"> In case of <n>=0: <CR><LF>OK<CR><LF> In case of <n>=1, no result is returned.

Parameter description

<n>: integer; ATQ is equivalent to ATQ0.

0: The DCE returns the execution results (default value).

1: The DCE does not return the execution results.



2.5 ATV-Command for Setting the Formats of ME Responses

The ATV command sets the formats of result code and information field returned by the AT command, including the composition of head and tail. In addition, the ATV command sets the forms of the contents of returned result code, including numeric and verbose string forms.

Execution command ATV[<value>]

Function Sets the formats of result code and information field returned by the AT command, and the forms of the contents of returned result code.

Response

- In case of successful execution:
<CR><LF>OK<CR><LF> (if <value> is 1)
0<CR> (if <value> is 0, because numeric response text is being used)
- In case of an error:
<CR><LF>ERROR<CR><LF> (for unsupported values, if previous value was V1)
4<CR> (for unsupported values, if previous value was V0)

Parameter description

<value>: integer; ATV is equivalent to ATV0.

0: The MS sends the abbreviated head and full tail, and returns the result code in numeric form.

1: The MS sends the full head and tail, and returns the result code in verbose string form (default value).

Table 2-4 Effect of ATV on response formats

	V0	V1
Returned information field	<text><CR><LF>	<CR><LF><text><CR><LF>
Returned result code	<numeric code><CR>	<CR><LF><verbose code><CR><LF>
Note: In the response format, <CR> indicates the S3 character; <LF> indicates the S4 character.		

Table 2-5 List of execution results

String Format	Numeric Format	Meaning
OK	0	The command is successfully executed.
CONNECT	1	The connection is successfully set up.
RING	2	The terminal rings.
NO CARRIER	3	The connection fails to be set up or the connection is hung up.
ERROR	4	An error occurs during command execution because the command is unavailable or the command line is too long.
BUSY	7	The called user is busy.
CONNECT 2400	47	Link with 2400 bps,
CONNECT 4800	48	Link with 4800 bps.
CONNECT 9600	49	Link with 9600 bps.

2.6 ATZ-Command for Restoring the Settings Saved by the User

The ATZ command restores the setting values saved by the user in the profile through AT&W to the module.

Execution command	ATZ[<value>]
Function	Restores the setting values saved by the user in the profile through AT&W.
Response	<CR><LF>OK<CR><LF>

Parameter description

<value>: integer; ATZ is equivalent to ATZ0.

0: Restores the setting values saved in the profile to the module.

2.7 ATE-Command for Setting Echo

The ATE command sets whether the TA echoes the characters received from the TE when the TA is in command state.

Execution command	ATE[<value>]
Function	Sets whether the TA echoes the characters received from the TE when the TA is in command state.
Response	<CR><LF>OK<CR><LF>

Parameter description

<n>: integer; ATE is equivalent to ATE0.

0: Disables echo.

1: Enables echo (default value).

2.8 AT+CFUN–Command for Setting the Work Mode

The AT+CFUN command is used to set the work mode of the module.

2.8.1 Querying the Supported Work Modes

Test command	AT+CFUN=?
Function	Queries the work modes supported by the module.
Response	<CR><LF>+CFUN: (list of supported <fun>s),(list of supported <rst>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<fun>: integer; indicates the work mode to be set on the board. The values are described in the following table.

Table 2-6 List of work modes

<fun>	Function Description	Remarks
0	Non-cyclic sleep mode.	Upon wakeup, the system is switched to the state of no power saving.
1 (default value)	No power saving.	
5	Cyclic sleep mode. After data processing is complete upon wakeup, the system stays in IDLE state for 2s.	

<fun>	Function Description	Remarks
6	Cyclic sleep mode. After data processing is complete upon wakeup, the system stays in IDLE state for 10 minutes. For other tasks, after message processing is complete and the system is IDLE again, the system automatically enters SLEEP mode again.	
7	Cyclic sleep mode. After data processing is complete upon wakeup, the system stays in IDLE state for 2s. For other tasks, after message processing is complete and the system is IDLE again, the system automatically enters SLEEP mode again.	During wakeup, the serial port can work properly.
8	Cyclic sleep mode. After data processing is complete upon wakeup, the system stays in IDLE state for 10 minutes. For other tasks, after message processing is complete and the system is IDLE again, the system automatically enters SLEEP mode again.	Same as AT+CFUN=6.
9	Cyclic sleep mode. After data processing is complete upon wakeup, the system stays in IDLE state for a period (2s by default), which is configurable. AT^SCFG="PowerSaver/Mode9/Timeout",<psm9to>; RTS0 and RTS1 can function as wakeup sources.	Wakeup can be activated through RTS0 and RTS1.

Table 2-7 Relations between work modes and services

Service	Setting Value			
	AT+CFUN=0	AT+CFUN=5 AT+CFUN=6	AT+CFUN=7 AT+CFUN=8	AT+CFUN=9
RTS1 activation	Quitting the current state	Short-term wakeup	Short-term wakeup	Short-term wakeup
Unsolicited report (URC)	Quitting the current state	Quitting the current state	Short-term wakeup	Short-term wakeup
Entry of AT commands on the serial port	Without effect (serial port unavailable)	Short-term wakeup	Short-term wakeup	Short-term wakeup



Service	Setting Value			
	AT+CFUN=0	AT+CFUN=5 AT+CFUN=6	AT+CFUN=7 AT+CFUN=8	AT+CFUN=9
Arrival of short messages (the reporting is set by AT+CNMI)	Quitting the current state	Quitting the current state	Short-term wakeup	Short-term wakeup
GPRS data transmission	Without effect (serial port unavailable)	Short-term wakeup	Short-term wakeup	Short-term wakeup
RTC alarm clock	Quitting the current state	Quitting the current state	Short-term wakeup	Short-term wakeup
AT+CFUN=1	Without effect (serial port unavailable)	Quitting the current state	Quitting the current state	Quitting the current state

<rst>: integer; indicates whether the board restarts before the work mode is switched.

0: The board does not restart (default value).

1: The board restarts.

2.8.2 Reading the Current Work Mode

Read command AT+CFUN?

Function Reads the current work mode of the module.

Response <CR><LF>+CFUN: <fun><CR><LF><CR><LF>OK<CR><LF>



2.8.3 Setting the Work Mode

Set command	AT+CFUN=[<fun>[,<rst>]]
Function	Sets the current work mode of the module.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR<CR><LF>

Notes:

- The work mode of the board that is configured through the set command can be saved upon power failure; If no parameters of this command are set, AT+CFUN= considers the previously set values valid for various parameters.
- When AT+CFUN=<fun>, 1 is set, <fun> is useless.
- During voice services, this command is invalid and "ERROR" will be returned.
- If the SIM card is not inserted, the PIN code is not activated, or the module is not registered with the network, the system will not go into the sleep mode even if it is set to a non-full-speed operation state.
- When AT+CFUN is set to 5, 6, 7, 8 or 9, after module enters sleep status, the data sent from serial port for the first time will be only used as wakeup source to wake up the module. The latter data will be processed normally.

2.9 AT^SMSO-Command for System Shutdown

The AT^SMSO command is used to shut down the system.

2.9.1 Checking Whether the Command for System Shutdown Exists in the Module

Test command	AT^SMSO=?
Function	Checks whether the command for system shutdown exists in the module.
Response	<CR><LF><CR><LF>OK<CR><LF>



2.9.2 Setting System Shutdown

Execution command	AT^SMSO
Function	Sets ME shutdown. After the shutdown process starts, the voltage of the VDD decreases and "^SHUTDOWN" is unsolicitedly reported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SMSO: MS OFF<CR><LF><CR><LF>OK<CR><LF><CR><LF>^SHUTDOWN <CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>
Notes:	<ul style="list-style-type: none">• Do not cut off the power of the ME before the VDD voltage decreases and the "^SHUTDOWN" URC is reported. Otherwise, data may be lost.• Other AT commands after the AT^SMSO command are not handled by the ME.

2.9.3 Examples

Send the command for system shutdown.

AT^SMSO

^SMSO: MS OFF

OK

^SHUTDOWN

2.10 AT+GCAP-Command for Querying the Transmission Capability Domain Supported by the MS

The AT+GCAP command is used to query the transmission capability domain supported by the MS.



2.10.1 Checking Whether the Command for Querying the Transmission Capability Domain Exists in the Module

Test command	AT+GCAP=?
Function	Checks whether the command for querying the transmission capability domain exists in the module.
Response	<CR><LF>OK<CR><LF>

2.10.2 Listing the Transmission Capability Domain Currently Supported by the MS

Execution command	AT+GCAP
Function	Lists the transmission capability domain currently supported by the MS.
Response	<CR><LF>+GCAP:<name><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<name>: string; for example, +CGSM.

2.10.3 Examples

List the transmission capability domain currently supported by the MS.

AT+GCAP

+GCAP:+CGSM

OK

The returned value +CGSM indicates that the MS currently supports the GSM mode.

2.11 AT+CMEE–Command for Setting Terminal Error Reporting

The AT+CMEE command is used to set terminal error reporting.

2.11.1 Querying the Error Reporting Mode Supported by the Terminal

Test command	AT+CMEE=?
Function	Queries the terminal error reporting mode supported by the module.
Response	<CR><LF>+CMEE: (list of supported <errMode>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<errMode>: integer; indicates the terminal error reporting mode.

0: Does not report the error code and returns ERROR only in case of an error (default value).

1: Reports the error by using +CME ERROR: <err>, in which <err> indicates the error code number.

2: Reports the error by using +CME ERROR: <err>, in which <err> indicates the string value of error description.

2.11.2 Reading the Terminal Error Reporting Mode

Read command	AT+CMEE?
Function	Reads the terminal error reporting mode of the module.
Response	<CR><LF>+CMEE: <errMode><CR><LF><CR><LF>OK<CR><LF>

2.11.3 Setting the Terminal Error Reporting Mode

Set command	AT+CMEE=<n>
Function	Sets the mode of reporting errors related to the ME by the module.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

If the error cause is unrelated to the MT, common ERROR is returned.



2.12 AT+CSCS–Command for Setting the TE Character Set

The AT+CSCS command is used to set the TE character set.

2.12.1 Querying the Character Set Supported by the TE

Test command	AT+CSCS=?
Function	Queries the character set supported by the TE.
Response	<CR><LF>+CSCS: (list of supported <chset>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<chset>: string, which indicates the character set of the MS.

Table 2-8 Character set of the MS

Value	Description
"GSM" (default value)	GSM 7bit coding (GSM 03.38 subclause 6.2.1)
"UCS2"	16-bit universal multiple-octet coded character set (ISO/IEC10646); the UCS2 string is converted into a hexadecimal number ranging from 0000 to FFFF, for example, "004100620063", which is equivalent to three 16-bit characters. The ASCII values in decimal mode are 65, 98, and 99.
"IRA"	International reference character set
Note: If <chset> is set to "GSM", an error may occur on software flow control (XOFF/XON).	

2.12.2 Reading the Character Set of the TE

Read command	AT+CSCS?
Function	Reads the character set of the TE.
Response	<CR><LF>+CSCS: <chset><CR><LF><CR><LF>OK<CR><LF>

2.12.3 Setting the Character Set of the TE

Set command	AT+CSCS=[<chset>]
Function	Sets the character set of the TE and notifies the TA of it so that the TA can properly convert the character set between the TE and MT.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- If the interface between the TA and TE has eight bits and the character set used by the TE has seven bits, the most significant bit of the character set must be set to 0.
- If no parameters of this command are set, AT+CSCS= considers the previously set values valid for various parameters.

2.13 AT^SCFG-Extended Command for Setting Configuration Items

The AT^SCFG command is used to set configuration items.

2.13.1 Querying the Configuration Items That Can Be Set by the Module

Test command	AT^SCFG=?
Function	Queries the configuration items that can be set by the module.
Response	<CR><LF>^SCFG: <str>s,(list of supported <value>s)<CR><LF>^SCFG: <str>s,(list of supported <value>s)[...]<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<str>: string, which indicates the configurable items. For details, see Table 2-9 .

<value>: indicates the configurable parameter values. For details, see Table 2-9 .

Table 2-9 List of configurable items

<str>	<value>
"PowerSaver/Mode9/Timeout"	<psm9to>
"Tcp/IRT" (which is not supported currently.)	<tcpIrt>
"Tcp/MR"	<tcpMr>

<str>	<value>
"Tcp/OT"	<tcpOt>
"Tcp/WithURCs"	<tcpWithUrc>
"URC/Datamode/Ringline"	<udri>
"URC/Ringline"	<uri>

<psm9to>: string, which indicates the duration of wakeup state in power saving mode 9 (the AT+CFUN command). The default value is 20, that is, 2s. The value range is as follows:

5–36000: The value 10 indicates 1s. The time interval is 100 ms.

<tcpIrt>: string, which indicates the waiting time for initial re-connection (IRT). The default value is 3.

1–60: This parameter sets the waiting time (in seconds) before starting the initial re-connection in the stage of setting up initial TCP/IP connection.

<tcpMr>: integer; indicates the maximum number of retransmissions (MR). The default value is 10.

1–30: Maximum number of times for retransmitting a TCP/IP data packet.

<tcpOt>: integer; indicates the duration for link disabling. The default value is 6000.

1–6000: Duration (in seconds) to be waited for disabling a link when a TCP/IP data packet is not acknowledged.

<tcpWithUrc>: string, which indicates whether the Internet service command follows the unsolicited reporting mode or polling mode. This parameter controls whether ^SISR, ^SISW, and ^SIS are unsolicitedly reported.

Table 2-10 Values of the <tcpWithUrc> parameter

Value	Description
"on" (default value)	Enables unsolicited reporting related to the Internet service command.
"off"	Disables unsolicited reporting related to the Internet service command.

<udri>: indicates RING reporting in data mode. This parameter controls the reporting string in TA-TE connection hold state (such as CS data service, GPRS data service, and AT command execution).

Table 2-11 Values of the <udri> parameter

Value	Description
"on"	Reports RING. This value is set by <urat> and <uri>.

Value	Description
"off" (default value)	Reports BREAK.

<uri>: string, which indicates the URC mode of the RING pin.

Table 2-12 Values of the <uri> parameter

Value	Description
"local" (default value)	Reports RING.
"off"	Does not report RING.

2.13.2 Reading the Settings for Configuration Items

Read command	AT^SCFG?
Function	Reads the settings for configuration items.
Response	<CR><LF>^SCFG: <str>s,<value>[<CR><LF>^SCFG: <str>s,<value>[...]]<CR><LF><CR><LF>OK<CR><LF>

2.13.3 Setting Configuration Items

Set command	AT^SCFG=<str>[,<value>]
Function	Sets configuration items.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

2.14 ^SYSSTART-Command for Unsolicitedly Reporting Module Startup

This command indicates that the module is started, and can be operated.

If the adaptive baud rate is set (that is, AT+IPR=0), this command is not reported.

URC <CR><LF>^SYSSTART<CR><LF>

2.15 ^SHUTDOWN-Command for Unsolicitedly Reporting Module Power-off

This command indicates that the power-off process of the module is complete.

URC <CR><LF><CR><LF>^SHUTDOWN<CR><LF>

2.16 AT^PWROFFCFG-Command for Setting the Power-off Stabilization Time

This command is used to set the power-off stabilization time.

2.16.1 Querying the Value Range Supported by This Command

Test command	AT^PWROFFCFG=?
Function	Queries the value range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^PWROFFCFG: (list of <duration>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<duration>: value type: integer; value range: 1–4; default value: 1; unit: second.

2.16.2 Querying the Current Stabilization Time

Read command	AT^PWROFFCFG?
Function	Queries the current stabilization time.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^PWROFFCFG: <duration><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>



2.16.3 Setting the Power-off Stabilization Time

Execution command	AT^PWROFFCFG=<duration>
Function	Sets the power-off stabilization time.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Note:

The setting configured by this command is effective even after the module is powered off.

2.16.4 Examples

Test command:

AT^PWROFFCFG=?

^PWROFFCFG: (1–4)

OK

Set command:

AT^PWROFFCFG=3

OK

Query command:

AT^PWROFFCFG?

^PWROFFCFG: 3

OK



3 Commands for Status Control

This chapter describes the AT commands for controlling the status of the module.

3.1 AT+CMER–Command for Setting Event Reporting

The AT+CMER command controls the +CIEV unsolicited reporting that is related to AT^SIND and AT+CIND commands. For an event that is registered through AT^SIND and AT+CIND commands, if the indicator value related to the event changes, unsolicited reporting is performed.

3.1.1 Querying the Supported Settings for Event Reporting

Test command	AT+CMER=?
Function	Queries the supported settings for event reporting.
Response	<CR><LF>+CMER: (list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<mode>: integer.

0: Unsolicited report codes (URCs) are buffered on the TA. If the buffer of the TA is full, URCs are buffered at other locations or the oldest URCs are discarded (default value).

1: URCs are discarded in TA-TE connection hold state (such as data service mode). Otherwise, the event is reported directly to the TE.

2: URCs are discarded when TA-TE link is reserved, for example, in online data mode. Otherwise they are forwarded directly to the TE (this is not supported currently).

<keyp>: integer; enables key event reporting, which is not supported currently.

0: Reports the event.

<disp>: integer; enables display event reporting, which is not supported currently.

0: Reports the event.

<ind>: integer; indicates event reporting.

0: Disables event reporting (default value).

1: Enables event reporting; +CIEV:<ind>,<value>, in which <ind> indicates the event of the indicator, which is a character string.

2: Enables event reporting; +CIEV: <ind>,<value>, in which all events occur directly between the TE and TA.

<bfr>: integer; clears the buffer.

0: Clears the buffer.

3.1.2 Reading the Current Settings for Event Reporting

Read command	AT+CMER?
Function	Reads the current settings for event reporting.
Response	<CR><LF>+CMER: <mode>,<keyp>,<disp>,<ind>,<bfr><CR><LF><CR><LF>OK<CR><LF>

3.1.3 Setting the Event Reporting Mode

Set command	AT+CMER=[<mode>,<keyp>,<disp>,<ind>,<bfr>]]]]
Function	Sets the event reporting mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR:<err><CR><LF>

Note:

If no parameters of this command are set, AT+CMER= considers the previously set values valid for various parameters.

3.2 AT+CIND–Command for Controlling Indication Events

The AT+CIND command controls the mode of reporting indication events for certain functions, including battery power level, signal strength, service availability, unread short message indicator, and full short message storage.

3.2.1 Querying the Supported Indication Events and Indication Status

Test command	AT+CIND=?
Function	Queries the supported indication events and the indication status.
Response	<CR><LF>+CIND: (<indDescr>,list of supported <indValue>s)[,<indDescr>,list of supported <indValue>s][,...]]<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<indValue>: integer; indication event, corresponding to the value of <indDescr>.

<indDescr>: string; indication status; Table 3-1 describes the values of the parameter.

Table 3-1 Values of the <indDescr> and <indValue> parameters

<indDescr>	<indValue>
"battchg": battery power level indicator. Currently, only the value 5 is supported.	0: has not been connected to any charger.
	1: has been connected to a charger.
	2: being charged.
	3: the charge process is complete.
	4: the charge process is interrupted due to an error.
	5: unknown.
"signal": receive signal bit error rate indicator. Currently, only the value 99 is supported.	0–7: correspond to the values of RXQUAL in the GSM 05.08 section 8.2.4.
	99: unknown.
"service": network service status indicator.	0: has not been registered with any network.
	1: has been registered with the home network. When "roam"=1, the MT has been registered with another network.
"sounder": audio status indicator, which indicates an event with ring. Currently, only the value 0 is supported.	0: without ring.
	1: with ring.
"message": unread short message indicator.	0: without unread short message.
	1: with unread short message.
"call": conversation status	0: without conversation.

<indDescr>	<indValue>
indicator.	1: ongoing conversation or conversation hold.
"roam": roaming indicator.	0: registers with the home network or does not register with any network.
	1: registers with the roaming network.
"smsfull": short message storage full indicator.	0: the short message storage media is not full.
	1: the short message storage media is full.
"rssi": receive signal strength indicator.	0: ≤ -112 dBm.
	1–4: the strength interval is 15 dBm.
	5: ≥ -51 dBm.
	99: unknown or unmeasurable.

3.2.2 Reading the Current Indication Status

Read command	AT+CIND?
Function	Reads the current indication status.
Response	<CR><LF>+CIND: <indValue>[,<indValue>[,...]]<CR><LF><CR><LF>OK<CR><LF>

3.2.3 Setting Whether to Report Indication Events

Set command	AT+CIND=<mode>[,<mode>[,<mode>...]]
Function	Sets whether to report indication events.
Response	<ul style="list-style-type: none"> • In case of successful execution: <CR><LF>OK<CR><LF> • In case of an error: <CR><LF>ERROR<CR><LF> • In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<mode>: integer. This parameter controls whether to report a single indication event.

0: Deregisters indication event and disables event reporting.

1: Registers indication event and enables event reporting (default value).

3.2.4 Examples

Example 1:

Query the supported indication event and its indication status.

```
^SYSSTART
```

```
AT+CPIN=1111
```

```
OK
```

```
AT+CIND=?
```

```
+CIND: (battchg,(0-5)),(signal,(0-7,99)),(service,(0-1)),(sounder,(0-1)),(message,(0-1)),(call,(0-1)),(roam,(0-1)),(smsfull,(0-1)),(rssi,(0-5,99))
```

```
OK
```

Example 2:

Read the current indication status.

```
AT+CIND?
```

```
+CIND: 5,99,1,0,0,0,0,4
```

```
OK
```

3.3 AT^SIND-Extended Command for Controlling Indication Events

The AT^SIND command controls the mode of reporting indication events for certain functions. The AT^SIND command can control more indication events than the AT+CIND command, including the events that can be controlled by the AT+CIND command.

3.3.1 Querying the Supported Report Events

Test command	AT^SIND=?
Function	Queries the supported report events.
Response	<CR><LF>^SIND: (<indDescr>,list of supported <indValue>s)[,<indDescr>,list of supported <indValue>s][,...]<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<indValue>: integer, which corresponds to the value of <indDescr>.

<indDescr>: string; Table 3-2 describes the values of the parameter.

Table 3-2 Values of the <indDescr> and <indValue> parameters

<indDescr>	<indValue>
"battchg": battery power level indicator. Currently, only the value 5 is supported.	0: has not been connected to any charger.
	1: has been connected to a charger.
	2: being charged.
	3: the charge process is complete.
	4: the charge process is interrupted due to an error.
	5: unknown.
"signal": receive signal bit error rate indicator. Currently, only the value 99 is supported.	0: ≤ -113 dBm.
	1: -111 dBm.
	2–30: -109 dBm to -53 dBm.
	31: ≥ -51 dBm.
	99: unknown.
"service": network service status indicator.	0: has not been registered with any network.
	1: has been registered with the home network. When "roam"=1, the MT has been registered with another network.
"sounder": audio status indicator, which indicates an event with ring. Currently, only the value 0 is supported.	0: without ring.
	1: with ring.
"message": unread short message indicator.	0: without unread short message.
	1: with unread short message.
"call": conversation status indicator.	0: without conversation.
	1: ongoing conversation or conversation hold.
"roam": roaming indicator.	0: registers with the home network or does not register with any network.
	1: registers with the roaming network.
"smsfull": short message storage full indicator.	0: the short message storage media is not full.
	1: the short message storage media is full.
"rssi": receive signal strength indicator.	0: ≤ -112 dBm.
	1–4: the strength interval is 15 dBm.
	5: ≥ -51 dBm.

<indDescr>	<indValue>
	99: unknown or unmeasurable.
"ciphcall": encryption status change indicator. This indicator may be disabled by the EFad (administrative data) file data of the SIM card.	0: short messages are not encrypted.
	1: short messages are encrypted.
"eons": enhanced Operator Name String (EONS) indicator. The presentation of the "eons" indicator is determined by network activities. For example, the indicator appears every time a location update occurs or a NITZ message is sent, no matter whether or not the status of the EONS message has changed. The EONS tables are stored in the SIM card and will be read at power-up. 0–5 indicates the priority of the operator name source (GSM 22.101).	0: not registered.
	1: EF-OPL, EF-PNN (the longest character: 24).
	2: long and short string format, Common PCN Handset Specification (CPHS).
	3: operator name with NITZ message. Short string format only display when the EFopshort of CPHS is usable.
	4: operator name with ME stored.
	5: broadcast MCC-MNC (digital format).
"nitz": network and time zone indicator. When the network or time zone with which the MT registers changes, the network sends a time indicator.	The related parameters are <nitzUT>, <nitzTZ>, and <nitzDST>.

3.3.2 Reading the Current Event Reporting Mode

Read command	AT^SIND?
Function	Reads the current event reporting mode.
Response	<ul style="list-style-type: none"> In case of successful execution: <pre><CR><LF>^SIND: <indDescr>,<mode>,<indValue>[<CR><LF>^SIND: <indDescr>,<mode>,<indValue>[...]]<CR><LF><CR><LF>OK<CR><LF></pre> In case of an error: <CR><LF>ERROR<CR><LF> In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<mode>: integer. This parameter controls the reporting of a single event.

0: Disables event reporting.

1: Enables event reporting.

2: Queries the settings for event reporting.

3.3.3 Setting the Event Reporting Mode

Set command	AT^SIND=<indDescr>,<mode>
Function	Sets the event reporting mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SIND: <indDescr>,<mode>,<indValue><CR><LF>• When <indDescr>="nitz" and <mode>=2, after the ME registered with the network: <CR><LF>^SIND: <indDescr>,<mode>,<nitzUT>,<nitzTZ>,<nitzDST><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<nitzUT>: time information.

<nitzTZ>: time zone information.

<nitaDST>: daylight saving time for adaptive NITZ indicator.

3.4 AT+WS46–Command for Selecting a Radio Network

The AT+WS46 command sets and queries the radio network of a standard with which the ME registers.

3.4.1 Querying the Supported Radio Networks

Test command	AT+WS46=?
Function	Queries the supported radio networks.
Response	<CR><LF>(list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>



Parameter description

<n>: integer; AT+WS46= is equivalent to AT+WS46=12.

12: GSM digital cellular network.

3.4.2 Reading the Current Radio Network

Read command	AT+WS46?
Function	Reads the current radio network.
Response	<CR><LF><n><CR><LF><CR><LF>OK<CR><LF>

3.4.3 Setting the Radio Network to Be Registered

Set command	AT+WS46=[<n>]
Function	Sets the radio network to be registered.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

3.5 +CIEV-Command for Indicating the Status Change

When the status of relevant event set by using AT+CIND or AT^SIND is changed, the MT unsolicitedly reports +CIEV.

URC1	Reports with the standard format. <CR><LF>+CIEV: <indDescr>,<indValue>1[,<indValue>2]<CR><LF>
URC2	Reports with the "nitz" indication format. <CR><LF>+CIEV: <indDescr>,<nitzUT>,<nitzTZ>,<nitzDST><CR><LF>
Function	Indicates that the status of the event registered by using AT+CMER is changed.

Parameter description

Refer to the parameter descriptions of AT+CMER, AT+CIND, and AT^SIND commands.

4

Commands for Serial Port Control

This chapter describes the AT commands for controlling the serial ports of the module.

4.1 AT\Q-Command for Enabling Software or Hardware Flow Control

The AT\Q command sets the flow control mode.

Execution command AT\Q[<n>]

Function Sets the flow control mode.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of not supporting RTS/CTS when n=2 or n=3: <CR><LF>ERROR<CR><LF>

Notes:

- Hardware flow control is recommended, especially for the data service and multiplexing.
- In the case of CSD data service, hardware flow control must be adopted.

Parameter description

<n>: integer, which is not saved upon power failure; AT\Q is equivalent to AT\Q0.

0: Disables flow control (default value).

1: XON/XOFF software flow control.

2: Only CTS by DCE (TA).

3: RTS/CTS hardware flow control.



4.2 AT&C-Command for Setting the DCD Usage State

The AT&C command sets the relation between the status of the DCD line and signal detection of the remote receiving line.

Execution command	AT&C[<value>]
Function	Sets the relation between the status of the DCD line and signal detection of the remote receiving line.
Response	<CR><LF>OK<CR><LF>

Parameter description

<value>: integer; AT&C is equivalent to AT&C0.

0: Enables the DCD line.

1: The DCD line is enabled only when data carrier exists (default value).

2: The DCD line is enabled only when the status of one or more TCP or UDP connections is UP if Huawei's proprietary protocol is used. If FTP is used, the DCD line is effective only for data connections.

4.3 AT&D-Command for Setting the DTR Usage State

The AT&D command sets the result returned by the TA in data service state when the DTR circuit is disabled from enabling state.

Execution command	AT&D[<value>]
Function	Sets the result returned by the TA in data service state when the DTR circuit is disabled from enabling state.
Response	<CR><LF>OK<CR><LF>

Parameter description

<value>: integer; AT&D is equivalent to AT&D0.

0: The TA ignores the status of the DTR circuit.

1: Enters the command mode while holding the current data conversation.

2: Releases the data or data conversation and enters the command mode. When DTR=OFF, automatic response is disabled (default value).



4.4 AT&S-Command for Setting the DSR Usage State

The AT&S command sets the status of the DSR line according to different communication status of the ME.

Execution command	AT&S[<value>]
Function	Sets the status of the DSR line.
Response	<CR><LF>OK<CR><LF>

Parameter description

<value>: integer; AT&S is equivalent to AT&S0.

0: The DSR is always valid (default value).

1: When the ME is in command mode, the DSR is invalid. When the ME is in data mode, the DSR is valid.

4.5 AT^HRIM- Command for Setting the RI Usage State

The RI pin can inform the application layer of its voltage level change even when the module is in data mode. The AT^HRIM command is used to set the duration for how long the RI pin is kept at low voltage level.

4.5.1 Querying the Parameter Values Supported by the Command

Test command	AT^HRIM=?
Function	Queries the parameter values supported by the command.
Response	<ul style="list-style-type: none">In case of successful execution: <CR><LF>^HRIM: (list of supported <RI_Type>s),(list of supported <RI_Time>s)<CR><LF><CR><LF>OK<CR><LF>In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<RI_Type>: 0-2. The following table lists the <RI_Type> values.

<RI_Type>	Function	Supported or Not
0	Enables the RI pin voltage level to be pulled down to indicate the arrival of new text messages.	Supported

<RI_Type>	Function	Supported or Not
1	Enables the RI pin voltage level to be pulled down to indicate the arrival of new incoming calls.	Not supported at present
2	Sets the time duration for which the voltage level is pulled down upon the arrival of IPSTACK data.	Supported

<RI_Time>: integer ranging from 0 to 50000 with the unit of ms.

4.5.2 Querying the Functions and Value Range Supported by the Command

Read command	AT^HRIM?
Function	Queries the event type that pulls down the RI pin voltage level and the duration for how long the RI pin is kept at that level.
Response	<ul style="list-style-type: none"> In case of successful execution: <CR><LF>^HRIM: <RI_Type>,<RI_Time><CR><LF><CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

4.5.3 Setting the Duration of Low Voltage Level

Set command	AT^HRIM=<RI_Type>,<RI_Time>
Function	Sets the duration for how long the RI pin is kept by the specified event at low voltage level.
Response	<ul style="list-style-type: none"> In case of successful execution: <CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

The settings configured by running this command are lost after the module is powered off.

If RI_Type=0, the default value of RI_Time is 1s, and the minimum value is 1ms.

If RI_Type=2, the default value of RI_Time is 0s, which indicates this function is disabled.



4.5.4 Examples

```
AT^HRIM=?  
^HRIM: (0,2),(0-50000)
```

```
OK  
AT^HRIM?  
^HRIM: 0,1000  
^HRIM: 2,0
```

```
OK  
AT^HRIM=0,150  
OK  
AT^HRIM?  
^HRIM: 0,150  
^HRIM: 2,0
```

```
OK
```

4.6 AT+IPR-Command for Setting the Baud Rate of the DTE-DCE

The AT+IPR command sets the baud rate of the DTE-DCE.

4.6.1 Querying the Supported Baud Rates of the DTE-DCE

Test command	AT+IPR=?
Function	Queries the supported baud rates of the DTE-DCE.
Response	<CR><LF>+IPR: (list of supported auto-detectable <rate>s)[,(list of supported fixed-only <rate>s)]<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<rate>: integer, which is saved upon power failure.

0: Indicates adaptive baud rate.

Range of baud rate adaptation: 9600, 19200, 38400, 57600, and 115200.



Fixed baud rate: 9600, 14400, 19200, 28800, 38400, 57600, 115200, and 230400.

Default value: 115200.

4.6.2 Reading the Current Baud Rate of the DTE-DCE

Read command	AT+IPR?
Function	Reads the current baud rate of the DTE-DCE.
Response	<CR><LF>+IPR: <rate><CR><LF><CR><LF>OK<CR><LF>

4.6.3 Setting the Baud Rate of the DTE-DCE

Set command	AT+IPR=<rate>
Function	Sets the baud rate of the DTE-DCE.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- To set an adaptive baud rate, run AT+IPR=0.
- To set a fixed baud rate, ensure that the baud rates configured for the TE and TA are the same.
- When running the at command to set baud rate adaptation, ensure that AT ahead of the command is in upper case.
- After baud rate adaptation is enabled, if you want to change the baud rate of Application Procession, do the following: Set the baud rate, disable and enable the serial port or change the state of DTR (the interval between changing the status of the serial port or the DTR must be over two seconds), and then synchronize the serial port with capital "AT" in the command.
- In multiplexing mode, a baud rate higher than 115200 bit/s is recommended.

4.7 AT+ICF-Command for Setting the Character Frame Format

This command sets the character frame format.



4.7.1 Querying the Supported Character Frame Format

Test command	AT+ICF=?
Function	Queries the supported character frame format.
Response	<CR><LF>+ICF: (list of supported <format>s),(list of supported <parity>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<format>:

0: Auto detect (reserved, not supported currently)

1: 8 Data, 2 Stop

2: 8 Data, 1 Parity, 1 Stop

3: 8 Data 1 Stop (default value)

4: 7 Data 2 Stop

5: 7 Data 1 Parity 1 Stop

6: 7 Data 1 Stop

<parity>:

0: Odd parity

1: Even parity

2: Mark (reserved, not supported currently)

3: Space (default value)

4.7.2 Reading the Current Character Frame Format

Read command	AT+ICF?
Function	Reads the current character frame format.
Response	<CR><LF>+ICF: <format>,<parity><CR><LF><CR><LF>OK<CR><LF>

4.7.3 Setting the Character Frame Format

Set command	AT+ICF=[<format>[,<parity>]]
Function	Sets the character frame format.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>ERROR<CR><LF>

Notes:

- The <format> and <parity> settings configured by running this command are effective even after the module is powered off. If the module is upgraded, <format> and <parity> are restored to their default values, which are both 3.
- After you run this command, restart the module for the settings to take effect.
- If <format> is set to 2 or 5, <parity> cannot be left blank.
- If <format> is set to 1, 3, 4, or 6, set <parity> to 3 or leave it blank. If you leave <parity> blank, the module sets it to 3.
- If no parameters of this command are set, AT+ICF= considers the previously set values valid for various parameters.

4.7.4 Examples

Example 1:

Test command:

AT+ICF=?

+ICF: (1-6),(0,1,3)

OK

Example 2:

Read command:

AT+ICF?

+ICF: 3,3

OK

Example 3:

Set command.

AT+ICF=2,1

OK

AT+ICF?

+ICF: 2,1



OK

4.8 AT+IFC-Command for Controlling Local Flow

This command can be used to set or query the data flow control for both data directions.

4.8.1 Querying the Value Range Supported by This Command

Test command	AT+IFC=?
Function	Queries the value range supported by this command.
Response	<CR><LF>+IFC: (list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<DCE_by_DTE>: specifies the method to be used by the DTE to control the flow of received data from the DCE.

0: None (default value)

1: XON/XOFF, terminate flow control in the Cellular Engine (reserved, not supported currently)

2: RTS line

<DTE_by_DCE>: specifies the method to be used by the DCE to control the flow of transmitted data from the DTE.

0: None (default value)

1: XON/XOFF (reserved, not supported currently)

2: CTS line

4.8.2 Reading the Current Character Frame Format

Read command	AT+IFC?
Function	Reads the current flow control mode.
Response	<CR><LF>+IFC: <DCE_by_DTE>,<DTE_by_DCE><CR><LF><CR><LF>OK<CR><LF>



4.8.3 Setting the Character Frame Format

Set command	AT+IFC=[<DCE_by_DTE>][,<DTE_by_DCE>]
Function	Sets the flow control mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Note:

If no parameters of this command are set, AT+IFC= considers the previously set values valid for various parameters.

4.8.4 Examples

Example 1:

Test command:

AT+IFC=?

+IFC: (0-2),(0-2)

OK

Example 2:

Read command:

AT+IFC?

+IFC: 0,0

OK

Example 3:

Set command.

AT+IFC=0,2

OK



5 Commands for Security Control

This chapter describes the AT commands that allow external applications to configure different security-based policies of the module.

5.1 AT+CPIN–Command for PIN Management

The AT+CPIN command identifies networks.

5.1.1 Checking Whether a PIN Management Command Exists

Test command	AT+CPIN=?
Function	Check whether a PIN management command exists.
Response	<CR><LF>OK<CR><LF>

5.1.2 Reading the Password Entry Request

Read command	AT+CPIN?
Function	Reads the current authentication status of the SIM card.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPIN: <code><CR><LF><CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<code>: string without quotation marks. Table 5-1 describes PIN authentication performed by the SIM card.

Table 5-1 PIN authentication performed by the SIM card

Value	Description
READY	The PIN code has been entered and the SIM card has completed PIN authentication.
SIM PIN	The ME is waiting for the entry of SIM PIN code.
SIM PUK	After the SIM PIN code is improperly entered for three times, the ME is waiting for the entry of SIM PUK code.
SIM PIN2	The ME is waiting for the entry of SIM PIN2 code.
SIM PUK2	After the SIM PIN2 code is improperly entered for three times, the ME is waiting for the entry of SIM PUK2 code.

5.1.3 Responding to the Password Entry Request

Set command AT+CPIN=<pin>[,<newpin>]

Function Checks and unlocks the PIN and PIN2.

- If the current password entry request is PIN or PIN2, run the following command:
AT+CPIN=<pin>
- If the current password entry request is PUK or PUK2, run the command: AT+CPIN=<pin>,<newpin>
The first parameter <pin> indicates the SIM PUK or SIM PUK2. The second parameter <newpin> indicates the new PIN or PIN2 code.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- If no PIN entry request exists currently, running this command returns an error message: +CME ERROR: operation not allowed;
- If PIN or PUK is checked during an ongoing call or other services, the call may be hung up or other services may be interrupted.

Parameter description

<pin>, <newpin>: a string, which can be or may not be placed inside quotation marks. The characters inside the string must be obtained from '0'-'9'. Otherwise, an error is returned directly.

5.1.4 Examples

Example 1:

Enter the PIN code for unlocking.



AT+CPIN?

+CPIN: SIM PIN

OK *Note: A PIN code entry request exists.*

AT+CPIN="1234"

OK *Note: Enter the PIN code.*

Example 2:

Enter the PUK code for unlocking and modify the PIN code.

AT+CPIN?

+CPIN: SIM PUK *Note: A PUK code entry request exists.*

OK

AT+CPIN="12345678","1234" *Note: Enter the PUK code and modify the PIN code.*

OK

5.2 AT+CLCK-Command for Locking and Unlocking the Device

The AT+CLCK command locks and unlocks the device.

5.2.1 Checking the Devices Supported by This Command

Test command AT+CLCK=?

Function Returns the devices supported by this command.

Response <CR><LF>+CLCK: (list of supported
<fac>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<fac>: string, which indicates the object on which this command operation is performed.

- "SC": SIM card. If the SIM card is locked, the MS requests you to enter the password during power-on. The password is the SIM PIN1 code.
- "AO": Forbids all outgoing calls; this parameter is reserved and is not supported currently.
- "OI": Forbids outgoing international calls; this parameter is reserved and is not supported currently.

- "OX": Forbids outgoing international calls excluding the calls originated to the home country; this parameter is reserved and is not supported currently.
- "AI": Forbids all outgoing calls; this parameter is reserved and is not supported currently.
- "IR": Forbids all incoming calls when the MS roams outside the home country. This parameter is reserved and is not supported currently.
- "AB": Forbids all services; this parameter is reserved and is not supported currently.
- "AG": Forbids all outgoing calls; this parameter is reserved and is not supported currently.
- "AC": Forbids all incoming calls; this parameter is reserved and is not supported currently.
- "FD": The SIM card locks the dialing memory. This parameter is reserved and is not supported currently.
- "PN": Network customization. This parameter is reserved and is not supported currently.
- "PU": Subnet customization. This parameter is reserved and is not supported currently.
- "PP": Customized by service providers. This parameter is reserved and is not supported currently.

5.2.2 Locking and Unlocking the Device

Set command AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]

Function Locks and unlocks the MT or network functions, and queries the locking status.

Response

- In case of successful execution:
When <mode>=2:
<CR><LF>+CLCK: <status><CR><LF><CR><LF>OK<CR><LF>
When <mode>≠2: <CR><LF>OK<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

Parameter description

<mode>: integer; indicates the operation mode.

0: Unlocks the device.

1: Locks the device.

2: Queries the status.

<status>: integer; indicates the current status.

0: Inactive

1: Active

<passwd>: string, which can be or may not be placed inside quotation marks. This parameter corresponds to the password of <fac> and can be modified through +CPWD. When mode is set to 0 or 1, this parameter is mandatory. When mode is set to 2, no password is required. The characters inside the string must be obtained from '0'-'9'. Otherwise, an error is returned directly.

<class>: integer; indicates the service type.

1: Voice call (not supported currently)

2: Data

4: Fax (not supported currently)

7: Voice+data+fax (not supported currently)

5.2.3 Examples

Example 1:

Lock the SIM card.

```
AT+CLCK="SC",1, "1234"
```

OK

Example 2:

Unlock the SIM card.

```
AT+CLCK="SC",0, "1234"
```

OK

Example 3:

Query the locking status of the SIM card.

```
AT+CLCK="SC",2
```

```
+CLCK: 0
```

OK

5.3 AT+CPWD-Command for Modifying the Password

The AT+CPWD command modifies the password.

5.3.1 Checking the Devices Supported by This Command

Test command	AT+CPWD=?
Function	Returns the devices supported by this command and the maximum length of passwords corresponding to the devices.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPWD: (list of supported <fac>s),(list of supported <pwdlength>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<fac>: string, which indicates the object on which this command operation is performed.

- "P2": PIN2 of the SIM card.
- "SC": SIM card. If the SIM card is locked, the MS requests you to enter the password during power-on.
- "AO": Forbids all outgoing calls; this parameter is reserved and is not supported currently.
- "OI": Forbids outgoing international calls; this parameter is reserved and is not supported currently.
- "OX": Forbids outgoing international calls excluding the calls originated to the home country; this parameter is reserved and is not supported currently.
- "AI": Forbids all outgoing calls; this parameter is reserved and is not supported currently.
- "IR": Forbids all incoming calls when the SIM card roams outside the home country. This parameter is reserved and is not supported currently.
- "AB": Forbids all services; this parameter is reserved and is not supported currently.

<pwdlength>: string, which indicates the maximum length of the password corresponding to the locking function of the device.

5.3.2 Modifying the Password

This command modifies the password that corresponds to the locking function of the device.

Set command	AT+CPWD=<fac>,<oldpwd>,<newpwd>
Function	Modifies the password (such as PIN) that corresponds to the locking function of the device.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<oldpwd>,<newpwd>: old password and new password; string; the maximum length of password is specified by the <pwdlength> parameter; the characters inside the string must be obtained from '0'-'9'. Otherwise, an error is returned directly.

5.3.3 Examples

Run AT+CPWD to modify the PIN code.

AT+CLCK="SC",2 *Note :Query the locking status of the SIM card.*

+CLCK:0

OK

AT+CLCK="SC",1, "1234" *Note :Set the SIM card to the PIN locking state.*

OK

AT+CPWD="SC","1234","1111" *Note: Modify the PIN code.*

OK



6 Commands for Identification

This chapter describes the AT commands that allow external applications to obtain the identification information about the module or about the entities that connect to the module.

6.1 ATI-Command for Querying the Product Information

The ATI command queries the product information, including the vendor information (+CGMI), product model number (+CGMM), software version number (+CGMR), ESN/IMEI (+CGSN), and capability list (+GCAP).

Execution command ATI[<value>]

Function Queries the product information.

Response [<CR><LF>Manufacture: ...[<CR><LF>Model: ...[<CR><LF>Revision: ...[<CR><LF>IMEI: ...[<CR><LF>+GCAP: ...<CR><LF>]]]]<CR><LF>OK<CR><LF>

Parameter description

<value>: integer; ATI is equivalent to ATI0.

0: MS information (default value)

1: Reserved

2: Reserved

3: Reserved

4: Vendor ID and product model number

5: Vendor ID

6: Reserved

7: Reserved



6.1.1 Examples

Example 1:

Send the ATI command.

ATI

Manufacture: HUAWEI

Model: MG323/MG323-B

Revision: 11.810.01.00.00

IMEI: 350050500005492

+GCAP: +CGSM

OK

Example 2:

Send the ATI4 command.

ATI4

HUAWEI MG323/HUAWEI MG323-B

OK

Example 3:

Send the ATi5 command.

ATi5

HUAWEI

OK

6.2 AT+CGMI/AT+GMI-Command for Querying the Vendor Information

The AT+CGMI/AT+GMI command queries the information about the module vendor.



6.2.1 Checking Whether the Command for Querying the Vendor Information Exists

Test command	AT+CGMI=? or AT+GMI=?
Function	Checks whether the command for querying the vendor information exists.
Response	<CR><LF>OK<CR><LF>

6.2.2 Querying the Vendor Information Request

Execution command	AT+CGMI or AT+GMI
Function	Queries the vendor information.
Response	<CR><LF><manufacture><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<manufacture>: string, which indicates the vendor information.

"HUAWEI"

6.2.3 Examples

Query the vendor information.

AT+CGMI

HUAWEI

OK

AT+GMI

HUAWEI

OK

6.3 AT+CGMM/AT+GMM-Command for Querying the Product Model

The AT+CGMM/AT+GMM command queries the product model.

6.3.1 Checking Whether the Command for Querying the Product Model Exists

Test command	AT+CGMM=? or AT+GMM=?
Function	Checks whether the command for querying the product model exists.
Response	<CR><LF>OK<CR><LF>

6.3.2 Querying the Product Model Number Request

Execution command	AT+CGMM or AT+GMM
Function	Queries the product model number.
Response	<CR><LF><model><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<model>: string, which indicates the product model number.

6.3.3 Examples

Query the product model number.

AT+CGMM

MG323/MG323-B

OK

AT+GMM

MG323/MG323-B

OK

6.4 AT+CGMR/AT+GMR-Command for Querying the Software Version Number

The AT+CGMR/AT+GMR command queries the software version number of the module.



6.4.1 Checking Whether the Command for Querying the Software Version Number Exists

Test command	AT+CGMR=? or AT+GMR=?
Function	Checks whether the command for querying the software version number exists.
Response	<CR><LF>OK<CR><LF>

6.4.2 Querying the Software Version Number

Execution command	AT+CGMR or AT+GMR
Function	Queries the software version number.
Response	<CR><LF><softversion><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<softversion>: string, which indicates the software version number.

6.4.3 Examples

Query the software version number.

AT+CGMR

11.810.01.00.00

OK

AT+GMR

11.810.01.00.00

OK

6.5 AT+CGSN/AT+GSN-Command for Querying the IMEI

The AT+CGSN/AT+GSN command queries the IMEI of the module.



6.5.1 Checking Whether the Command for Querying the IMEI Exists

Test command	AT+CGSN=? or AT+GSN=?
Function	Checks whether the command for querying the IMEI exists.
Response	<CR><LF>OK<CR><LF>

6.5.2 Querying the IMEI

Execution command	AT+CGSN or AT+GSN
Function	Queries the IMEI of the module.
Response	<CR><LF><sn><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<sn>: string, which indicates the IMEI of the board. Table 6-1 lists the composition of the IMEI.

Table 6-1 Composition of the IMEI

8 char	6 char	1 char
TAC	SNR	Spare

TAC: type code assigned to the device

SNR: sequence number of the device

Spare: reserved

6.5.3 Examples

Query the IMEI.

AT+CGSN

350050500005492

OK

AT+GSN

350050500005492

OK

6.6 AT+CIMI- Command for Querying the IMSI

The AT+CIMI command queries the IMSI of the SIM card.

6.6.1 Checking Whether the Command for Querying the IMSI Exists

Test command	AT+CIMI=?
Function	Checks whether the command for querying the IMSI exists.
Response	<CR><LF>OK<CR><LF>

6.6.2 Querying the IMSI

Execution command	AT+CIMI
Function	Queries the IMSI of the SIM card.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><imsi><CR><LF><CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<imsi>: string, which indicates the IMSI of the SIM card. The IMSI is a string that consists of decimal numbers ranging from 0 to 9. Table 6-2 lists the composition of the IMSI.

Table 6-2 Composition of the IMSI

3 char	2 or 3 char	
MCC	MNC	MSIN
Note: The IMSI consists of not more than 15 characters in total.		

MCC: Mobile Country Code

MNC: Mobile Network Code

MSIN: Mobile Station Identification Number



6.6.3 Examples

Query the IMSI.

AT+CIMI

460097552007741

OK

7

Commands for Call Control

This chapter describes the AT commands that are related to the calling and called parties of the data service.

7.1 ATD-Command for Originating a Call

The ATD command originates a voice call or a CSD data service. For originating a voice call, the command ends with ";". For establishing a data service connection, the command ends without ";".

Execution command ATD<dialstring>[:]

Function Originates voice call or CSD data services.

Response When originating a voice call:

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error: <CR><LF>ERROR<CR><LF>
or <CR><LF>+CME ERROR: <err><CR><LF>
- In case of failed link establishment: <CR><LF>NO CARRIER<CR><LF>
or <CR><LF>NO ANSWER<CR><LF>
- If the called party is busy: <CR><LF>BUSY<CR><LF>

When establishing a CSD data service connection:

- In case of successful execution: <CR><LF>CONNECT[<text>]<CR><LF>
- In case of failure in establishing the connection: <CR><LF>NO CARRIER<CR><LF>
- If the called party is busy: <CR><LF>BUSY<CR><LF>

Parameter description

<dialstring>: the telephone number of the called party. "1, 2, 3, 4, 5, 6, 7, 8, 9, 0, *, #, +".



7.2 ATD*99#-Command for Requesting the GPRS Service

The ATD*99# command establishes a communication link between the TE and Public Data Network (PDN). After the ITU-T V.250 'D' (dialing) command is executed; the MT enters the ITU-T V.250 online data state and starts the specified layer-2 protocol jointly with the TE. Other AT commands following this command line are not executed. After the MT enters the online data state, its detailed behaviors depend on the type of Packet Data Protocol (PDP).

Execution command	ATD*99[*[<called_address>[[*[<L2P>][*[<cid>]]]]]]#
Function	Establishes a communication link between the TE and PDN.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>CONNECT<CR><LF>• In case of failed link establishment: <CR><LF>NO CARRIER<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<called_address>: string, which indicates an IPv4 address in the w.x.y.z format. This parameter is not supported currently.

<L2P>: string, which indicates the layer-2 protocol between the TE and MT.

"PPP": The layer-2 protocol is PPP.

"1": The layer-2 protocol is PPP.

<cid>: integer; indicates the index value of the PDP context; ATD*99# is equivalent to ATD*99***1#. The value ranges from 1 to 3.

7.3 ATD*98#- Command for Requesting the GPRS IP Service

The ATD*98# command establishes a communication link between the TE and PDN. After the ITU-T V.250 'D' (dialing) command is executed; the MT enters the ITU-T V.250 online data state and starts the specified layer-2 protocol jointly with the TE. Other AT commands following this command line are not executed. After the MT enters the online data state, its detailed behaviors depend on the type of PDP.

Execution command	ATD*98[*<cid>]#
Function	Establishes a communication link between the TE and PDN.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>CONNECT<CR><LF>• In case of failed link establishment: <CR><LF>NO CARRIER<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: integer; indicates the index value of the PDP context; ATD*98# is equivalent to ATD*98*1#. The value ranges from 1 to 3.

7.4 ATH-Command for Hanging Up the Connection

The ATH command hangs up all voice call on the current channel and currently connected data service.

Execution command	ATH[<n>]
Function	Hangs up all voice call on the current channel and currently connected data service.
Response	<CR><LF>OK<CR><LF>

Notes:

- The ATH command can deactivate all activated or online PDP contexts. This command cannot be used in the PDP deactivation process that is triggered when the LCP is terminated or the DTR pin is lowered.
- In addition, the ATH command can reject the request for activating the PDP context on the network. The request reports URC"RING: GPRS" or "+CRING: GPRS".

Parameter description

<n>: integer; ATH is equivalent to ATH0.

0: Hangs up all CS domain call in activated and waiting state (including voice and CSD data services) and GPRS data services on the current channel (default value).

1: Hangs up all CS domain call in activated and waiting state (including voice and CSD data services) and GPRS data services on all channels.

2: Hangs up all CS data services on the current channel.

3: Hangs up all GPRS data services on the current channel.

4: Hangs up all activated CS domain call (including voice and CSD data services) on the current channel (the CS data services in waiting state are not hung up).



5: Hangs up the CS domain call in waiting state (including voice and CSD data services) GPRS data services on the current channel (the CS data services in activated state are not hung up).

7.5 ATA–Command for Answering a Call or Data Services

The ATA command answers a call or CSD data services.

Execution command	ATA
Function	Answers a call or CSD data services.
Response	<ul style="list-style-type: none">• In case of successful in establishing a call: <CR><LF>OK<CR><LF>• In case of successful in establishing CSD data services: <CR><LF>CONNECT[<text>]<CR><LF>• In case of failed link establishment: <CR><LF>NO CARRIER<CR><LF>

Notes:

- During the command execution process, entering a character interrupts command execution and returns OK.
- The ATA command can be used to receive the PDP context activation request from the network side, and unsolicitedly report URC"RING: GPRS" or "+CRING: GPRS".

7.6 ATSO– Command for Setting the Automatic Answer Data Services

The ATSO command sets the automatic answer data services.

7.6.1 Reading the Settings of the Automatic Answer Data Services

Read command	ATSO?
Function	Reads the settings of the automatic answering data services.
Response	<CR><LF><n><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<n>: integer

0: Automatic answer mode is disabled (default value).

1–255: Number of rings before automatically answering a call.

7.6.2 Setting Unsolicitedly Answering Data Services

Set command	ATS0=<n>
Function	Sets unsolicitedly answering data services.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Note:

If <n> is set to a too great value, the calling party may hang up before the call is automatically answered.

7.7 ATS7-Command for Setting the Duration to Be Waited for Completion of Connection Establishment

The ATS7 command sets the duration to be waited by the TA for the completion of connection establishment when originating or receiving a data call. Generally, this duration is calculated as the duration to be waited for bearer signals. If failing to receive bearer signals within a specified duration, the TA hangs up the current data call.

7.7.1 Reading the Set Waiting Duration Request

Read command	ATS7?
Function	Reads the set waiting duration.
Response	<CR><LF><n><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<n>: integer; indicates the waiting duration in seconds. The default value is 60. The value ranges from 000–255.



7.7.2 Setting the Waiting Duration

Set command	ATS7=<n>
Function	Sets the duration to be waited by the TA for the completion of connection establishment when originating or receiving a data call.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Notes:

- This command applies to data call services only.
- <n> is not allowed starting with "0x", or regarding as ATS7=0.

7.8 AT+CRLP-Command for Setting Radio Link Protocol Parameters for Non-Transparent Transmission Data Services on the Calling Party Side

The AT+CRLP command sets the related radio link protocol (RLP) parameters when non-transparent transmission data services are originated.

7.8.1 Querying the Supported RLP Parameters

Test command	AT+CRLP=?
Function	Queries the supported RLP parameters.
Response	<CR><LF>+CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s),(list of supported <ver1>s),(list of supported <T4>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<iws>: integer; indicates the interactive window size (IWF TO MS). The default value is 61. The value ranges from 0–61.

<mws>: integer; indicates the mobile window size (MS TO IWF). The default value is 61. The value ranges from 0–61.

<T1>: integer; indicates the acknowledgement timer (T1: measured by 10 ms). The default value is 78 (780 ms). The value ranges from 48–255.

<N2>: integer; indicates the number of times for attempting retransmission. The default value is 6. The value ranges from 1–255.

<ver1>: integer; indicates the RLP version. Only the value 0 is supported.



<T4>: integer; indicates the sequence period as an integer. Only the value 7 is supported.

7.8.2 Reading RLP Parameters for the Current Non-Transparent Transmission Data Services on the Calling Party Side

Read command	AT+CRLP?
Function	Reads RLP parameters for the current non-transparent transmission data services on the calling party side.
Response	<CR><LF>+CRLP: <iws>,<wms>,<T1>,<N2>,<ver1>,<T4><CR><LF><CR><LF>OK<CR><LF>

7.8.3 Setting RLP Parameters for the Non-Transparent Transmission Data Services on the Calling Party Side

Set command	AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>]]]]
Function	Sets RLP parameters for the non-transparent transmission data services on the calling party side.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

If no parameters of this command are set, AT+CRLP= considers the previously set values valid for various parameters.

7.9 AT+CBST-Command for Setting the Bearer Service Type

The AT+CBST command sets the bearer service <name>, data rate <speed>, and connection mode <ce> that are required for originating data services. The preceding settings also apply to MT data services, especially in the case that single number data services or the data services originated by similar devices are received.



7.9.1 Querying the Supported Bearer Service Types

Test command	AT+CBST=?
Function	Queries the supported bearer service types.
Response	<CR><LF>+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<speed>: integer; indicates the data rate.

0: Adaptive baud rate

7: 9600 bit/s (V.32) (default value)

71: 9600 bit/s (V.110)

<name>: integer

0: Asynchronous data circuit (UDI or 3.1 kHz modem).

<ce>: integer. The transparent transmission mode is not supported.

1: Non-transparent transmission.

7.9.2 Querying the Current Bearer Service Type

Read command	AT+CBST?
Function	Queries the current bearer service type.
Response	<CR><LF>+CBST: <speed>,<name>,<ce><CR><LF><CR><LF>OK<CR><LF>

7.9.3 Setting the Bearer Service Type

Set command	AT+CBST=<speed>[,<name>[,<ce>]]
Function	Sets the bearer service type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

7.10 +++-Command for Switching Data Mode to Command Mode

The +++ command switches data mode to command mode during the connection of CSD services or GPRS data services.

Execution command +++

Function After "+++" is executed, the TA terminates the data transmission stream on the AT interface and enters the command mode so that AT commands can be executed when the links towards remote terminals or GPRS connections are maintained.

Response <CR><LF>OK<CR><LF>

Notes:

- To prevent the entered command line from being confused with "+++" in the transmission data stream, do not enter other characters within 1000 ms before and after entering the command line. In addition, two adjacent '+'s must be entered at a time interval of smaller than 1000 ms.
- In multiplexing mode, this command is unavailable. In this case, you need to enter other exit instructions (such as DTR signals and modem status command MSC) to switch data mode to command mode.

7.11 ATO-Command for Switching Command Mode to Data Mode

The ATO command switches command mode to data mode. When a CSD call or GPRS connection is established, the TA is in command mode. This command can switch command mode to data mode or PPP online mode.

Execution command ATO[<n>]

Function Switches command mode to data mode.

Response • In case of successful execution:
 <CR><LF>CONNECT[<text>]<CR><LF>
 • In case of failed connection recovery: <CR><LF>NO
 CARRIER<CR><LF>

Parameter description

<n>: integer; ATO is equivalent to ATO0.

0: Switches command mode to data mode (default value).



7.12 AT+CHUP-Command for Hanging Up Call

The AT+CHUP command hangs up all active and suspended call (including voice and CSD data service).

7.12.1 Checking Whether AT+CHUP Hang-up Is Supported

Test command	AT+CHUP=?
Function	Checks whether AT+CHUP hang-up is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

7.12.2 Hanging Up

Execution command	AT+CHUP
Function	Hangs up all active and suspended data services (including voice and CSD data service).
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

After the call is hung up, NO CARRIER is reported on the side of the hung-up firmware.

7.13 AT+CR-Command for Setting the Service Reporting Mode

The AT+CR command sets whether to report the intermediate result code +CR: <serv> to the TE during the establishment of data services.

7.13.1 Querying the Supported Settings for Service Reporting

- Test command** AT+CR=?
- Function** Queries the supported settings for service reporting.
- Response**
- In case of successful execution:
<CR><LF>+CR: (list of supported <mode>s)<CR><LF><CR><LF>OK<CR><LF>
 - In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<mode>: integer.

0: Disables service reporting (default value).

1: Enables service reporting. The TA reports the intermediate result code after determining the rate and service quality in connection negotiation and before reporting error settings or data compression and other result codes such as CONNECT.

<serv>: string.

Table 7-1 describes the values of <serv>.

Table 7-1 Values of <serv>

Value	Description
"REL ASYNC"	Asynchronous and non-transparent transmission
"GPRS"	Request for activating the PDP context on the GPRS network

7.13.2 Reading the Current Settings for Service Reporting

- Read command** AT+CR?
- Function** Reads the current settings for service reporting.
- Response**
- In case of successful execution:
<CR><LF>+CR: <mode><CR><LF><CR><LF>OK<CR><LF>
 - In case of an error: <CR><LF>ERROR<CR><LF>

7.13.3 Setting Service Reporting

Set command	AT+CR=[<mode>]
Function	Sets service reporting.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Note:

If no parameters of this command are set, AT+CR= considers the previously set values valid for various parameters.

7.14 AT+CRC-Command for Setting the Cell Result Codes

The AT+CRC command sets whether the caller ID display follows the extended format.

7.14.1 Querying the Supported Settings for the Cell Result Codes

Test command	AT+CRC=?
Function	Queries the settings for the cell result code in caller ID display.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CRC: (list of supported <mode>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<mode>: integer.

0: Does not follow the extended format. In this case, the reporting format is RING (default value).

1: Follows the extended format. In this case, the reporting format is as follows:

+CRING: <type>

<type>: string. Table 7-2 describes the values of <type>.

Table 7-2 Values of <type>

Value	Description
"REL ASYNC"	Asynchronous and non-transparent transmission
"GPRS"	Request for activating the PDP context on the GPRS network



Value	Description
"VOICE"	Voice call

7.14.2 Querying the Current Settings for the Cell Result Codes

Read command	AT+CRC?
Function	Reads the current settings for the cell result code in caller ID display.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CRC: <mode><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

7.14.3 Settings the Cell Result Codes

Set command	AT+CRC=[<mode>]
Function	Sets the cell result code in caller ID display.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Note:

If no parameters of this command are set, AT+CRC= considers the previously set values valid for various parameters.

7.15 AT+VTS-Command for Sending the DTMF Tone

The AT+VTS command sends the DTMF tone.

7.15.1 Sending the DTMF Tone

Set command	AT+VTS=<DTMF>
Function	Sends the DTMF tone.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Set command	AT+VTS={<DTMF>,<duration>}
Function	Sends the DTMF tone with the specified duration.
Response	<ul style="list-style-type: none">• In the case of successful execution: <CR><LF>OK<CR><LF>• In the case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<DTMF>: character type; 0–9, #, *, A, B, C, D in the ASCII character set (excluding a, b, c and d).

<duration>: integer; indicates the DTMF duration in ms. The value of this parameter ranges from 1 to 1000. The default value is 1.

Notes:

- The +VTS command cannot be used to send DTMF strings. The default value of <duration> is 1. When entering {<DTMF>,<duration>}, enclose them with double quotation marks ("").
- The DTMF send side need to build the DTMF signal with playing time ≥ 100ms.
- The DTMF send side should not send the DTMF signal too fast, the interval time between the two DTMF signal data ≥ 200ms.

7.15.2 Examples

Example 1:

Dial China Unicom's interactive voice response (IVR) system.

ATD10010;

^ORIG: 1,0

OK

AT+VTS=1 *Note: Enter China Unicom's IVR system.*

OK

AT+VTS=9 *Note: Repeat the voice prompt.*

OK

AT+VTS=* *Note: Return to the previous menu.*

OK

AT+VTS=12

ERROR

Example 2:

Send a DTMF tone with the specified duration.

ATD075536836412; *Note: 075536836412 is the dialed number.*

^ORIG: 1,0

OK

^CONF: 1

^CONN: 1,0 *Note: Send the call connected indication after the called party answers the call.*

AT+VTS="{1,100}" *Note: The called party hears the DTMF tone, and the duration of the DTMF tone is 100 ms.*

OK

7.16 AT+CPAS–Command for Querying the Current Status

The AT+CPAS command is used to query the current status.

7.16.1 Checking the Parameter Range Supported by This Command

Test command	AT+CPAS=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In the case of successful execution: <CR><LF>+CPAS: (list of supported <pas>s)<CR><LF><CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR/+CME ERROR: <err><CR><LF>

Parameter description

<pas>: integer; indicates the current status of module.

Table 7-3 Values of <pas>

Parameter	Value	Description
<pas>	0	Ready



Parameter	Value	Description
	2	Unknown
	3	Ringing for an incoming call
	4	Call connected

7.16.2 Reading the Current Status

Execution command AT+CPAS

Function Reads the current status.

Response

- In the case of successful execution:
<CR><LF>+CPAS: <pas><CR><LF><CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR/+CME ERROR: <err><CR><LF>

7.16.3 Examples

Example 1:

Get the parameter range:

AT+CPAS=?

+CPAS: (0,2,3,4)

OK

Example 2:

Query the current status:

AT+CPAS

+CPAS: 0 *Note: READY state*

OK

RING

RING

AT+CPAS

+CPAS: 3 *Note: RING state*

OK

Reference AT command:

GSM Rec.07.07

7.17 ^ORIG–Command for Call Origination Indication

When a call is originated, MT reports this indication to the TE.

URC <CR><LF>^ORIG: <call_x>,<call_type><CR><LF>

Functions Unsolicitedly reports indication for the Origination of a Call.

Parameter description

<call_x>: integer; indicates the call ID. The value ranges from 1 to 7.

<call_type>: integer; indicates the call type.

Table 7-4 Values of <call_type>

Parameter	Value	Description
<call_type>	0	voice call
	9	emergency call

7.18 ^CONF–Command for Ringback Tone Indication

The MT sends the ^CONF command when it receives a ringback tone indication.

URC <CR><LF>^CONF: <call_x><CR><LF>

Function Unsolicitedly reports a ringback tone indication.

Parameter description

<call_x>: integer; indicates the call ID. The value ranges from 1 to 7.

7.19 ^CONN–Command for Call Connection Indication

When a call is connected, MT reports this indication to the TE.

URC <CR><LF>^CONN: <call_x>,<call_type><CR><LF>

Function Unsolicitedly reports indication for a call connection.

Parameter description

<call_x>: integer; indicates the call ID. The value ranges from 1 to 7.

<call_type>: integer; indicates the call type.

Table 7-5 Values of <call_type>

Parameter	Value	Description
<call_type>	0	voice call
	9	emergency call

7.20 ^CEND- Command for Call Ending Indication

After a call is terminated, the MT reports this indication to the TE to notify the TE of the call end cause and the call duration.

URC <CR><LF>^CEND: <call_x>,<duration>,<end_status>[,<cc_cause>]
 <CR><LF>

Function Unsolicitedly reports a call ending indication.

Parameter description

<call_x>: integer; indicates the call ID. The value ranges from 1 to 7.

<duration>: integer; indicates the call duration in the unit of second.

<end_status>: integer; indicates the call end cause.

Table 7-6 Values of <end_status>

Parameter	Value	Description
<end_status>	0	Unknown.
	48	Call ended normally (ended by either party; not answered by the called party).
	67	Call ended from the network. Further causes are indicated by <cc_cause>.

<cc_cause>: integer; indicates call control information.

Table 7-7 Values of <cc_cause>

Parameter	Value	Description
<cc_cause>	1	UNASSIGNED_CAUSE



Parameter	Value	Description
	3	NO_ROUTE_TO_DEST
	6	CHANNEL_UNACCEPTABLE
	8	OPERATOR_DETERMINED_BARRING
	16	NORMAL_CALL_CLEARING
	17	USER_BUSY
	18	NO_USER_RESPONDING
	19	USER_ALERTING_NO_ANSWER
	21	CALL_REJECTED
	22	NUMBER_CHANGED
	26	NON_SELECTED_USER_CLEARING
	27	DESTINATION_OUT_OF_ORDER
	28	INVALID_NUMBER_FORMAT
	29	FACILITY_REJECTED
	30	RESPONSE_TO_STATUS_ENQUIRY
	31	NORMAL_UNSPECIFIED
	34	NO_CIRCUIT_CHANNEL_AVAILABLE
	38	NETWORK_OUT_OF_ORDER
	41	TEMPORARY_FAILURE
	42	SWITCHING_EQUIPMENT_CONGESTION
	43	ACCESS_INFORMATION_DISCARDED
	44	REQUESTED_CIRCUIT_CHANNEL_NOT_AVAILABLE
	47	RESOURCES_UNAVAILABLE_UNSPECIFIED
	49	QUALITY_OF_SERVICE_UNAVAILABLE
	50	REQUESTED_FACILITY_NOT_SUBSCRIBED
	55	INCOMING_CALL_BARRED_WITHIN_CUG
	57	BEARER_CAPABILITY_NOT_AUTHORISED
	58	BEARER_CAPABILITY_NOT_PRESENTLY_AVAILABLE
	63	SERVICE_OR_OPTION_NOT_AVAILABLE
	65	BEARER_SERVICE_NOT_IMPLEMENTED
	68	ACM_GEQ_ACM_MAX

Parameter	Value	Description
	69	REQUESTED_FACILITY_NOT_IMPLEMENTED
	70	ONLY_RESTRICTED_DIGITAL_INFO_BC_AVAILABLE
	79	SERVICE_OR_OPTION_NOT_IMPLEMENTED
	81	INVALID_TRANSACTION_ID_VALUE
	87	USER_NOT_MEMBER_OF_CUG
	88	INCOMPATIBLE_DESTINATION
	91	INVALID_TRANSIT_NETWORK_SELECTION
	95	SEMANTICALLY_INCORRECT_MESSAGE
	96	INVALID_MANDATORY_INFORMATION
	97	MESSAGE_TYPE_NON_EXISTENT
	98	MESSAGE_TYPE_NOT_COMPATIBLE_WITH_PROTOCOL_STATE
	99	IE_NON_EXISTENT_OR_NOT_IMPLEMENTED
	100	CONDITIONAL_IE_ERROR
	101	MESSAGE_NOT_COMPATIBLE_WITH_PROTOCOL_STATE
	102	RECOVERY_ON_TIMER_EXPIRY
	111	PROTOCOL_ERROR_UNSPECIFIED
	127	INTERWORKING_UNSPECIFIED

Notes:

- <end_status> is reported only when a call is ended from the network (<end_status>=67). If the call is ended before the network responds, <cc_cause> will not be reported.
- When parameters reported by ^CEND are four, there are a space respectively after the comma which is between <duration> and <end_status>, and the comma which is between <end_status> and <cc_cause>.

7.20.1 Examples

Example 1:

Make an emergency call.

ATD911; *Note: Dials 911.*

^ORIG: 1,9 *Note: Unsolicitedly reports a call originating indication.*



OK

^CONF: 1 *Note: Unsolicitedly reports a ringback tone indication.*

ATH

^CEND: 1,0,48 *Note: Unsolicitedly reports a call ending indication.*

OK

Example 2:

Make a voice call.

ATD075536836412;

^ORIG: 1,0

OK

^CONF: 1

^CONN: 1,0 *Note: Sends the call answered indication after the call is put through.*

ATH

^CEND: 1,4,48

OK

7.21 AT+CLIP-Command for Displaying the Calling Line Identification

The AT+CLIP command refers to the Calling Line Identification Presentation (CLIP), a GSM supplementary service. The called party can get the Calling Line Identification (CLI) of the caller when receiving a call.

7.21.1 Querying the Settings Supported by the AT+CLIP Command

Test Command	AT+CLIP=?
Function	Queries the CLIP settings that can be set by the command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CLIP: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: integer; sets or displays the result code state of TE (the value set for <n> remains unchanged even if the module is powered off).

0: Indicates that the CLIP is not provisioned (default value).

1: Indicates that the CLIP is provisioned.

7.21.2 Reading the Settings of the CLIP Service

Read command	AT+CLIP?
Function	Reads the settings of the CLIP service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CLIP: <n>,<m><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<m>: integer; sets whether the CLIP service is provisioned on the network.

0: Indicates that the CLIP is not provisioned.

1: Indicates that the CLIP is provisioned.

2: Unknown (due to interworking problems or limitations of originating network).

7.21.3 Setting the CLIP

Set command	AT+CLIP=[<n>]
Function	Enables or disables the CLIP service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

AT+CLIP= is equivalent to AT+CLIP=0.

7.22 +CLIP- Command for Unsolicitedly Reporting the CLI

URC	<CR><LF>+CLIP: <number>,<type>[,<subaddr>,<satype>[,<alpha>][,<CLI validity>]]<CR><LF>
------------	---

Parameter description

<number>: character type, which indicates the telephone number.

<type>: integer; indicates the telephone number in character type.

145: International number

129: Other number

<subaddr>: string type subaddress of format specified by <satype>.

<satype>: type of subaddress octet in integer format.

<alpha>: string type, not supported currently.

<CLI validity>: integer

0: The CLI is valid.

1: The CLI is withheld by the caller.

2: The CLI is not available due to interworking problems or limitations of originating network.



7.23 RING–Command for Unsolicitedly Reporting Incoming Calls

This command indicates that the module has an incoming call.

If AT+CRC is set to 0, this command is reported in the case of an incoming call.

URC <CR><LF>RING<CR><LF>

7.24 +CRING–Command for Unsolicitedly Reporting Incoming Calls

This command indicates that the module has an incoming call.

If AT+CRC is set to 1, this command is reported in the case of an incoming call.

URC <CR><LF>+CRING: <type><CR><LF>

Parameter description

<type>: character string. Table 7-8 lists the values.

Table 7-8 <type> values

Value	Description
"REL ASYNC"	Asynchronous non-transparent transmission.
"GPRS"	PDP context activation request at the GPRS network side.
"VOICE"	Voice call.

7.25 AT^VOLRING–Command for Adjusting the Ringtone Volume

This command can query and set the ringtone volume for incoming calls.

7.25.1 Checking the Parameter Range Supported by This Command

Test command AT^VOLRING=?

Function Returns the parameter range supported by this command.

Response <CR><LF>^VOLRING: (list of supported <volring>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<volring>: integer; indicates the ringtone volume level.

Table 7-9 Values of <volring>

Parameter	Value	Description
<volring>	(0–3)	Supported ringtone volume levels. 0 indicates no ringtone. The default value is 2.

7.25.2 Reading the Current Ringtone Volume Level

Read command AT^VOLRING?

Function Reads the current ringtone volume level.

Response <CR><LF>^VOLRING:
<volring><CR><LF><CR><LF>OK<CR><LF>

7.25.3 Setting the Ringtone Volume Level

Set command AT^VOLRING=<volring>

Function Sets the ringtone volume level.

Response

- In the case of successful execution: <CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR/+CME ERROR: <err><CR><LF>

Notes:

- When the ringtone is playing, the ringtone volume cannot be adjusted and the settings configured using this command will not take effect until the ringtone plays next time.
- The ringtone volume settings remain effective after the module is powered off.
- If <volring>=0, no ringtone is played for incoming calls.

7.25.4 Examples

Examples 1:

Obtain the parameter value range supported by this command.

AT^VOLRING=?

^VOLRING: (0–3)

OK

Examples 2:

Query the ringtone volume level.

AT^VOLRING?

^VOLRING: 1

OK

Examples 3:

Set the ringtone volume level.

AT^VOLRING=3

OK

The settings take effect the next time the ringtone plays.

7.26 AT+CLCC–Command for Querying the Call Status

The TA uses this command to query the current call information list.

7.26.1 Checking Whether This Command Is Supported

Test command AT+CLCC=?

Function Checks whether this command is supported.

Response <CR><LF>OK<CR><LF>

7.26.2 Querying the Current Call Information List

Execution command	AT+CLCC
Function	Reads the current call information.
Response	<p>[<CR><LF>+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]<CR><LF>]]+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]<CR><LF>]][...]]<CR><LF>OK<CR><LF></p> <ul style="list-style-type: none"> • In the case of an error during command execution: <CR><LF>ERROR<CR><LF> • In the case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Table 7-10 Parameter description

Parameter	Value	Description
<idx>	1–7	Integer; call identification number
<dir>	0	Mobile originated (MO) call
	1	Mobile terminated (MT) call
<stat>: call status	0	Active
	1	On hold (not supported currently)
	2	Dialing (MO call)
	3	Alerting (MO call)
	4	Incoming (MT call)
	5	Waiting (not supported currently)
<mode> (bearer/teleservice)	0	Voice
	1	Data (not supported currently)
	2	Fax (not supported currently)
<mpty>	0	Non-multi-party call such as meeting
	1	Multi-party call such as meeting (not supported currently)
<number>	-	String type phone number in format specified by <type>



Parameter	Value	Description
<type>	-	Type of address octet in integer format (refer to GSM 04.08 subclause 10.5.4.7). When <number> contains the plus sign (+), the value of <type> is 145. When <number> does not contain the plus sign (+), the value of <type> is 129.

7.26.3 Examples

Query the current call status.

RING

+CLIP: "+8613903710439",145,"",,,0

AT+CLCC

+CLCC: 1,1,4,0,0,"+8613903710439",145

OK

AT+CLCC

+CLCC: 1,1,4,0,0,"+8613903710439",145

OK

RING



8

Commands for Network Services

This chapter describes the AT commands that allow users to query and configure the operator information.

8.1 AT+COPN-Command for Querying the Operator Name

The AT+COPN command queries the operator name.

8.1.1 Checking Whether This Command Is Supported

Test command	AT+COPN=?
Function	Checks whether this command is supported.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

8.1.2 Reading the List of Operators

Execution command AT+COPN

Function Reads the list of operators.

Response

- In case of successful execution:
<CR><LF>+COPN:<numericn>,<alphan><CR><LF>[+COPN: ...(list of operators)<CR><LF>]<CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<numericn>: indicates an operator in numeric format.

<alphan>: indicates an operator in long string format.

8.1.3 Examples

Example 1:

Query the command status.

AT+COPN=?

OK *Note: The command is available.*

Example 2:

Query all the operator information.

AT+COPN

+COPN: "36320", "DIGICEL"

<list of operator information, which is omitted due to excessive length>

OK

8.2 AT+COPS–Command for Selecting Operators

The AT+COPS command registers a network and queries the currently registered network status and network selection mode.



8.2.1 Checking the Current Available Network and Operator Information

Test command AT+COPS=?

Function Returns the current available network and operator information.

Response

- In case of successful execution:
<CR><LF>+COPS: [list of present operators(<opStatus>s, long alphanumeric <oper>s, short alphanumeric <oper>s, numeric <oper>s)],, (list of supported <mode>s), (list of supported <format>s)<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Note:

It takes a long time for this command to query the current available network.

Parameter description

<mode>: network selection mode, whose values are as follows:

0: Automatic mode (other parameters are omitted) (default value).

1: Manual network searching.

2: Deregisters a network and maintains the network in unregistered state until <mode>=0, 1, or 4 (this is not supported currently).

3: Sets the value of <format> in the result returned by the read command.

4: Combination of automatic and manual network searching modes. If manual network searching fails, the automatic network searching mode is started.

<opStatus>: network status identifier, whose values are as follows:

0: Unknown

1: Available

2: Currently registered

3: Disabled

<format>: format of the operator information <oper>. The values of this parameter are as follows:

0: Operator information <oper> in long string format, which consists of not more than 16 characters (default value).

1: Operator Information with short string format (not supported currently).

2: Operator information <oper> in numeric format.



<oper>: operator information. In a test command, the operator name follows the long string format and numeric format. In a read command, the operator name contains all fields.

8.2.2 Reading the Currently Registered Network and Operator Information

Read command	AT+COPS?
Function	Reads the currently registered network and operator information.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+COPS: <mode>[,<format>[,<oper>]]<CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

8.2.3 Setting the Current Operator Information

Set command	AT+COPS=<mode>[,<format>[,<oper>]]
Function	Sets the current operator information.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- In automatic network searching mode, only the <mode> parameter is valid and other parameters are omitted.
- When the set operator information does not exist or is unavailable, the CME ERROR is returned.

8.2.4 Examples

Example 1:

Obtain the list of available operator information.

AT+COPS=?

+COPS: (2,"CC 460 NC 09",,"46009"),(3,"CHN-CUGSM",,"46001"),(3,"CHINA MOBILE",,"46000"),,(0-4),(0,2)

OK

Example 2:

Set the automatic network searching mode.

AT+COPS=0 *Note: In automatic network searching mode, only the <mode> parameter is valid.*

OK

Example 3:

Manually register with the network.

AT+COPS=1,2,46000

OK

8.3 AT+CREG–Command for Querying Network Registration

The AT+CREG command queries network registration.

8.3.1 Checking the Parameter Range Supported by This Command

Test command	AT+CREG=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CREG: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: URC mode

0: Disables unsolicited reporting of AT+CREG (default value).

1: Enables unsolicited reporting of +CREG: <stat>. When <n>=1, that is, when the status of network registration changes, +CREG:<stat> is reported.

2: Enables unsolicited reporting of +CREG: <stat>[,<lac>,<ci>]. After the AT+CREG READ command is sent previously or is reported unsolicitedly, the values of the <lac> and <ci> parameters do not change, the preceding command is not displayed. During the call, the optional parameters <lac> and <ci> are not displayed. When <n>=2, that

is, when the cell information changes, +CREG: <stat>[,<lac>,<ci>] is reported. The location information <lac>,<ci> is reported only when <n>=2.

8.3.2 Querying the Current Status of Network Registration

Read command AT+CREG?

Function Queries the current status of network registration.

Response

- In case of successful execution:
<CR><LF>+CREG:<n>,<stat>[,<lac>,<ci>]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<stat>: current status of network registration.

0: Does not register. Currently, the ME does not search for a new operator to be registered with.

1: Registers with the local network.

2: Does not register. The ME, however, is searching for a new operator to be registered with.

3: Network registration is rejected.

4: Unknown reason.

5: Registers with the roaming network.

<lac>: location area code, which consists of two bytes in hexadecimal mode (for example, "00C3"=195 in decimal mode).

<ci>: cell information, which consists of two bytes in hexadecimal mode.

8.3.3 Setting the Status of Network Registration

Set command AT+CREG=[<n>]

Function Queries the current status of network registration.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error during command execution: <CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

In this section, AT+CREG= is equivalent to AT+CREG=0.

8.4 +CREG-Command for Unsolicitedly Reporting the Network Registration Status

URC

- If AT+CREG is set to 1, when the network registration status is changed:
<CR><LF>+CREG:<stat><CR><LF>
- If AT+CREG is set to 2, when the network registration status or network cell is changed:
<CR><LF>+CREG:<stat>[,<lac>,<ci>]<CR><LF>

Function Indicates that the network registration status is changed.

8.4.1 Examples

Example 1:

Query the current status of network registration.

AT+CREG?

+CREG: 0,1 *Note: Has been registered with the local network and does not unsolicitedly report the CREG information.*

OK

Example 2:

Set unsolicited reporting of the current +CREG information.

AT+CREG=2

OK



8.5 AT+CSQ-Command for Querying the Signal Quality

The AT+CSQ command queries the signal quality and returns the receive signal strength indicator <rssi> and channel bit error rate <ber> that are sent by the ME.

8.5.1 Checking the Parameter Range Supported by This Command

Test command AT+CSQ=?

Function Returns the parameter range supported by this command.

Response

- In case of successful execution:
<CR><LF>+CSQ: (list of supported <rssi>s),(list of supported <ber>s)<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<rssi>: receive signal strength indicator.

0: ≤ -113 dBm

1: -111 dBm

2–30: -109 dBm to -53 dBm

31: ≥ -51 dBm

99: Unknown or immeasurable

<ber>: bit error rate in percentage. The value of ber can be queried only during the call processing. Otherwise, only the value 0 or 99 is returned. Currently, only the value 99 is returned.

0–7: Correspond to the values of RXQUAL in the GSM 05.08 section 8.2.4.

99: Unknown or immeasurable



8.5.2 Querying the Current Signal Quality

Execution command	AT+CSQ
Function	Queries the current signal quality.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSQ: <rsqi>,<ber><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

After running a network related AT command such as AT+CLCK, you are advised to run the AT+CSQ command after three seconds.

8.5.3 Examples

Example 1:

Query the parameter range supported by the command.

AT+CSQ=?

+CSQ: (0–31,99),(0–7,99)

OK

Example 2:

Query the current signal quality.

AT+CSQ

+CSQ: 23, 99

OK

8.6 AT^SMONC-Command for Querying the Cell Information

The AT^SMONC command obtains the cell information. A maximum of seven BTS cells can be obtained, including the serving cell and up to six neighbor cells.



8.6.1 Checking Whether This Command Is Available

Test command	AT^SMONC=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

8.6.2 Querying the Cell Information

Execution command	AT^SMONC
Function	Obtains the cell information.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SMONC: <MCC>1,<MNC>1,<LAC>1,<cell>1,<BSIC>1,<chann>1,<RSSI>1,<C1>1,<C2>1,<MCC>2,<MNC>2,<LAC>2,<cell>2,<BSIC>2,<chann>2,<RSSI>2,<C1>2,<C2>2,...<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<MCC>: country code, which is a 3-digit decimal number.

<MNC>: network code, which is a 2-digit or 3-digit decimal number.

<LAC>: location area code, which is a 4-digit hexadecimal number.

<cell>: cell code, which is a 4-digit hexadecimal number.

<BSIC>: base station identification code, which is a 2-digit decimal number.

<chann>: Absolute Frequency Channel Number (ARFCN)

<RSSI>: received signal level of BCCH carriers (0–63), which is expressed by dBm value plus offset value. For details, see the 3GPP TS 05.08.

<C1>: cell reselection coefficient.

<C2>: cell reselection coefficient.



8.6.3 Examples

Example 1:

Query the parameter range supported by the command.

AT^SMONC=?

OK

Example 2:

Query the current cell information.

AT^SMONC

^SMONC:

460,01,2540,7ade,3b,722,19,23,33,460,01,2540,7a9a,03,730,18,20,30,460,01,2540,
7a09,32,118,16,19,19,000,000,0000,0000,00,0,0,-,-,000,000,0000,0000,00,0,0,-,-
,000,000,0000,0000,00,0,0,-,-,000,000,0000,0000,00,0,0,-,-

OK

8.7 AT^SMOND-Command for Querying the Cell Information (Including Neighbor Cells)

The AT^SMOND command obtains the information about the serving cell and up to six related neighbor cells. This command can obtain the detailed information about the receive signal strength.

8.7.1 Checking Whether This Command Is Available

Test command	AT^SMOND=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

8.7.2 Querying the Cell Information

Execution command AT^SMOND

Function Obtains the cell information.

Response

- In case of successful execution:
<CR><LF>^SMOND:
[<sci>][,<nci>][,<TA>][,<rssiber>]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<sci>: serving cell information (separated by a comma, excluding CR/LF), which is described as follows:

<MCC>,<MNC>,<LAC>,<cell>,<BSIC>,<chann>,<RxLev>,<RxLevFull>,<RxLevSub>,<RxQual><RxQual Full>,<RxQual Sub>,<Timeslot>

If the serving cell information is not found, the parameter values are omitted. For example, " , , , , , <RxLev> , , , 0 , , 0".

<nci>: neighbor cell information (neighbor cells 1–6) (separated by a comma, excluding CR/LF), which is described as follows:

<MCC>1,<MNC>1,<LAC>1,<cell>1,<BSIC>1,<chann>1,<RxLev>1, (these parameters repeated for neighbor cells 2 through 6 with no CR/LF):...
<MCC>6,<MNC>6,<LAC>6,<cell>6,<BSIC>6,<chann>6,<RxLev>6; for unavailable cells, " , , , , , 0 "is displayed.

<TA>: timing advance value of the serving cell (bits).

<rssiber>: RSSI and BER values (separated by a comma, excluding CR/LF), which are described as follows:

<RSSI>,<BER>

<MNC>: network code, which is a 2-digit or 3-digit decimal number.

<LAC>: location area code, which is a 4-digit hexadecimal number.

<cell>: cell code, which is a 4-digit hexadecimal number.

<BSIC>: base station identification code, which is a 2-digit decimal number. (If no base station identification code is found, this parameter will be left blank in the response.)

<chann>: absolute Frequency Channel Number (ARFCN).

<RxLev>: receive signal level (dBm).

<RsQual>: receive signal quality, which is defined in the GSM 05.08.

<Timeslot>: assigned time slots (0–8). If the MS is in idle mode, time slot 0 is displayed.

<RSSI>: receive signal strength indicator (0–31).

<BER>: bit error rate (0–7, 99)

8.7.3 Examples

Query the current cell information.

AT^SMOND

^SMOND: 460, 09,0001,0003,00, 552,
47,,,0,,,0,,,,,0,,,,,0,,,,,0,,,,,0,,,,,0,255,47,255

OK

8.8 AT^MONI-Command for Querying the Cell Information in Idle and Dedicated Modes

The AT^MONI command obtains the information about the serving cell or dedicated cells. In idle and dedicated modes of the ME, the cell information (serving cell information and dedicated channel information) can be returned by execution command and Set command. The Set command periodically returns the cell information. To stop periodical return of the cell information, you can enter any character.

8.8.1 Checking the Parameter Range Supported by This Command

Test command	AT^MONI=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^MONI: (list of supported <period>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<period>: integer; indicates the period in seconds. The value ranges from 1 to 254.

Table 8-1 List of parameters for the serving cell

Parameter	Description
chann	ARFCN (Absolute Frequency Channel Number) of the BCCH carrier
rs	RSSI value (0–63) (RSSI= Received signal strength indication)
dBm	Receive signal strength of the BCCH (dBm)
MCC	Country code (first part of the PLMN code)
MNC	Network code (second part of the PLMN code)
LAC	Location area code
cell	Cell ID
NCC	Network color code, which is used to differentiate PLMN subnets
BCC	Base station color code, which is used to differentiate intra-frequency cells
PWR	Maximum power level of the RACH (dBm)
PXLev	Minimum receive signal level allowed for registration (dBm)
C1	Base station selection coefficient

Table 8-2 List of parameters for dedicated channels

Parameter	Description
chann	Absolute Frequency Channel Number (ARFCN) of the Traffic Channel (TCH) Note: When <chann>=h, it indicates frequency hopping.
TS	Sequence number of time slot
dBm	Receive signal strength level of the BCCH (dBm)
timAdv	Timing advance value (bits)
PWR	Power level
dBm	Receive signal strength level of the TCH (dBm)
Q	Receive signal quality (0–7)
ChMod	Channel mode (--: Signaling, S_HR: Half rate, S_FR: Full rate, S_EFR: Enhanced Full Rate, A_HR: AMR Half rate, A_FR: AMR Full rate)

Parameter values set for the ME in different states



The ME has accessed the cell and registered with the network.

Serving cell												I Dedicated channel
Chann	rs	dBm	MCC	MNC	LAC	cell	NCC	BCC	PWR	RXLev	C1	I chann TS timAdv PWR dBm Q ChMod
82	23	-63	460	00	0001	0003	0	0	0	-102	13	I No connection

The ME has accessed the cell but has not registered with the network (only emergency calls can be made).

Serving cell												I Dedicated channel
Chann	rs	dBm	MCC	MNC	LAC	cell	NCC	BCC	PWR	RXLev	C1	I chann TS timAdv PWR dBm Q ChMod
82	23	-63	460	00	0001	0003	0	0	0	-102	13	Limited Service

The ME is searching for the network but fails to find a proper cell.

Serving cell												I Dedicated channel
Chann	rs	dBm	MCC	MNC	LAC	cell	NCC	BCC	PWR	RXLev	C1	I chann TS timAdv PWR dBm Q ChMod
Searching												

The returned result contains the related text information based on the service status.

Value	Description
Searching	The MS is searching for the network but fails to find a proper cell. When the MS restarts or is not covered by signals, the MS is in this service state.
No connection	The MS is accessing the cell and registering with the network. In this case, the service state is "idle".
Cell Reselection	The MS is covered by signals of a cell but is searching for a better cell.

Value	Description
Limited Service	The MS is located inside a cell but does not register with the network. In this case, the MS can make emergency calls only.

8.8.2 Obtaining the Information About the Serving Cell or Dedicated Cells.

Execution command AT^MONI

Function Obtains the information about the serving cell or dedicated cells.

Response

- In case of successful execution:


```
<CR><LF>Serving cell                I Dedicated channel
<CR><LF>chann rs dBm MCC MNC LAC cell NCC BCC PWR
RXLev C1 I chann TS timAdv PWR dBm Q ChMod
<CR><LF>...(list of cell information, for details, see Examples.)
<CR><LF><CR><LF>OK<CR><LF>
```
- In case of an error during command execution:


```
<CR><LF>ERROR<CR><LF>
```
- In case of an error related to the MT during command execution:


```
<CR><LF>+CME ERROR: <err><CR><LF>
```

Note:

"Limited service" or "Searching" may be returned only when the module is unsolicitedly searching for or deregistering with the network.

8.8.3 Periodically Obtaining the Information About the Serving Cell or Dedicated Cells.

Set command AT^MONI=<period>

Function Periodically obtains the information about the serving cell or dedicated cells.

Response

- In case of successful execution:


```
Periodically returns <CR><LF>Serving cell
I Dedicated channel
<CR><LF>chann rs dBm MCC MNC LAC cell NCC BCC PWR
RXLev C1 I chann TS timAdv PWR dBm Q ChMod
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
```

<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information. For details, see Examples.)
<CR><LF>...(list of cell information,. For details, see Examples.)
<CR><LF>...(list of cell information,. For details, see Examples.)
<CR><LF>...(enter any character to stop periodical return of the list of cell information)

(For details, see Examples.)

<CR><LF><CR><LF>OK<CR><LF>

- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Note:

"Limited service" or "Searching" may be returned only when the module is unsolicitedly searching for or deregistering with the network.

8.8.4 Examples

Example 1:

Query the parameter range supported by the command.

AT^MONI=?

^MONI: (1-254)

OK

Example 2:

Query the cell information.

AT^MONI

Serving cell *Note: 1 Dedicated channel*

chann rs dBm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv
PWR dBm Q ChMod

552 18 -76 460 09 0001 0003 0 0 0 -102 32 I No connection

552 18 -76 460 09 0001 0003 0 0 0 -102 32 I No connection

OK

Example 3:



Periodically return the cell information.

AT^MONI=1

Serving cell

I Dedicated channel

chann rs dBm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv
PWR dBm Q ChMod

552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection

Serving cell

I Dedicated channel

chann rs dBm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv
PWR dBm Q ChMod

552	18	-69	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection
552	18	-70	460	09	0001	0003	0	0	0	-102	32	I	No connection

e(enter the letter e to stop information return and an echo is returned)

OK



8.9 AT^MONP-Command for Monitoring Idle Neighbor Cells

The AT^MONP command monitors neighbor cells and obtains the information about a maximum of six neighbor cells through the execution command and Set command. The Set command periodically returns the related information. To stop periodical return of the related information, you can enter any character.

8.9.1 Checking the Parameter Range Supported by This Command

Test command	AT^MONP=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^MONP: (list of supported <period>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<period>: integer; indicates the period in seconds. The value ranges from 1 to 254.

For details about other parameters, see the AT^SMONC command.



8.9.2 Obtaining the Monitoring Information About Neighbor Cells

Execution command AT^MONP

Function Obtains the monitoring information about neighbor cells.

Response

- In case of successful execution:
 <CR><LF>chann rs dBm MCC MNC BCC C1 C2
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)
 [<CR><LF>...(information about neighbor cells. For details, see Examples.)]]]]]]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
 <CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
 <CR><LF>+CME ERROR: <err><CR><LF>

8.9.3 Periodically Obtaining the Monitoring Information About Neighbor Cells

Set command	AT^MONP=<period>
Function	Periodically obtains the monitoring information about neighbor cells.
Response	<ul style="list-style-type: none">• In case of successful execution: Periodically returns <CR><LF>chann rs dBm MCC MNC BCC C1 C2 <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.) <CR><LF>...(information about neighbor cells, For details, see Examples.)<CR><LF>...(enter any character to stop periodical return of the list of cell information)<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

8.9.4 Examples

Example 1:

Query the parameter range supported by the command.

AT^MONP=?

^MONP: (1–254)

OK



Example 2:

Query the information about neighbor cells.

AT^MONP

chann	rs	dBm	MCC	MNC	BCC	C1	C2
-------	----	-----	-----	-----	-----	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

OK

Example 3:

Periodically return the information about neighbor cells.

AT^MONP=1

chann	rs	dBm	MCC	MNC	BCC	C1	C2
-------	----	-----	-----	-----	-----	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

chann	rs	dBm	MCC	MNC	BCC	C1	C2
-------	----	-----	-----	-----	-----	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712	20	-73	460	001	2	22	32
-----	----	-----	-----	-----	---	----	----

735	16	-81	460	001	7	19	27
-----	----	-----	-----	-----	---	----	----

705	15	-83	460	001	5	12	22
-----	----	-----	-----	-----	---	----	----

712 20 -73 460 001 2 22 32

e(enter the letter e to stop information return and an echo is returned)

OK

8.10 AT^SMONG–Command for GPRS Monitoring

The AT^SMONG command performs GPRS monitoring and obtains the information about the cells that support the GPRS function. The information can be obtained by execution command and Set command. The Set command can be set to periodically return the cell information. To stop periodical return of the cell information, you can enter any character.

8.10.1 Checking the Parameter Range Supported by This Command

Test command AT^SMONG=?

Function Returns the parameter range supported by this command.

Response

- In case of successful execution:
<CR><LF>^SMONG: (list of supported <table>s),(list of supported <period>s)<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<period>: integer. This parameter can be set to periodically return the list of cell information (in seconds).

The value ranges from 1 to 100. If the value of the <period> parameter is omitted, the returned cell information is displayed in a single line. If the value of the <period> parameter is set, 10 lines of cell information are returned periodically and each 10 lines are accompanied by a text title line.

<table>: integer; indicates the cell information table. The value is 1.

Table 8-3 List of cell information

Parameter	Description
BCCH	Absolute Frequency Channel Number (ARFCN) of the Broadcast Control Channel (BCCH)



Parameter	Description
G	GPRS status of the current serving cell: -: unavailable 1: available
PBCCH	If Packet Broadcast Control Channel (PBCCH) exists, this parameter indicates the ARFCN. Otherwise, this parameter is left empty or set to H (frequency hopping).
PAT	Priority Access Threshold (GSM 04.08 subclause 10.5.2.37b): 0: the current cell forbids packet access. 1: reserved; equivalent to "000" (forbids packet access). 2: reserved; equivalent to "000" (forbids packet access). 3: allows packet access; the priority is 1. 4: allows packet access; the priority is 1–2. 5: allows packet access; the priority is 1–3. 6: allows packet access; the priority is 1–4.
MCC	Mobile Country Code
MNC	Mobile Network Code
NOM	Network Operation Mode (0...2)
TA	Timing Advance Value
RAC	Routing Area Code (in hexadecimal mode)



8.10.2 Obtaining the Information About the Cells That Support the GPRS Function

Execution command	AT^SMONG
Function	Obtains the list of cell information.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>GPRS Monitor<CR><LF><CR><LF>BCCH G PBCCH PAT MCC MNC NOM TA RAC # cell #<CR><LF>...(list of cell information, For details, see Examples.)<CR><LF><CR><LF><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

"Limited service" or "Searching" may be returned only when the module is unsolicitedly searching for or deregistering with the network.

8.10.3 Obtaining the Information About the Cells That Support the GPRS Function

Set command	AT^SMONG=<table>[,<period>]
Function	Obtains the list of information about the cells that support the GPRS function.
Response	<ul style="list-style-type: none">• In case of successful execution: If the <period> parameter is not set, the response is the same as that returned for the execution command in the preceding section. If the <period> parameter is set: <CR><LF>GPRS Monitor<CR><LF> Periodically returns <CR><LF>BCCH G PBCCH PAT MCC MNC NOM TA RAC # cell # <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(list of cell information. For details, see Examples.) <CR><LF>...(enter any character to stop periodical return of the list of cell information)<CR><LF><CR><LF>OK<CR><LF> (For details, see Examples.)• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

"Limited service" or "Searching" may be returned only when the module is unsolicitedly searching for or deregistering with the network.

8.10.4 Examples

Example 1:

Obtain the parameter range.

```
AT^SMONG=?
```

```
^SMONG: (1),(1-100)
```



OK

Example 2:

Obtain the list of cell information.

AT^SMONG

GPRS Monitor

BCCH	G	PBCCH	PAT	MCC	MNC	NOM	TA	RAC	# cell #
552	1	-	6	460	09	1	255	00	

OK

Example 3:

Periodically obtain the list of cell information.

AT^SMONG=1,1

GPRS Monitor

BCCH	G	PBCCH	PAT	MCC	MNC	NOM	TA	RAC	# cell #
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	

BCCH	G	PBCCH	PAT	MCC	MNC	NOM	TA	RAC	# cell #
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	
552	1	-	6	460	09	1	255	00	



```
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
BCCH G PBCCH PAT MCC MNC NOM TA RAC # cell #
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
552 1 - 6 460 09 1 255 00
```

e(enter the letter e to stop information return and an echo is returned)

OK

8.11 AT^SPLM-Command for Reading the PLMN List

The AT^SPLM command reads the PLMN list.

8.11.1 Checking Whether This Command Is Available

Test command	AT^SPLM=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

8.11.2 Querying the List of Operator Names Saved on the ME

Execution command AT^SPLM

Function Queries the list of operator names saved on the ME.

Response

- In case of successful execution:
<CR><LF>^SPLM:
<numericn>,<alphan><CR><LF>[^SPLM: ...<CR><LF>]<CR><LF>
>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<numericn>: indicates an operator in numeric format (for details, see AT+COPS).

<alphan>: indicates an operator in long string format (for details, see AT+COPS).

8.11.3 Examples

Query the list of operators saved on the ME.

AT^SPLM

^SPLM: "36320", "DIGICEL"

...<The information is omitted due to its excessive length>

OK

8.12 AT+CPOL-Command for Setting the List of Preferred Operators

The AT+CPOL command sets the list of preferred operators.

8.12.1 Checking the Parameter Range Supported by This Command

Test command	AT+CPOL=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPOL: (list of supported <index>s),(list of supported <format>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>: sequence number of an operator from the list of preferred operators on the SIM card.

<format>: integer; indicates the format of operator name.

0: Operator information <oper> in long string format, which consists of not more than 16 characters.

1: Operator information in short string format. Currently, the operator information in short string format and in long string format has the same meaning.

2: Operator information <oper> in numeric format (default value).

8.12.2 Querying the List of Preferred Operators

Read command	AT+CPOL?
Function	Queries the list of preferred operators.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CPOL: <index>,<format>,<operator><CR><LF>[+CPOL: ...<CR><LF>]]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<operator>: indicates an operator name in numeric format.

8.12.3 Setting the List of Preferred Operators

- Set command** AT+CPOL=<index>[,<format>,<operator>]
- Function** Sets the list of preferred operators.
- Response**
- In case of successful execution: <CR><LF>OK<CR><LF>
 - In case of an error during command execution: <CR><LF>ERROR<CR><LF>
 - In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

You can set <format> in AT+CPOL=,<format>.

8.12.4 Examples

Add a preferred operator.

AT+CPOL=1,2,46000

OK

8.13 AT^SPLR-Command for Querying Preferred Operators

The AT^SPLR command queries preferred operators.

8.13.1 Checking the Parameter Range Supported by This Command

- Test command** AT^SPLR=?
- Function** Returns the parameter range supported by this command.
- Response**
- In case of successful execution:
<CR><LF>^SPLR: (list of supported <index>s)<CR><LF><CR><LF>OK<CR><LF>
 - In case of an error during command execution: <CR><LF>ERROR<CR><LF>
 - In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>: sequence number range supported by the SIM card.

8.13.2 Querying the Current Range of Preferred Operators

Set command AT^SPLR=<index1>[,<index2>]

Function Queries the current status of network registration.

Response

- In case of successful execution:
[<CR><LF>^SPLR: <index1><oper><CR><LF>[^SPLR:
<index2><oper><CR><LF>]]<CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Note:

The system returns a single record or multiple consecutive records of the list of preferred operators on the SIM card that are read according to the index. If index1 and index2 are entered, all records from index1 to index2 (index1 and index2 included) are returned. If index2 is not entered, the single record index1 is returned.

Parameter description

<index1>: start sequence number in the list of preferred operators.

<index2>: end sequence number in the list of preferred operators. The value of <index2> must be larger than that of <index1>. Otherwise, the ERROR is returned.

<oper>: indicates an operator name in numeric format.

8.13.3 Examples

Read the current range of preferred operators.

```
AT^SPLR=1,2
```

```
^SPLR:1."46000"
```

```
^SPLR:2."46001"
```

```
OK
```

8.14 AT^SPLW-Command for Writing Preferred Operators

The AT^SPLW command sets preferred operators.



8.14.1 Checking the Parameter Range Supported by This Command

Test command	AT^SPLW=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SPLW: (list of supported <index>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>: sequence number of location

8.14.2 Writing the Information About Preferred Operators

Set command	AT^SPLW=<index>[,<oper>]
Function	Sets the information about preferred operators.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- An operator name is written to the specified location of the list of preferred operators on the SIM card. If the oper field does not exist, the record of the current index is deleted from the list.
- Each piece of oper information can correspond to only one record in the list. Otherwise, the ERROR is returned.

Parameter description

<oper>: indicates an operator name in numeric format.

8.14.3 Examples

Set a record into the list of preferred operators.

AT^SPLW=1,46000

OK



8.15 AT+CNUM-Command for Querying Subscriber Numbers

The AT+CNUM command queries subscriber numbers. This information is stored in the EF_{MSISDN} file in the DFTelecom directory on the SIM card. If a subscriber subscribes to different services, the subscriber corresponds to different MSISDNs, each of which is returned as a single line.

8.15.1 Checking Whether This Command Is Available

Test command	AT+CNUM=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>

8.15.2 Querying the MSISDN Related to Subscribers

Execution command	AT+CNUM
Function	Reads the mobile station international ISDN number (MSISDN) related to subscribers.
Response	<ul style="list-style-type: none">• In case of successful execution: [+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]]]<CR><LF>+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]]][...]<CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<alphax>: subscriber name of the local phone number. The subscriber name is a string consisting of digits and characters and the used character set is the value set by +CSCS.

<numberx>: phone number string type that is defined according to the <typex> format and consists of digits 0–9 and the + symbol.

<typex>: type of the local phone number. An 8-digit address type in integer format. When <numberx> contains the + symbol, the value of <typex> is 145, indicating an international phone number. When <numberx> does not contain the + symbol, the value of <typex> is 129, indicating a phone number of the home country.

<speed>: not supported currently.



0: Adaptive baud rate

7: 9600 bit/s (V.32)

71: 9600 bit/s (V.110)

<service>: services related to the phone number, which are not supported currently.

0: Asynchronous modem

1: Synchronous modem

2: PAD Access (asynchronous)

3: Packet Access (synchronous)

<itc>: information transmission capability, which is not supported currently.

0: 3.1 kHz

1: UDI

8.15.3 Examples

Example 1:

Query the MSISDN related to subscribers.

Set two local phone numbers onto the SIM card.

AT+CPBS="ON"

OK

AT+CPBW=1,"13903702769",145

OK

Query the MSISDN.

AT+CNUM

+CNUM: "", "+13903702769",145

OK

Example 2:

Clear the local phone numbers.

AT+CPBS="ON"

OK

AT+CPBW=1

OK

AT+CNUM

OK

8.16 AT^FREQLOCK-Command for Frequency Lock

This command can query, enable and disable the frequency lock function.

8.16.1 Setting the Frequency Lock Function

Set command AT^FREQLOCK=<enable>[,<freq>[,<mode>[,<band>]]]

Function Sets the frequency lock function.

Response

- In the case of successful execution: <CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR/+CME ERROR: <err><CR><LF>

Parameter description

<enable>: integer; indicates whether the frequency lock function is enabled.

Table 8-4 Values of <enable>

Parameter	Value	Description
<enable>	0 (default value)	The frequency lock function is disabled.
	1	The frequency lock function is enabled.

<freq>: integer; indicates the absolute radio frequency channel number locked currently. When <enable>=0, <freq> can be omitted.

Table 8-5 Values of <freq>

Parameter	Value	Description
<freq>	(0–124, 128–251, 512–885, 975–1023)	supported absolute radio frequency channel numbers

<mode>: string type; indicates frequency lock mode (If the parameter is not specified, the GSM frequency is locked by default).

If the value of <freq> is in the duplicate frequency range of GSM 1800 and GSM 1900, lock GSM 1800.

Table 8-6 Values of <mode>

Parameter	Value	Description
<mode>	01 (default value)	GSM

Parameter	Value	Description
	02 (not supported currently)	WCDMA
	03 (not supported currently)	LTE
	04 (not supported currently)	CDMA 1X
	05 (not supported currently)	TD-SCDMA
	06 (not supported currently)	Wimax
	07 (not supported currently)	CDMA-EVDO

<band>: string type; indicates locked frequency band, used to distinguish bands of the same frequency; valid only in GSM mode.

Table 8-7 Values of <band>

Parameter	Value	Description
<band>	00	850
	01	900
	02	1800
	03	1900

8.16.2 Reading the Frequency Lock Status

Read command	AT^FREQLOCK?
Function	Reads the frequency lock status.
Response	<CR><LF>^FREQLOCK: <enable>[,<freq>[,<mode>[,<band>]]]<CR><LF><CR><LF>OK<CR><LF>

Note:

When the value of <enable> is 0, no other parameters are returned. When the value of <enable> is 1, <freq> and <mode> are returned.



8.16.3 Examples

Example 1:

Lock absolute radio frequency channel number 512 of GSM1900.

```
AT^FREQLOCK=1,512,"01","03"
```

OK

Query the frequency lock status.

```
AT^FREQLOCK?
```

```
^FREQLOCK: 1,512
```

OK

Example 2:

Lock absolute radio frequency channel number 512 of GSM1800.

```
AT^FREQLOCK=1,512
```

OK

Query the frequency lock status.

```
AT^FREQLOCK?
```

```
^FREQLOCK: 1,512
```

OK

Example 3:

Disable the frequency lock function.

```
AT^FREQLOCK=0
```

OK

Query the frequency lock status.

```
AT^FREQLOCK?
```

```
^FREQLOCK: 0
```

OK

8.17 AT^NTCT-Set Presentation of Network Time

This command controls the presentation of network time.

The SET command selects the control mode for the presentation of network time. When <n> is set to 1, ^NWTIME is presented.

The READ command returns the current presentation status.

The TEST command returns the value range of supported parameters.

8.17.1 Querying the Settings Supported by the AT^NTCT Command

Test Command	AT^NTCT=?
Function	Queries the NTCT settings that can be set by the command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^NTCT: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: enables or disables the presentation.

0: Disable (default value)

1: Enable

Note:

If <n> is not specified, the value of <n> is 1. The settings are not saved when the MT is powered off. The command is controlled by PIN.

8.17.2 Reading the Settings of the NTCT Service

Read command	AT^NTCT?
Function	Reads the settings of the NTCT service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^NTCT: <n><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>



8.17.3 Setting the NTCT

Set command	AT^NTCT[=<n>]
Function	Enables or disables the NTCT service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

8.17.4 Examples

```
AT^NTCT=1
OK
```

8.18 AT^NWTIME-Query Presentation of Network System Time

This command controls the presentation of network system time, time zone, and daylight saving time.

8.18.1 Querying the Network System Time

Read command	AT^NWTIME?
Function	Query presentation of network system time.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^NWTIME: <date>,<time>,<dt><CR><LF><CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<date>: specifies date in the format of yy/MM/dd.

<time>: specifies the time and time zone in the format of hh:mm:ss+tz. The value of <time> consists of time and time zone, for example, 05:56:13+32. The unit of time zones is 15 minutes. The +32 value indicates 32 times of 15 minutes, that is, +8 hours.

<dt>: specifies daylight saving time. When the parameter is not specified, the board presents 00. Otherwise, corresponding daylight saving time is presented. Detailed values and descriptions are as follows (refer to table 10.5.97a/3GPP TS 24.008):

Value	Description
00	No adjustment for Daylight Saving Time
01	+1 hours adjustment for Daylight Saving Time
02	+2 hours adjustment for Daylight Saving Time
03	Reserved

8.18.2 Examples

Query network system time, time zone, and daylight saving time:

AT^NWTIME?

^NWTIME: 11/12/20,12:33:18+32,00

OK

8.19 ^NWTIME–Unsolicitedly Report the Network Time

URC <CR><LF>^NWTIME:
 <date>,<time>,<dt><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<date>: specifies date in the format of yy/MM/dd.

<time>: specifies the time and time zone in the format of hh:mm:ss+tz. The value of <time> consists of time and time zone, for example, 05:56:13+32. The unit of time zones is 15 minutes. The +32 value indicates 32 times of 15 minutes, that is, +8 hours.

<dt>: specifies daylight saving time. When the parameter is not specified, the board presents 00. Otherwise, corresponding daylight saving time is presented. Detailed values and descriptions are as follows (refer to table 10.5.97a/3GPP TS 24.008):

Value	Description
00	No adjustment for Daylight Saving Time
01	+1 hours adjustment for Daylight Saving Time
02	+2 hours adjustment for Daylight Saving Time
03	Reserved



9

Commands for Data Services

This chapter describes the AT commands that set and operate data services.

9.1 AT+CGDCONT-Command for Defining the PDP Context

The AT+CGDCONT command defines the PDP context. The MT locally saves a group of PDP contexts with <cid> as the index. Each record of the saved setting environment contains a group of PDP related parameters. The Set command saves the group of PDP related parameters in the PDP contexts that use <cid> as the index. Each PDP context is initially undefined. After the Set command saves a group of parameters in a PDP context, the PDP context is defined. The number of defined PDP contexts that can be saved at the same time is determined by the value range of <cid>.

If AT+CGDCONT=<cid> is sent, all parameters in the PDP contexts indicated by <cid> are cleared. In this case, the PDP contexts become undefined again.

9.1.1 Querying the Range of PDP Related Parameters

Test command	AT+CGDCONT=?
Function	Returns the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported<d_comp>s),(list of supported<h_homp>s) <CR><LF>+CGDCONT: (list of supported <cid>s),<PDP_type>,,,(list of supported<d_comp>s),(list of supported<h_homp>s) <CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter; the value ranges from 1 to 3; this parameter indicates the PDP context identification. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context.

<PDP_type>: character type parameter, which indicates the type of packet exchange protocol.

"IP": Internet Protocol (IP)

"PPP": Point-to-Point Protocol (not supported currently)

<APN>: character type parameter, which indicates the domain name of the access point that connects to the GGSN or external networks.

<PDP_addr>: character type parameter. This parameter identifies the address that is assigned to the specified PDP context. If the value of this parameter is null or omitted, the TE provides other address during the PDP startup process. Otherwise, a dynamic address must be requested. Even if an address is assigned during PDP establishment, null is returned after the read command is sent. To read this address, run AT+CGPADDR.

<d_comp>: numeric parameter, which controls the data compression of PDP (available for SNDCP only. For details, see the 3GPP TS 44.065).

0: No compression (default value)

<h_comp>: numeric parameter, which controls the head compression of PDP (for details, see the 3GPP TS 44.065 and 3GPP TS 25.323).

0: No compression (default value)

9.1.2 Reading the Status of the PDP Context

Read command AT+CGDCONT?

Function Reads the status of the PDP context.

Response

- In case of successful execution:
[<CR><LF>+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp><CR><LF>[+CGDCONT: ...<CR><LF>]]<CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:<err><CR><LF>



9.1.3 Setting the Status of the PDP Context

Set command	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>]]]]
Function	Sets the status of the PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

9.1.4 Examples

Define the PDP context.

```
AT+CGDCONT=1, "IP", "1234"
```

OK

Query the defined PDP context.

```
AT+CGDCONT?
```

```
+CGDCONT: 1,"IP","1234","",0,0
```

OK

9.2 AT+CGAUTH-Command for Configuring the PPP Authentication Mode of the Modem

Based on the host requirements, use AT+CGAUTH to configure the PPP authentication mode for the modem to facilitate the host's control over the dial-up process.



9.2.1 Checking Whether AT+CGAUTH Is Supported

Test command	AT+CGAUTH=?
Function	Checks whether AT+CGAUTH is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>(list of supported <cid>s),(list of supported <auth_prot>s),(list of supported <userid>s),(list of supported <password>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter; index of the PDP context; ranging from 1 to 3. See <cid> of AT+CGDCONT for reference.

<auth_prot>: numeric parameter; specifies the authentication mode of the PDP context. Its values are defined as follows:

0: No authentication mode

1: PAP only

2: CHAP only

3: PAP and then CHAP

The default value of <auth_prot> is 3.

<userid>: numeric parameter, indicates the user name used to access the IP network, ranging from 0 to 32 bytes.

<password>: numeric parameter, indicates the password used to access the IP network, ranging from 0 to 32 bytes.



9.2.2 Querying the Current Authentication Mode of the Modem

Read command	AT+CGAUTH?
Function	Queries the current authentication mode of the modem.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGAUTH: <cid>,<auth_prot>,<userid>,<password>[[<CR><LF>+CGAUTH: . ..]...] <CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

9.2.3 Setting the Authentication Mode of the Modem

Set command	AT+CGAUTH=[[<cid>],[<auth_prot>],[<userid>],[<password>]]
Function	Sets the authentication mode of the modem
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

The settings configured by running this command are lost after the module is powered off. Before running this command, disable the PIN lock of the SIM card.

9.2.4 Examples

Set the authentication mode to CHAP only.

```
AT+CGAUTH=1,2,huawei,huawei
```

```
OK
```


9.3 AT+CGACT-Command for Activating or Deactivating the PDP Context

After AT+CGACT (command for activating or deactivating the PDP context) is successfully executed, the MT remains in V.250 command state. If the PDP context is in request state, the state remains unchanged. When the activation form of this command is executed, if the MT has not been attached to the GPRS, the MT must perform GPRS attachment before attempting to activate the specified PDP context. If <cid> is not specified, all PDP contexts are activated or deactivated.

9.3.1 Querying the Supported Status of PDP Context

Test command	AT+CGACT=?
Function	Queries the supported status of PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGACT: (list of supported <state>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<state>: numeric parameter, which indicates the activation state of the PDP context.

0: Deactivation

1: Activation

9.3.2 Reading the Activation State of the PDP Context

Read command	AT+CGACT?
Function	Reads the activation state of the specified PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CGACT:<cid><state><CR><LF>+CGACT:<cid><state><CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter; the value ranges from 1 to 3; this parameter indicates the PDP context identification. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context.

9.3.3 Setting the Activation State of the PDP Context

Set command	AT+CGACT=[<state>[,<cid>[,<cid>]]]
Function	Sets the status of the PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- To hang up the dialing of a data service through AT commands, first send AT+CGACT to deactivate the PDP context, and then send ATH to hang up the data service.
- In this section, AT+CGACT= is equivalent to AT+CGACT=1 (<state>=1).

9.3.4 Examples

Example 1:

Define the PDP context.

```
AT+CGDCONT=1,"IP","1234"
```

OK

Read the activation state of the PDP context.

```
AT+CGACT?
```

```
+CGACT: 1,0
```

OK

Example 2:

Set to activate the PDP context.

```
AT+CGACT=1,1
```

OK

Read the activation state of the PDP context.

```
AT+CGACT?
```

```
+CGACT:1,1
```

OK

9.4 AT+CGATT-Command for Attaching the MT to or Detaching the MT from the GPRS Service

The AT+CGATT command attaches the MT to the GPRS service or detaches the MT from the GPRS service. After this command is successfully executed, the MT remains in V.250 command state. If the MT is in request state, this command is ignored and OK is returned. When the attachment state is changed to the detachment state, all PDP contexts are deactivated automatically.

9.4.1 Checking the Supported GPRS Service State

Test command	AT+CGATT=?
Function	Checks the supported GPRS service state.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGATT: (list of supported <state>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<state>: character type parameter, which indicates the GPRS attachment state.

0: Detachment state

1: Attachment state

9.4.2 Querying the Current GPRS Service State

Read command	AT+CGATT?
Function	Queries the current GPRS service state.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGATT: <state><CR><LF><CR><LF>OK<CR><LF>• In case of failed command execution: <CR><LF>+CME ERROR: <err><CR><LF>

9.4.3 Setting the GPRS Service State

Set command	AT+CGATT=[<state>]
Function	Sets the GPRS service state.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

In this section, AT+CGATT= is equivalent to AT+CGATT=1 (<state>=1).

9.4.4 Examples

Example 1:

Read the GPRS attachment state.

AT+CGATT?

+CGATT: 1

OK

Example 2:

Set the GPRS detachment state.

AT+CGATT=0

OK

9.5 AT+CGEREP-Command for Reporting GPRS Events

The AT+CGEREP command sets the unsolicited reporting of GPRS events. When certain events occur on the GPRS MT or the network, this command can enable or disable the sending of URC+CGEV: XXX from the MT to the TE. For the +CGEV reporting command, refer to section 9.12 .

9.5.1 Checking the Supported GPRS Event Reporting Mode

Test command	AT+CGEREP=?
Function	Checks the supported GPRS event reporting mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGEREP: (list of supported <mode>s),(list of supported <bfr>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<mode>: numeric parameter.

0: Buffers the URCs on the MT. If the buffer is full, the oldest URC is discarded and URCs are not sent to the TE.

1: When the MT-TE link is reserved (for example, in online data mode), URCs are discarded. Otherwise, URCs are directly forwarded to the TE.

2: When the MT-TE link is reserved (for example, in online data mode), URCs are buffered. After the MT-TE link is available, all URCs are sent to the TE. Otherwise, URCs are directly forwarded to the TE. If the buffer is full, the oldest URC is discarded.

<bfr>: numeric parameter.

0: When the entered value of the <mode> parameter is 1 or 2, the URC buffer defined by this command is cleared.

1: When the entered value of the <mode> parameter is 1 or 2, the URC buffer defined by this command is fully sent to the TE (OK is returned before sending) and the buffer is cleared.

9.5.2 Reading the GPRS Event Reporting Mode

Read command	AT+CGEREP?
Function	Reads the GPRS event reporting mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGEREP: <mode>,<bfr><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

9.5.3 Setting the GPRS Event Reporting Mode

Set command	AT+CGEREP=[<mode>[,<bfr>]]
Function	Sets the GPRS event reporting mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Unsolicited event reporting

URC 1

+CGEV: REJECT <PDP_type>, <PDP_addr>

The MT disables the reporting of +CRING to the TE. The request for activating the PDP context on the network is automatically rejected.

URC 2

+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]

The network requests for re-activating the PDP context. The <cid> parameter is used to re-activate the PDP context.

URC 3

+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]

The network requests for deactivating the PDP context. The <cid> parameter is used to activate the PDP context.

URC 4

+CGEV: MT DEACT <PDP_type>, <PDP_addr>, [<cid>]

The MT requests for deactivating the PDP context. The <cid> parameter is used to activate the PDP context.

URC 5

+CGEV: NW DETACH

The network requests for GPRS detachment.

URC 6

+CGEV: MT DETACH

The MT requests for GPRS detachment.

URC 7

+CGEV: NW CLASS <class>

The network requests for changing the MS class and reports the class with the highest priority.

URC 8

+CGEV: MT CLASS <class>

The MT requests for changing the MS class and reports the class with the highest priority.

Parameter description

<class>: character type parameter, which indicates the GPRS class.

"B": class B

For details about the <PDP_type>, <PDP_addr>, and <cid> parameters, see the parameter description of the AT+CGDCONT command.

9.6 AT+CGDATA-Command for Entering the Data Mode

The AT+CGDATA command sets whether the MT uses one or more GPRS PDP types, performs related operations, and establishes communication between the TE and network.



9.6.1 Querying the Layer-2 Protocol Supported Between the TE and MT

Test command	AT+CGDATA=?
Function	Checks the layer-2 protocol supported between the TE and MT.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGDATA: (list of supported <L2P>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<L2P>: character type parameter, which indicates the layer-2 protocol used between the TE and MT. The default value is PPP.

"PPP": Layer-2 protocol

9.6.2 Establishing Communication Between the TE and Network

Set command	AT+CGDATA=[<L2P>[,<cid>[,<cid>]]]
Function	Establishes communication between the TE and network.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>CONNECT<CR><LF>• In case of failed communication establishment: <CR><LF>NO CARRIER<CR><LF>• In case of failed command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter, which indicates the index value of the PDP context; value range: 1–3. Other commands related to the PDP context can invoke the saved settings through this index value. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context. If <cid> is not specified or the defined PDP context is not matched, the MT activates the PDP context of IP type. Other parameters retain the default values (for details, see AT+CGDCONT, AT+CGQREQ, and AT+CGQMIN).

9.6.3 Examples

Define the PDP context.

```
AT+CGDCONT=1,"IP","1234"
```

OK

Query the defined PDP context.

```
AT+CGDCONT?
```

```
+CGDCONT: 1,"IP","1234","",0,0
```

OK

Establish the communication.

```
AT+CGDATA="PPP",1
```

CONNECT

Run +++ to quit the data mode and enter the command mode.

9.7 AT+CGPADDR-Command for Reading the PDP Address

The AT+CGPADDR command reads the PDP address. This command can return the PDP address list of the specified PDP context identification <cid>. If <cid> is omitted, the addresses of all defined PDP contexts are returned.

9.7.1 Querying the Supported PDP Index Value

Test command	AT+CGPADDR=?
Function	Checks the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CGPADDR: (list of supported <cid>s)<CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter, which indicates the index value of the PDP context; the value ranges from 1 to 3. Other commands related to the PDP context can invoke the saved settings through this index value. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context.

<PDP_addr>: character type parameter, which indicates the PDP address. The PDP address can be a static or dynamic address.

9.7.2 Reading the PDP Address List of the Specified PDP Context

This command reads the PDP address list of the specified PDP context.

Set command	AT+CGPADDR=[<cid>[,<cid>]]
Function	Reads the PDP address list of the specified PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CGPADDR: <cid>,<PDP_address><CR><LF>[+CGPADDR: <cid>,<PDP_address><CR><LF>]]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

9.7.3 Examples

Define the PDP context.

```
AT+CGDCONT=1,"IP","1234"
```

```
OK
```

Activate the PDP context.

```
AT+CGACT=1,1
```

```
OK
```

Read the PDP address.

```
AT+CGPADDR=1
```

```
+CGPADDR:1,"192.168.50.64"
```

```
OK
```

9.8 AT+CGQMIN-Command for Setting the Acceptable Minimum Quality of Service Profile

The AT+CGQMIN command allows the TE to specify an acceptable minimum quality of service (QoS). This profile is verified by the MT and is compared with the negotiation profile returned by the "PDP context activation" message.



The Set command can specify a profile for the context. This profile is identified by the (local) context identification parameter <cid>. If AT+CGQMIN=<cid> is sent, the defined QoS of <cid> is deleted.

9.8.1 Querying the Supported QoS Parameter Range

Test command	AT+CGQMIN=?
Function	Queries the supported QoS parameter range.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGQMIN: <PDP_type>,(list of supported<precedence>s),(list of supported <delay>s),(list of supported <reliability>s),(list of supported <peak>s),(list of supported <mean>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<PDP_type>: type of packet data protocol; string parameter.

"IP"

"PPP" (not supported currently)

<precedence>: numeric parameter, which indicates the priority level.

0: Network customization parameter (default value).

1: Higher than priority levels 2 and 3; implements service commitments with high priority.

2: Higher than priority level 3; implements service commitments with medium priority.

3: Implements service commitments with low priority.

<delay>: numeric parameter, which indicates the delay level; value range: 0–4; this parameter defines the delay of SDU transmission on the GPRS network.

0: Network customization parameter (default value).

When the size of SDU is 128 octets:

Delay Level	Average Transmission Delay	95 Percentile
1(Predictive)	<0.5	<1.5
2(Predictive)	<5	<25
3(Predictive)	<50	<250
4(Best Effort)	Unspecified	

When the size of SDU is 1024 octets:

Delay Level	Average Transmission Delay	95 Percentile
1(Predictive)	<0.5	<1.5
2(Predictive)	<5	<25
3(Predictive)	<50	<250
4(Best Effort)	Unspecified	

<reliability>: integer; indicates the reliability level of processing uncommon data loss.

0: Network customization parameter (default value).

1: Cannot process non-real-time services and error-sensitive applications for data loss.

2: Can process non-real-time services and error-sensitive applications for data loss.

3: Can process non-real-time services and error-sensitive applications for data loss, GMM/SM, and SMS.

4: Can process real-time services and error-sensitive applications for data loss.

5: Can process real-time services and error-sensitive applications for data loss.

<peak>: integer; indicates the peak throughput level (octets/s).

0: network customization parameter (default value).

1: Maximum 1000 (8 kbit/s)

2: Maximum 2000 (16 kbit/s)

3: Maximum 4000 (32 kbit/s)

4: Maximum 8000 (64 kbit/s)

5: Maximum 16000 (128 kbit/s)

6: Maximum 32000 (256 kbit/s)

7: Maximum 64000 (512 kbit/s)

8: Maximum 128000 (1024 kbit/s)

9: Maximum 256000 (2048 kbit/s)

<mean>: integer; indicates the average throughput level.

0: Network customization parameter (default value)

1: 100 (about 0.22 bit/s)

2: 200 (about 0.44 bit/s)

3: 500 (about 1.11 bit/s)

4: 1000 (about 2.2 bit/s)

- 5: 2000 (about 4.4 bit/s)
- 6: 5000 (about 11.1 bit/s)
- 7: 10000 (about 22 bit/s)
- 8: 20000 (about 44 bit/s)
- 9: 50000 (about 111 bit/s)
- 10: 100000 (about 0.22 kbit/s)
- 11: 200000 (about 0.44 kbit/s)
- 12: 500000 (about 1.11 kbit/s)
- 13: 1000000 (about 2.2 kbit/s)
- 14: 2000000 (about 4.4 kbit/s)
- 15: 5000000 (about 11.1 kbit/s)
- 16: 10000000 (about 22 kbit/s)
- 17: 20000000 (about 44 kbit/s)
- 18: 50000000 (about 111 kbit/s)
- 31: Maximum throughput (best effort)

9.8.2 Querying the Minimum QoS of All PDP Contexts

Read command	AT+CGQMIN?
Function	Queries the minimum QoS of all PDP contexts.
Response	<ul style="list-style-type: none"> • In case of successful execution: <ul style="list-style-type: none"> [<CR><LF>+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[+CGQMIN: ...<CR><LF>]]<CR><LF>OK<CR><LF> • In case of an error during command execution: <ul style="list-style-type: none"> <CR><LF>ERROR<CR><LF> • In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

9.8.3 Setting the Minimum QoS of a PDP Context

Set command AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]

Function Sets the minimum QoS of a PDP context.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error during command execution: <CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter, which indicates the index value of the PDP context; the value ranges from 1 to 3. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context.

Note:

If no parameters of this command are set, AT+CGQMIN= considers the previously set values valid for various parameters.

9.9 AT+CGQREQ-Command for Setting the Requested QoS Profile

The AT+CGQREQ command allows the TE to specify a QoS level when the MT sends the "PDP context activation request" message to the network. The Set command can specify a profile for the context. This profile is identified by the (local) context identification parameter <cid>. If AT+CGQREQ=<cid> is sent, the defined QoS of <cid> is deleted.



9.9.1 Checking the Parameter Range Supported by the Command

Test command	AT+CGQREQ=?
Function	Queries the parameter range supported by the command.
Response	<ul style="list-style-type: none">• In case of successful execution: +CGQREQ: <PDP_type>,(list of supported <precedence>s),(list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<PDP_type>: type of packet data protocol; string parameter.

"IP"

"PPP" (not supported at present)

<precedence>: numeric parameter, which indicates the priority level.

0: Network customization parameter (default value).

1: Higher than priority levels 2 and 3; implements service commitments with high priority.

2: Higher than priority level 3; implements service commitments with medium priority.

3: Implements service commitments with low priority.

<delay>: numeric parameter, which indicates the delay level; value range: 0–4; this parameter defines the delay of SDU transmission on the GPRS network.

0: Network customization parameter (default value).

When the size of SDU is 128 octets:

Delay Level	Average Transmission Delay	95 Percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	

When the size of SDU is 1024 octets:

Delay Level	Average Transmission Delay	95 Percentile
1(Predictive)	<0.5	<1.5
2(Predictive)	<5	<25
3(Predictive)	<50	<250
4(Best Effort)	Unspecified	

<reliability>: integer; indicates the reliability level of processing uncommon data loss.

0: Network customization parameter (default value).

1: Cannot process non-real-time services and error-sensitive applications for data loss.

2: Can process non-real-time services and error-sensitive applications for data loss.

3: Can process non-real-time services and error-sensitive applications for data loss, GMM/SM, and SMS.

4: Can process real-time services and error-sensitive applications for data loss.

5: Can process real-time services and error-sensitive applications for data loss.

<peak>: integer; indicates the peak throughput level (octets/s).

0: Network customization parameter (default value)

1: Maximum 1000 (8 kbit/s)

2: Maximum 2000 (16 kbit/s)

3: Maximum 4000 (32 kbit/s)

4: Maximum 8000 (64 kbit/s)

5: Maximum 16000 (128 kbit/s)

6: Maximum 32000 (256 kbit/s)

7: Maximum 64000 (512 kbit/s)

8: Maximum 128000 (1024 kbit/s)

9: Maximum 256000 (2048 kbit/s)

<mean>: integer; indicates the average throughput level.

0: Network customization parameter (default value).

1: 100 (about 0.22 bit/s)

2: 200 (about 0.44 bit/s)

3: 500 (about 1.11 bit/s)

4: 1000 (about 2.2 bit/s)

5: 2000 (about 4.4 bit/s)

6: 5000 (about 11.1 bit/s)

- 7: 10000 (about 22 bit/s)
- 8: 20000 (about 44 bit/s)
- 9: 50000 (about 111 bit/s)
- 10: 100000 (about 0.22 kbit/s)
- 11: 200000 (about 0.44 kbit/s)
- 12: 500000 (about 1.11 kbit/s)
- 13: 1000000 (about 2.2 kbit/s)
- 14: 2000000 (about 4.4 kbit/s)
- 15: 5000000 (about 11.1 kbit/s)
- 16: 10000000 (about 22 kbit/s)
- 17: 20000000 (about 44 kbit/s)
- 18: 50000000 (about 111 kbit/s)
- 31: Maximum throughput (best effort)

9.9.2 Querying All QoS Levels Specified by the TE

Read command	AT+CGQREQ?
Function	Queries all QoS levels specified by the TE when the MT sends the "PDP context activation request" message to the network.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR> <LF>[<CR><LF>+CGQREQ: ...<CR><LF>]]<CR><LF>OK<CR> <LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>



9.9.3 Setting the QoS of a PDP Context

Set command	AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]
Function	Sets the QoS of a PDP context.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<cid>: numeric parameter, which indicates the index value of the PDP context; the value ranges from 1 to 3. For a TE-MT interface, this parameter is local and can be used for other commands related to the PDP context.

Note:

If no parameters of this command are set, AT+CGQMIN= considers the previously set values valid for various parameters.

9.10 AT+CGREG–Command for Setting Whether to Report the GPRS Network Registration Status

The AT+CGREG command sets the unsolicited reporting upon change of the GPRS registration status.

9.10.1 Checking the Parameter Range Supported by this Command

Test command	AT+CGREG=?
Function	Checks the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGREG:(list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: numeric parameter.

0: Disables the URC (default value)

1: Enables the URC"+CGREG:<stat>"

2: Enables the URC"+CGREG:<stat>[<lac>,<ci>]"

<lac>: location Area Code (LAC)

<ci>: cell Identity (CI)

9.10.2 Querying the Parameters Unsolicitedly Reported When the Current GPRS Registration Status Changes

Read command AT+CGREG?

Function Queries the parameters unsolicitedly reported when the current GPRS registration status changes.

Response

- In case of successful execution:
When <n> is not set to 2:
<CR><LF>+CGREG:
<n>,<state><CR><LF><CR><LF>OK<CR><LF>
When <n> is set to 2:
<CR><LF>+CGREG:
<n>,<state>,<lac>,<ci><CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT during command execution:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<stat>: numeric parameter, GPRS registration status.

0: Has not been registered and the ME does not search for a new network currently. The ME is in GMM-NUL or GMM-DEREGISTERED-INITIATED state. The GPRS service is disabled and the subscriber can request the ME to attach to the GPRS.

1: Has been registered with the local network.

2: Has not been registered but the ME is searching for a new network. The ME is in GMM-NUL or GMM-DEREGISTERED-INITIATED state. The GPRS service is enabled but no available PLMN exists. After an available PLMN exists, the ME immediately attaches to the GPRS.

3: Registration is rejected. The GPRS service is disabled and the ME cannot be attached to the GPRS.

4: Unknown.

5: Has been registered with the roaming network.

9.10.3 Setting the Parameters Unsolicitedly Reported When the GPRS Registration Status Changes

Set command	AT+CGREG=[<n>]
Function	Sets the parameters unsolicitedly reported when the GPRS registration status changes.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- When the ME has been attached to the GPRS, if the PLMN reselects a network that does not support GPRS or a network where the SIM card disables the GPRS application, this command still returns the current status as follows: <stat>=1 or <stat>=5.
- URC: When the GPRS network registration status of the ME changes, the following status is returned:
+CGREG:<stat>
- If no parameters of this command are set, AT+CGREG= considers the previously set values valid for various parameters.

9.10.4 +CGREG-Command for Reporting Unsolicitedly

URC	<CR><LF>+CGREG: <stat><CR><LF>
Function	Indicates that the GPRS network registration status of the ME is changed.

9.11 AT+CGSMS- Command for Selecting the MO SMS Bearer Domain

The AT+CGSMS command sets the MT SMS bearer domain.

9.11.1 Querying the Supported SMS Bearer Domains

Test command	AT+CGSMS=?
Function	Queries the supported SMS bearer domains.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGSMS:(list of supported <service>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<service>: numeric parameter.

0: GPRS.

1: CS domain.

2: GPRS is preferred (if GPRS is unavailable, CS domain is used).

3: CS domain is preferred (if CS domain is unavailable, GPRS is used) (default value).

9.11.2 Reading the Current SMS Bearer Domain

Read command	AT+CGSMS?
Function	Reads the current settings.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CGSMS:<service><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

9.11.3 Setting the SMS Bearer Domain

Set command	AT+CGSMS=[<service>]
Function	Sets the SMS bearer domain.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

If no parameters of this command are set, AT+CGSMS= considers the previously set values valid for various parameters.

9.12 +CGEV-Command for Unsolicitedly Reporting GPRS MT or Network Events

When an event related to the GPRS MT or network occurs, the MT unsolicitedly reports +CGEV.

- URC1** When the MT is forbidden from reporting +CRING to the TE, the PDP context activation request of the network is automatically rejected.
<CR><LF>+CGEV: REJECT <PDP_type>, <PDP_addr><CR><LF>
- URC2** The network requests for re-activating the PDP context.
<CR><LF>+CGEV: NW REACT <PDP_type>, <PDP_addr>,
[<cid>]<CR><LF>
- URC3** The network initiates PDP context deactivation.
<CR><LF>+CGEV: NW DEACT <PDP_type>, <PDP_addr>,
[<cid>]<CR><LF>
- URC4** The MT initiates PDP context deactivation.
<CR><LF>+CGEV: MT DEACT <PDP_type>, <PDP_addr>,
[<cid>]<CR><LF>
- URC5** The network initiates a GPRS detach procedure.
<CR><LF>+CGEV: NW DETACH<CR><LF>
- URC6** The MT initiates a GPRS detach procedure.
<CR><LF>+CGEV: MT DETACH<CR><LF>
- URC7** When the network initiates an MS class change, the class with the highest priority is reported.
<CR><LF>+CGEV: NW CLASS <class><CR><LF>
- URC8** When the MT initiates an MS class change, the class with the highest priority is reported.
+CGEV: MT CLASS <class>

Parameter description

<cid> is used to re-activate the PDP context.

<class>: character type, which indicates the GPRS class.

"B": Class B

For the description of <PDP_type>, <PDP_addr>, and <cid>, see the parameter description of the AT+CGDCONT command.



10

Commands for Internet Services

Internet service, also known as IPSTACK service, means the service of using the TCP/IP protocol stack embedded in the MG323/MG323-B to perform data services. The Internet service allows the host to access the Internet more easily through AT commands. This chapter describes all the AT commands that are covered by the TCP/IP protocol.

Currently, the MG323/MG323-B supports Internet services for the Socket client/server of TCP and the Socket client/server of UDP.

Only the URC mode is supported for Internet services.

The URC mode means that the Internet service process is driven by the URC. The URC notifies the host of whether the data can be sent or received, whether data transmission is complete, whether the service can be disabled, and whether an error occurs.

10.1 AT^SICS-Command for Creating a Connection Profile

The AT^SICS command can create and edit a connection profile.

10.1.1 Checking Whether the SICS Command Is Available

Test command	AT^SICS=?
Function	Checks whether the SICS command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>



10.1.2 Reading the Information About Connection Profiles

Read command	AT^SICS?
Function	Reads the status of all connection profiles.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SICS:<conProfileId>,<conParmTag>,<conParmValue>[<CR><LF>^SICS:<conProfileId>,<conParmTag>,<conParmValue>[...]]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<conProfileId>: integer; identifies a connection profile. The value ranges from 0 to 5.

<conParmTag>: string, which indicates the configurable items of a connection profile.

Table 10-1 Parameter names supported by conType in CSD and GPRS0

	CSD (Not Supported Currently)	GPRS0
"conType"	Mandatory	Mandatory
"user"	Optional	Optional
"passwd"	Optional	Optional
"apn"	/	Mandatory
"inactTO"	Optional	Optional
"calledNum" (not supported currently)	Mandatory	/
"dataType" (not supported currently)	Mandatory	/
"dns1" (not supported currently)	Optional	Optional
"dns2" (not supported currently)	Optional	Optional
"alphabet" (not supported currently)	Optional	Optional

<conParmValue>: corresponds to the value of conParmTag.

The meanings of different values of conParmTag and the value range of the corresponding conParmValue are as follows:

"conType": Connection mode of the profile; string; value options are as follows:

"CSD": Data call in circuit switched domain (not supported currently).

"GPRS0": GPRS connection.

"none": Clears connection profiles.

"apn": Access point name in character type, which consists of not more than 100 characters (the default value is a null string).

"user": User name in character type, which consists of not more than 32 characters (the default value is a null string).

"alphabet": Selects the settings for input and output character parameters in the profile. This parameter is not supported currently.

"0": Character settings depend on AT+CSCS (default value).

"1": International reference alphabet (IRA, 7-bit ASCII).

"passwd": Password in character type, which consists of not more than 32 characters (the default value is ****).

"calledNum": Called BCD number, which is not supported currently.

"dataType": Data call type, which is not supported currently.

"0": ISDN.

"1": Analog (default value).

"dns1": Preferred DNS server address (IP address in the format of four dot-separated bytes), which is not supported currently.

"dns2": Alternative DNS server address (IP address in the format of four dot-separated bytes), which is not supported currently.

10.1.3 Setting the Internet Connection Profile

Set command AT^SICS=<conProfileId>,<conParmTag>,<conParmValue>

Function Sets all parameters of the Internet connection profile.

Response

- In case of successful execution:
<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

Note:

You need to select the internet connection type through the "conType" value of <conParmTag> before setting other values of <conParmTag> because the value of "conType" determines the applicability of other values (excluding the <conParmValue-alphabet>) of <conParmTag>. The <conParmValue-alphabet> parameter can be set either before or after "conType". The settings for all parameters of the profile are changeable.



10.1.4 Examples

Example 1:

Query the status of the connection profile.

AT^SICS?

^SICS: 0,"conType","GPRS0"

^SICS: 0,"alphabet","0"

^SICS: 0,"inactTO","20"

^SICS: 0,"user",""

^SICS: 0,"passwd","*****"

^SICS: 0,"apn","1234"

^SICS: 1,"conType",""

^SICS: 2,"conType",""

^SICS: 3,"conType",""

^SICS: 4,"conType",""

^SICS: 5,"conType",""

OK

Example 2:

Set the connection profile.

AT^SICS=0,conType,GPRS0
whose ID is 0 to GPRS0.

Note: Set the value of conType for the profile

OK

AT^SICS=0,apn,1234
to 1234.

Note: Set the value of apn for the profile whose ID is 0

OK

10.2 AT^SICI-Command for Querying the Connection Profile

The AT^SICI command queries the status of the connection profile.

10.2.1 Querying the ID of the Defined Connection Profile

Test command	AT^SICI=?
Function	Queries the ID of the defined connection profile.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>^SICI: (list of defined <conProfileId>s)<CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<conProfileId>: numeric parameter, which indicates the identification of the connection profile. The value ranges from 0 to 5.

10.2.2 Querying the Status of the Connection Profile

Read command	AT^SICI?
Function	Queries the status of the defined connection profile.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>^SICI: <conProfileId>,<conState>,<numServices>,<conAddr>[<CR><LF>...]]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<conState>: numeric parameter, which indicates the status of the Internet connection profile.

0: Down state, which indicates that the Internet connection is defined but not established.

1: Connected state, which indicates that the service is enabled and the Internet connection is initialized. This is not supported currently.

2: Up state, which indicates that the Internet connection has been established, and one or more services are being used. When network signals are temporarily unavailable, the connection is kept in Up state, unless the user or the network disconnects the connection.

3: Restricted state, which indicates that the Internet connection is established but is not covered by a network currently. This is not supported currently.

4: Disabled state, which indicates that the Internet connection is interrupted. This is not supported currently.

<numServices>: numeric parameter, which indicates the IDs of services that use the Internet connection profile. The value ranges from 0 to 9.

<conAddr>: character type parameter, which indicates the local IP address of the Internet connection profile (if no local IP address exists, this parameter is left empty).

10.2.3 Displaying the Status of the Specified Connection Profile

Set command AT^SICI=<conProfileId>

Function Displays the status of the specified connection profile.

Response

- In case of successful execution:
<CR><LF>^SICI:
<conProfileId>,<conState>,<numService>,<conAddr><CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

10.2.4 Examples

Example 1:

Query the ID of the supported connection profile.

AT^SICI=?

^SICI: (0,1)

OK

Example 2:

Query the information about the current connection profile.

AT^SICI?

^SICI: 0,2,1,192.168.50.100

OK

Example 3:

Display the information about the connection profile whose value of conProfileId is 0.



AT^SICI=0

^SICI: 0,2,1,192.168.50.100

OK

10.3 AT^SISS–Command for Creating the Service Profile

The AT^SISS command sets the service profile.

10.3.1 Checking Whether This Command Is Available

Test command	AT^SISS=?
Function	Checks whether the AT^SISS command is supported.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>

10.3.2 Reading the Status of the Service Profile

Read command	AT^SISS?
Function	Reads the status of the defined service profile.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SISS: <srvProfileId>,<srvParmTag>,<srvParmValue><CR><LF>^SISS: <srvProfileId>,<srvParmTag>,<srvParmValue><CR><LF>...<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvProfileId>: numeric parameter, which identifies the service profile. The value ranges from 0 to 9.

<srvParmTag>: string parameter. Currently, the socket service, FTP service and HTTP service are supported. The following table lists the values of <srvParmTag>.

Table 10-2 Values of <srvParmTag>

<srvParmTag>	Mandatory/Optional
"srvType"	Mandatory
"conId"	Mandatory
"alphabet"(which is not supported currently)	Optional
"address"	Mandatory
"tcpMR"	Optional
"tcpOT"	Optional

<srvParmValue>: value range of the parameter defined by <srvParmTag>. For details, see the following table.

Table 10-3 Value range of <srvParmValue> and <srvParmTag>

<srvParmTag>	<srvParmValue>
"srvType": service type.	<ul style="list-style-type: none"> • Socket • Ftp • Http • Smtpt (not supported currently) • Pop3 (not supported currently) • none
"conId": used Internet connection profile.	Corresponds to <conProfileId>. Value range: 0–5.
"alphabet": selects the settings for input and output character parameters in the profile. The selected values are related to specific profiles. Different profiles have different alphabets. The alphabet is changeable regardless of the value of "srvType" in <srvParmTag> (which is not supported currently).	<ul style="list-style-type: none"> • "0": character settings depend on "AT+CSCS". Default value. • "1": international reference alphabet (IRA, 7-bit ASCII)



<srvParmTag>	<srvParmValue>
"address": character value, which depends on the uniform resource loctor (URL) under srvType.	<ul style="list-style-type: none">• URL of TCP client of Socket type "socktcp://"host':remote tcpPort"• URL of TCP server of Socket type 'socktcp://"listener':local tcpPort"• URL of UDP client of Socket type "sockudp://"host':remote udpPort"• URL of UDP client of Socket type "sockudp://"listener':local udpPort"• URL of FTP client• ftp://"username':password'@'host':remote ftpPort'• URL of HTTP client• "http://"host':Port"
"tcpMR": integer; indicates the maximum number of retransmissions (MR).	Value range: 1–30; default value: 10.
"tcpOT": integer; indicates the duration (in seconds) to be waited for disabling a link when a TCP/IP data packet is not acknowledged.	Value range: 1–6000; default value: 6000.

Notes:

- The maximum length of <username> and <password> is 64 Bytes, in which, ":" is not specified by <username>, otherwise, login will be failed.
- When <srvParmTag> is set to address, host supports characters with domain name and IP.



10.3.3 Setting the Internet Service Profile

- Set command** AT^SISS=<srvProfileId>,<srvParmTag>,<srvParmValue>
- Function** Sets the value of <srvParmTag> for the service profile whose ID is <srvProfileId> to <srvParmValue>.
- Response**
- In case of successful execution:
<CR><LF><CR><LF>OK<CR><LF>
 - In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
 - In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

Note:

You need to select the Internet service type through the "srvType" value of <srvParmTag> before setting other values of <srvParmTag> because the value of "srvType" determines the applicability of other values (excluding the <srvParmValue-alphabet>) of <srvParmTag>. The <srvParmValue-alphabet> parameter can be set either before or after "srvType". The settings for all parameters of the profile are changeable.

10.3.4 Examples

Example 1:

Set srvType of the service profile whose ID is 0 to Socket.

AT^SISS=0,srvType, Socket

OK

AT^SISS=0,conId,0

OK

AT^SISS=0,address,"socket://listener:8000"

OK

Example 2:

Set srvType of the service profile whose ID is 1 to Ftp.

AT^SISS=1,srvType,Ftp

OK

AT^SISS=1,conId,0



OK

AT^SISS=1,address,"<ftp://jack:jackie@10.11.38.214:21>"

OK

HTTP Set srvType of the service profile whose ID is 2 to HTTP.

AT^SISS=2,srvType,http

OK

AT^SISS=2,address,"<http://172.22.44.33:8080>"

OK

Query the status of the service profile.

AT^SISS?

^SISS: 0,"srvType","Socket"

^SISS: 0,"conId","0"

^SISS: 0,"alphabet","0"

^SISS: 0,"address","<socket://listener:8000>"

^SISS: 0,"tcpMR","10"

^SISS: 0,"tcpOT","6000"

^SISS: 1,"srvType","Ftp"

^SISS: 1,"conId","0"

^SISS: 1,"alphabet","0"

^SISS: 1,"address","<ftp://10.11.38.214:21>"

^SISS: 1,"tcpMR","10"

^SISS: 1,"tcpOT","6000"

^SISS: 2,"srvType","Http"

^SISS: 2,"conId","0"

^SISS: 2,"alphabet","0"

^SISS: 2,"address","172.22.44.33"

^SISS: 2,"tcpMR","10"

^SISS: 2,"tcpOT","6000"

^SISS: 3,"srvType",""

^SISS: 4,"srvType",""

^SISS: 5,"srvType", ""

^SISS: 6,"srvType", ""

^SISS: 7,"srvType", ""

^SISS: 8,"srvType", ""

^SISS: 9,"srvType", ""

OK

10.4 AT^SISI-Command for Querying the Service Profile

The AT^SISI command queries the status of the service profile.

10.4.1 Querying the ID of the Defined Service Profile

Test command	AT^SISI=?
Function	Queries the ID of the defined service profile.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>^SISI: (list of defined <srvProfileId>s)<CR><LF>]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvProfileId>: numeric parameter, which indicates the identification of the service profile. The value ranges from 0 to 9.



10.4.2 Querying the Status of the Service Profile

Read command	AT^SISI?
Function	Queries the status of the defined service profile.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>^SISI: <srvProfileId>,<srvState>,<rxCount>,<txCount>,<ackData>,<unackData>[...]]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvState>: numeric parameter, which indicates the status of the Internet service profile.

2: Allocated

3: Connecting (which is not supported currently)

4: Up

5: Closing (The module goes into this state only when the other terminal of the connection disconnects the connection and local data has not been read.)

6: Down (which is not supported currently)

<rxCount>: numeric parameter, which indicates the number of bits received by AT^SISR after the link is successfully established.

<txCount>: numeric parameter, which indicates the number of bits sent by AT^SISW after the link is successfully established.

<ackData>: numeric parameter, which indicates the number of data bytes that have been sent and acknowledged by the TCP layer.

<unackData>: numeric parameter, which indicates the number of data bytes that have been sent but have not been acknowledged by the TCP layer. When the value of this parameter is 0, it indicates that the data has been fully sent and acknowledged.



10.4.3 Displaying the Status of the Specified Service Profile

Set command	AT^SISI=<srvProfileId>
Function	Queries the information about a service profile.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SISI:<srvProfileId>,<srvState>,<rxCount>,<txCount>,<ackData>,<unackData><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.4.4 Examples

Example 1:

Query the value of srvProfileId for the defined profile.

AT^SISI=?

^SISI: (0,1,2)

OK

Example 2:

Query the information about all defined service profiles.

AT^SISI?

^SISI: 0,3,0,0,0,0

^SISI: 1,4,10,0,0,0

^SISI: 1,4,0,10,0,0

OK

Example 3:

Query the information about the service profile whose value of srvProfileId is 1.

AT^SISI=1

^SISI: 1,4,10,0,0,0

OK



10.5 AT^SISO-Command for Starting Internet Services

This command starts a specified Internet service.

10.5.1 Checking Whether This Command Is Available

Test command	AT^SISO=?
Function	Returns the result of whether this command is available.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.5.2 Querying the Open Status of All Services

Read command	AT^SISO?
Function	Reads the open status of all services.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SISO: <srvProfileId>,<srvType>,<srvState>,<socketState>,<rxCount>,<txCount>,<locAddr>,<remAddr>[<CR><LF>^SISO: ...]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvProfileId>: numeric parameter, which indicates the ID of the Internet service profile. The value ranges from 0 to 9.

<srvType>: service type

- Socket
- Ftp
- Http
- Smtip (not supported currently)
- Pop3 (not supported currently)
- None

<srvState>: numeric parameter, which indicates the status of Internet services.

2: Allocated

3: Connecting

4: Up

5: Closing

6: Down (not supported currently)

<socketstate>: identification of socket status

1: No socket is allocated

2: Client socket

3: Listener socket

4: Server socket

<rxCount>: numeric parameter, which indicates the number of bits received by AT^SISR after the link is successfully established.

<txCount>: numeric parameter, which indicates the number of bits sent by AT^SISW after the link is successfully established.

<locAddr>: local IP address and TCP port that are used recently.

<remAddr>: remote IP address and TCP port.

10.5.3 Starting a Specified Internet Service

Set command	AT^SISO=<srvProfileId>
Function	Starts an Internet service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- 2G network does not support concurrent voice calls and data services. Therefore, "ERROR" will be returned if this command is run during a call.
- A maximum of eight services can be active at the same time.

10.5.4 Examples

Example 1:

Enable service 0.

AT^SISO=0



OK

Example 2:

Query the enabling status of all services.

AT^SISO?

^SISO: 0,"Socket","4","2","0","0","192.168.70.3:5747","172.22.44.32:5300"

^SISO: 1,""

^SISO: 2,""

^SISO: 3,""

^SISO: 4,""

^SISO: 5,""

^SISO: 6,""

^SISO: 7,""

^SISO: 8,""

^SISO: 9,""

OK

Example 3:

Enable listen service 0.

AT^SICS=1,ConType,GPRS0

OK

AT^SICS=1,APN,"1234"

OK

AT^SISS=0,srvType,socket

OK

AT^SISS=0,address,socktcp://listener:5123

OK

AT^SISS=0,ConID,1

OK



AT^SISO=0

OK

AT^SISO?

^SISO: 0,"Socket","3","3","0","0","192.168.70.62:5123","0.0.0.0:0"

^SISO: 1,""

^SISO: 2,""

^SISO: 3,""

^SISO: 4,""

^SISO: 5,""

^SISO: 6,""

^SISO: 7,""

^SISO: 8,""

^SISO: 9,""

OK

^SIS: 0, 1, 1 *Note: Remote client connecting. The module should open the socket 1 that is used to communicate with remote client.*

AT^SISO=1

OK

^SISW: 1,1

10.6 AT^SISC–Command for Stopping Internet Services

This command stops a specified Internet service.



10.6.1 Checking Whether This Command Is Available

Test command	AT^SISC=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.6.2 Stopping a Specified Internet Service

Set command	AT^SISC=<svrProfileId>
Function	Stops the service whose ID is <svrProfileId>.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<svrProfileId>: numeric parameter, which indicates the identification of the Internet service profile. The value ranges from 0 to 10. To set <svrProfileId> to be 0–9 indicates stop the specified socket link ID; to set <svrProfileId> to be 10 indicates stop all the current socket links.

10.6.3 Examples

Stop the internet service whose ID is 0.

AT^SISC=0

OK

Stop all the internet services:

AT^SISC=10

OK

10.7 AT^SISW-Command for Writing Data for Internet Services

The AT^SISW command uploads data to the upper layer from the internal buffer or queries the number of data bytes that have been sent but have not been acknowledged by the TCP layer. The unsolicited reporting command notifies the upper layer that the data can be written.

10.7.1 Checking Whether This Command Is Available

Test command	AT^SISW=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.7.2 Writing Data to the Buffer of a Service

Set command	AT^SISW=<srvProfileId>,<reqSetLength>[,<eodFlag>[,<mode>]]
Function	Sets data to the buffer of a service.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SISW: <srvProfileId>,<reqSetLength>[,<unackData>]<CR><LF>(Enter the data to be written but the data is not displayed.)<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvProfileId>: numeric parameter, which indicates the identification of the Internet service profile. The value ranges from 0 to 9.

<reqSetLength>: integer; indicates the length of data bytes to be written by ^SISW. The value ranges from 0 to 1500.

When the value is 0, if the TCP protocol is used, you can query the <unackdata> parameter that is not acknowledged by the TCP layer; if the UDP protocol is used, it indicates that an empty UDP packet is sent.

If the socket service uses the UPD protocol, it is recommended that each UPD packet limits 1472 bytes of data, otherwise the unsolicitedly report "^SIS: < srvProfileId >, 0, 9, the supplied buffer was too small / large" may occur.

<eodFlag>: flag of data tail identification (Not supported currently).

0: No data tail exists and other data is sent directly (default value).

1: Data tail.

<mode>: controls the mode of sending data (not supported currently).

0: Binary mode (default value)

1: Interactive text mode

<cnfSettLength>: integer, which confirms the number of data bytes to be sent in the Internet service whose ID is <srvProfileId>. Currently, <cnfSettLength> is equivalent to <reqSetLength>. The value ranges from 0 to 1500.

<unackData>: number of data bytes that have been sent but have not been acknowledged by the TCP layer.

10.8 ^SISW-Command for Reporting Unsolicitedly

URC <CR><LF>^SISW:
<srvProfileId>,<urcCauseId>[,<socketMSS>]<CR><LF>

Function The ^SISR command (command for unsolicitedly reporting data) notifies the upper layer that the service is established, data can be written and the maximum number of bytes that the ^SISW command can set.

Note:

When a non-monitored Internet service is successfully enabled, ^SISW is reported.

Parameter description

<srvProfileId>: numeric parameter, which indicates the identification of the Internet service profile. The value ranges from 0 to 9.

<urcCauseId>: integer

0: Data cannot be written to the buffer because it is full.

1: The service is ready for receiving new user data.

<socketMSS>: integer; indicates the maximum number of bytes that the ^SISW command can Set at a time (this parameter is valid only when the TCP or UDP link is open, that is, after the AT^SISO command is sent).

10.8.1 Examples

Example 1:

Check whether the command is available.

AT^SISW=?

OK

Example 2:

Open the link and Set 20 characters.

AT^SISO=0

OK

^SISW: 0, 1, 1380 *Note: Unsolicited information, indicating that data can be entered and the maximum number of bytes that can be entered.*

AT^SISW=0,20

^SISW: 0, 20, 20 *Note: The response to the AT command, prompting the user to enter 20 characters.*

<The user enters 20 characters.>

OK

^SISW: 0, 1 *Note: Unsolicited information, indicating that data can be entered.*

10.9 AT^IOMODE–Command for Set Data Modes for Internet Services

This command sets the data modes, such as whether to convert the received data and whether to use the buffer for receiving data.

10.9.1 Obtaining the Parameter Value Range Supported by This Command

Test command	AT^IOMODE=?
Function	Obtains the data mode parameter values supported by this command.
Response	<ul style="list-style-type: none">• In the case of successful execution: <CR><LF>^IOMODE: (list of supported <n>s),(list of supported <buffer_flag>s)<CR><LF><CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: integer; indicates whether BCD conversion is performed on received data.

0: Do not perform BCD conversion on received data but directly send the data in string format (default value).

1: Convert received data. If the received data is in hexadecimal format, it must be converted. Some data in hexadecimal format cannot be correctly sent to the TE if the data is not converted.

<buffer_flag>: integer; indicates whether a buffer is used for receiving data.

0: Use a receiving buffer (default value).

1: Do not use a receiving buffer.

10.9.2 Reading the Current Data Mode

Read command	AT^IOMODE?
Function	Reads the current data mode.
Response	<ul style="list-style-type: none">In the case of successful execution: <CR><LF>^IOMODE: <n>,<buffer_flag><CR><LF><CR><LF>OK<CR><LF>In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

10.9.3 Setting the Data Mode

Set command	AT^IOMODE=<n>,<buffer_flag>
Function	Sets the data mode.
Response	<ul style="list-style-type: none">In the case of successful execution: <CR><LF>OK<CR><LF>In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

Notes:

- When <n>=1, the module converts only the received data but not the transmitted data.
- After a buffer is used, use the ^SISR command to read data from the buffer.
- If no buffer is used, use the ^SISR command to send data.
- The AT^IOMODE=<n>,<buffer_flag> command must be sent before a link is established. The data mode cannot be changed after a link is established.
- The settings configured using the AT^IOMODE=<n>,<buffer_flag> command will be lost after the module is powered off.
- When the module uses a receiving buffer, the converts function is disabled.



10.10 AT^SISR–Command for Internet Services to Read Data

The AT^SISR command reads data out from the service buffer.

10.10.1 Checking Whether the AT^SISR Command Is Available

Test command	AT^SISR=?
Function	Checks whether this command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.10.2 Reading Data Out From the Buffer of an Internet Service

Set command	AT^SISR=<srvProfileId>,<reqReadLength>
Function	Reads data out from the buffer of an Internet service.
Response	<ul style="list-style-type: none">• In case of successful execution:• When the buffer contains data: <CR><LF>^SISR: <srvProfileId>,<reqReadLength>[,<remainUdpPacketLength>]<CR><LF>...(Returns the read data)<CR><LF><CR><LF>OK<CR><LF>• When the buffer contains no data or the length of the read data is 0: <CR><LF>^SISR: <srvProfileId>,<reqReadLength>[,<remainUdpPacketLength>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

The buffer for the SISR command can store a maximum of 1500 bytes of data. If a UDP packet contains more than 1500 bytes of data, the extra part will be discarded.

Parameter description

<srvProfileId>: integer; indicates the identification of the Internet service profile. The value ranges from 0 to 9.

<reqReadLength>: integer; indicates the data length requested from the buffer.



- 0: Peek Operator, which queries the number of bytes received by the internal buffer.
- 1–1500: Number of data bytes read by the Internet service whose <srvProfileId> is specified.
- 2: Indicates the data tail. The data is fully transmitted. This value is not supported currently.
- 1 (applies to HTTP only): Queries the number of available bytes not supported by the HTTP service. This value is not supported currently.
- 0: Indicates that no data is available currently.
- >0: Number of available data bytes. The value range is defined by <reqReadLength>.
- <remainUdpPacketLength>: Integer, which is used when Socket service is UDP protocol.
- 0: Indicates all the bytes that are being read from the current UDP data packet.
- 1...(max.data size) –1: Indicates that the current UDP data packet has not been completely read. The displayed value indicates the number of the remaining bytes.

10.10.3 Examples

Read data from the service buffer.

Precondition: The data service connection has been established and successfully enabled; there is data in the buffer.

AT^SISR=1,25

^SISR: 1,25

Message of MG323 (Or MG323-B) is here.

OK

10.11 ^SISR–Command for Reporting Unsolicitedly

The ^SISR command (URC command) unsolicitedly reports the information about internet services and indicates the data's status, including the data arrival and the storage status of data receive buffer.

10.11.1 Reporting Unsolicitedly When Using the Receiving Buffer

URC <CR><LF>^SISR: <srvProfileId>, <urcCauseId><CR><LF>

Function The ^SISR command (command for unsolicitedly reporting data) notifies the upper layer that certain data can be read.

URC <CR><LF>^SISR: 80 percent of the receiving buffer has been full<CR><LF>

Function The ^SISR command (command for unsolicitedly reporting data) notifies the upper layer that 80 percent of the receiving buffer has been used.

URC <CR><LF>^SISR: the receiving buffer has been full<CR><LF>

Function ^SISR command (command for unsolicitedly reporting data) notifies the upper layer that all the receiving buffer has been used.

Notes:

- If the buffer is not read or queried by the ^SISR command when data is available, no report will be submitted to the upper layer when new data arrives.
- When FTP server is used in the command mode, after data is received from the FTP server, <srvProfileId> reported by ^SISR is the FTP data-link ID.

Parameter description

<urcCauseId>: indicates whether there is data to be read.

1: Indicates that data is available and can be read by sending the AT^SISR command.

2: Indicates that the data transmission has ended (this setting is not supported currently).

10.11.2 Reporting Unsolicitedly When Not Using the Receiving Buffer

URC <CR><LF>^SISR: <srvProfileId>, <len>, <data><CR><LF>

Function The ^SISR command (command for unsolicitedly reporting data) notifies the upper layer that certain data can be read.

Parameter description

<srvProfileId>: integer; indicating the Internet service profile identification (<srvProfileId>) used by the link.

<len>: integer; indicating the data length (actual length, not the length after conversion).

<data>: string type; user data enclosed in double quotation marks.

10.12 ^SIS-Command for Unsolicitedly Reporting the Information About Internet Services

The ^SIS command (URC command) unsolicitedly reports the information about Internet services. Currently, the URC cannot be disabled.

URC <CR><LF>^SIS: <srvProfileId>, <urcCause>[, [<urcInfold>]],
<urcInfoText>]]<CR><LF>

Notes:

- This response is unsolicitedly reported, which is set through the AT^SCFG command.
- When the server receives the socket connection of the client, the <urlInfold> parameter in the ^SIS unsolicited reporting indicates the profile of the service that is automatically created by the server.

Parameter description

<urcCause>: identification of URC cause.

<srvProfileId>: integer; indicating the Internet service profile identification (<srvProfileId>) used by the link.

0: Indicates an event that occurs when an Internet service is enabled or being used. The event may be error, warning, information element, or note.

1: Indicates the service whose Socket listening is enabled is receiving the connection request sent by the remote client.

2: Indicates the failure of connecting the introduced Socket service client. Since no available Internet service profile exists, the request sent by the client is rejected.

3: Indicates an event that occurs when an HTTP service is being used.

4: Indicates an event that occurs when an FTP service is being used.

<urclInfoText>: the text string used for explain <urclInfold>.

<urcCause>	<urcInfoId>	Description
0, 2	0	The service works properly.
	1–2000	Error, the service is interrupted.
	2001–4000	Information about service processing
	4001–6000	Warning, the service is not interrupted.
	6001–8000	Notes.
1	0–9	The listener requests a dynamically allocated profile ID for the client.
3	200	The request succeeds.
	400	The server fails to understand the request.



<urcCause>	<urcInfoId>	Description
	401	Need user name and password for accessing the page requested.
		The table only lists values that are most commonly returned. For more values, see HTTP 1.1.
4	110	Restart marker reply.
	120	Service ready in nnn minutes.
	125	Data connection already open; transfer starting.
	150	File status okay; about to open data connection.
	200	Command okay.
	202	Command not implemented.
	211	System status.
	212	Directory status.
	213	File status.
	214	Help message.
	215	NAME system type.
	220	Service ready for new user.
	221	Service closing control connection. Logged out if appropriate.
	225	Data connection open; no transfer on progress.
	226	Closing data connection. Requested file action successful.
	227	Entering Passive Mode.
	230	User logged in, proceed.
	250	Requested file action okay, completed.
	257	"PATHNAME" created.
	331	User name okay, need password.
	332	Need account for login.
	350	Requested file action pending further information.
	421	Service not available, closing control connection.
	425	Can't open data connection.
	426	Connection closed; transfer aborted.
	450	Requested file action not taken.



<urcCause>	<urcInfoId>	Description
	451	Requested action aborted. Local error in processing.
	452	Requested action not taken. Insufficient storage space in system.
	500	Syntax error, command unrecognized.
	501	Syntax error in parameters or arguments.
	502	Command not implemented.
	503	Bad sequence of commands.
	504	Command not implemented for that parameter.
	530	Not logged in.
	532	Need account for storing files.
	550	Requested action not taken.
	551	Requested action aborted. Page type unknown.
	552	Requested file action aborted. Exceeded storage allocation (for current directory or dataset).
	553	Requested action not taken. File name not allowed.
	600	Unkown error.

10.13 AT^IPENTRANS-Command for Enabling Transmission

This command enables the transmission mode.

10.13.1 Enabling the Transparent Transmission Mode

Execution command AT^IPENTRANS=<srvProfileId>

Function Enables the transparent transmission mode, and connects the Internet service profile specified by <srvProfileId>.

Response

- In the case of successful execution:
<CR><LF>OK<CR><LF>
- In the case of an error: <CR><LF>ERROR<CR><LF>



Parameter description

<srvProfileId>: numeric parameter, which indicates the identification of the Internet service profile. The value ranges from 0 to 9.

If this command is successfully executed, OK is returned, indicating that the module's serial port has been switched to TCP/UDP transparent transmission mode. Users can then use the transparent transmission function. For details about how to use the transparent transmission function, see Appendix 19.4 .

10.14 AT^IPCFL–Command for Setting Network Parameters for Transparent Transmission Mode

This command sets the network parameters for the transparent transmission mode.

10.14.1 Reading Network Parameters for Transparent Transmission Mode

Read command	AT^IPCFL?
Function	Reads network parameters for transparent transmission mode.
Response	<ul style="list-style-type: none">In the case of successful execution, the defined network parameters and their values are displayed: <CR><LF>^IPCFL: <parameter_id>,<value>[<CR><LF>^IPCFL: <parameter_id>,<value>[...]]<CR><LF><CR><LF>OK<CR><LF> >In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

Parameter_id	Value Range (Unit)	Description
0 (not supported currently)	0–10	Sets the PPP connection retry count.
1 (not supported currently)	0–60 (unit: 1min)	Sets the Backoff duration.
2 (not supported currently)	(0–1)	Sets the connection check method.
3 (not supported currently)	10–36000 (unit: 1s)	Sets the connection check period.
4 (not supported currently)	(0–1)	Sets the TCP mode.
5	1–100 (unit: 0.1s; default value: 10)	Sets the timer for triggering transparent transmission.

Parameter_id	Value Range (Unit)	Description
6 (not supported currently)	(0–1500)	Sets the size of a maximum transmission unit (MTU).
7 (not supported currently)	(0–120) (unit: 1min)	Sets the TCP connection inactivity time.
8 (not supported currently)	(0–30) (unit: 1min)	Sets the retry timer after TCP connection failure.
9 (not supported currently)	(0–1440) (unit: 1min)	Sets the PPP connection inactivity time.
10	1–1460 (unit: byte; default value: 1024)	Sets the data length threshold for triggering the action of sending TCP/UDP packets.
14	0–1 (default value: 0)	Set data transmission mode 0: Transparent transmission mode 1: Command transmission mode
15	0–1 (default value: 0)	Set data retransmission mode. 0: Automatic retransmission mode 1: Manual retransmission mode
16	0–1 (default value: 1)	Set Ipstack mode. 0: Asynchronous mode 1: Synchronous mode

10.14.2 Configuring Network Parameters for Transparent Transmission

Set command AT+IPCFL=<parameter_id>,<value>

Function Configures network parameters for transparent transmission.

Response

- In the case of successful execution:
<CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

User-configured parameters are not stored after the module is powered off.



10.14.3 Examples

Set the timer to 2s and the data length trigger threshold to 10 bytes. Check whether the settings are configured successfully. Enable the transparent transmission function (link_id=0). After entering the transparent transmission mode, send the following data to the other end.

1. Enter abc within 2s, and wait until 2s pass.
2. Enter and send 0123456789 within 2s.
3. The other end sends KLMNOPQRST to the module.
4. Enter +++ to quit.

Check data transmission and reception on the module and the other end respectively, as shown in the following:

Data transmission on the module:

AT^IPCFL=5, 20

OK

AT^IPCFL=10, 10

OK

AT^IPCFL?

^IPCFL: 5,20

^IPCFL: 10,10

^IPCFL: 14,0

^IPCFL: 15,0

^IPCFL: 16,1

OK

AT^IPENTRANS=0

OK

KLMNOPQRST

OK

Data reception on the other end:

abc0123456789

10.15 AT^FTPCMD–Command for Enabling File Transmission

The AT^FTPCMD command is used to enable FTP transmit function.



10.15.1 Checking the Operation Range Supported by the Command

Test command	AT^FTPCMD=?
Function	Checks the operation range supported by the command.
Response	<ul style="list-style-type: none">• In the case of successful execution: <CR><LF>^FTPCMD: (list of supported <ftpProfileId>s),(list of supported <ftpCmd>s)<CR><LF><CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<ftpProfileId>: numeric, which indicates the ftpProfileId for FTP control connection. The value ranges from 0 to 9.

<ftpCmd>: character string. The parameter can be either of the following:

<ftpCmd>	Function	Support or Not
GET	Acquires files on the server.	Yes
PUT	Stores files to the server.	Yes
PORT	Build data connection by active mode	Yes
PASV	Build data connection by passive mode	Yes
FILESIZE	Acquires the size of files on the server. (unit: byte)	Yes



10.15.2 Configuring FTP Operations

Set command	AT^FTPCMD=<srvProfileId>,<ftpCmd>[,<FileName>[,<data_offset>][,<data_Length>]]]
Function	Configures FTP operations.
Response	<ul style="list-style-type: none">• In the case of successful execution of "GET", "PUT": <CR><LF>CONNECT<CR><LF><file content><CR><LF><CR><LF>OK<CR><LF>• In the case of successful execution of "PASV", "PORT": <CR><LF>OK<CR><LF>• In the case of successful execution of "FILESIZE": <CR><LF>^FTPSIZE: <File_length><CR><LF><CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR<CR><LF> Or <CR><LF>CONNECT<CR><LF><file content><CR><LF><CR><LF>ERROR<CR><LF>

Parameter description

<FileName>: name of the file to be uploaded or downloaded.

<data_offset>: offset of a data file (this parameter must be smaller than the file length; unit: byte).

<data_Length>: length of the file you read (unit: byte).

<File_length>: length of the file you need to query; the maximum length is $2^{32}-1$. (unit: byte).

Notes:

- For all FTP operation commands, if the data connection is set up, the module returns CONNECT first and enters the FTP mode to transmit data. The module returns OK when data transmission completes and ERROR when it fails. If no data connection is set up, the module returns ERROR immediately.
- After the file download completes, the module exits the GET command automatically and returns OK.
- After the file upload completes, enter +++ to exit the PUT command.
- To exit the FTP mode, enter +++ whose sequence format is the same as that in exiting transparent transmission.
- To use the FTP service, set the FTP data connection mode based on your current network firewall settings. Data connections for the FTP service are in passive mode by default.
- The data connection mode is restored to its default settings after you exit the FTP service. Therefore, after you log in to an FTP server, set the data connection mode before you upload or download files.
- In the command transmission mode (AT+IPCFL=14,1), the data received stores in the buffer area. And then the CAT client sends AT+SISR to read data. If the buffer data is not read in time, the latter data will be loss when the buffer area is full.
- In the command transmission mode, if the data is not read in time and FTP link is disconnected, AT+SISC should be executed to re-log in FTP server.
- This command can be used to download some or all data from a specific file on the FTP server. You can use the default values of <data_offset> and <data_Length>. If both parameters are not defined, the whole file will be downloaded. If only <data_Length> is not defined, content from <data_offset> to the end of the file will be downloaded. If only <data_offset> is not defined, the offset is 0 (content from the first byte of the file will be downloaded), the downloaded file length will be determined by <data_Length>. To download a specific piece of data, make sure <data_offset> and <data_Length> are correctly set.

The device use "FILESIZE" to obtain the file size and "GET" to obtain the required content.

Some FTP servers may not support downloading part of the file using the offset value. It is recommended that you use the default <data_offset> and <data_Length>.

10.15.3 Examples

Example 1: in the transparent transmission mode:

AT+SISO=0

OK

^SISW: 0,1,1460

^SIS: 0,4,230,Logged on

AT^FTPCMD=?

^FTPCMD: (0-9),("GET","PUT","PORT","PASV","FILESIZE")

OK

AT^FTPCMD=0,PASV



OK

AT^FTPCMD=0,GET,"ftp_download.txt"

CONNECT

I like traveling

OK

^SIS: 0,4,226,(16 Bytes) Transfer complete.

AT^FTPCMD=0,PUT,"ftp_upload.txt"

CONNECT

OK

^SIS: 0,4,226,Transfer complete.

AT^FTPCMD=0,FILESIZE,"ftp_download.txt"

^FTPSIZE: 16

OK

AT^FTPCMD=0,GET,"ftp_download.txt",0,6

CONNECT

I like

OK

^SIS: 0,4,226,(6 Bytes) Transfer complete.

AT^FTPCMD=0,GET,"ftp_download.txt",16,6

ERROR

^SIS: 0,4,213, The offset value no less than file-size

Example 2: in the command transmission mode:

AT^IPCFL=14,1

OK

AT^SISO=0

OK





10.16.1 Checking the Parameter Range Supported by the Command

Test command	AT^HTTPCMD=?
Function	Checks the parameter range supported by the command.
Response	<ul style="list-style-type: none">• In the case of successful execution: <CR><LF>^HTTPCMD: (list of supported <http_linkID>s),(list of supported <operation>s)<CR><LF><CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR<CR><LF>

10.16.2 Executing the Specified HTTP Operation

Execution command	AT^HTTPCMD=<http_linkID>,<operation>,<http_data_path>[,<http_data_length>[,http_data_type]]
Function	Executes the specified HTTP operation.
Response	<ul style="list-style-type: none">• In the case of successful execution: In the transparent transmission mode: <CR><LF>CONNECT<CR><LF><file content><CR><LF>OK<CR><LF> In the command transmission mode: <CR><LF>OK<CR><LF>• In the case of an error during command execution: <CR><LF>ERROR<CR><LF> or <CR><LF>CONNECT<CR><LF><file content><CR><LF>ERROR<CR><LF>

Parameter description

<http_linkID>: integer; indicates the linkID used; The value ranges from 0 to 9.

<operation>: character string; indicates HTTP request methods. The parameter is described in the following table.

Operation	Description
GET	Requests to read the file specified by the URL.
POST	Requests to upload http data information to the path specified by the URL.

<http_data_path>: character string. The parameter consists of a URL whose format is as follows:

<protocol>://<host>:<port>/<path>

Characters in <protocol>://<host>:<port> must be the same as in the address set by the AT+SISS command in the currently enabled connection. <path> includes a specific file name and its type.

<http_data_length>: indicates the length of HTTP POST data with the unit of byte. When <operation> is set to GET, <http_data_length> need not be input; when <operation> is set to POST, <http_data_length> must be input.

<http_data_type>: indicate the type of HTTP POST data with the unit of byte. It must be enclosed with double quotation marks. The maximum length is 256 byte. The default value is text/plain.

Notes:

- HTTP services can only be enabled when a module is connected to the server. http_linkID is the srvProfileID which has been enabled and being used.
- A URL address can be the domain name or IP address.
- The maximum length of a URL address is 128 characters.
- The module is in transparent mode during data services. To exit the HTTP service and disconnect http link, enter +++.
- During POST execution and in the transparent transmission mode, after data transmission is finished and the request is successful, OK is returned when module finishes reporting data to the CAT client, and then module exits the transparent mode. Otherwise, ERROR is returned and HTTP service is disconnected.
- During POST execution and in the command transmission mode, OK is returned if the command is executed successfully. Meanwhile AT+SISSW is executed to sent data. If the module receives the error codes, it is suggested not to sent data again, and you need re-execute POST operation.
- If the command execution fails, the module may:
Returns ERROR.
Returns CONNECT and then ERROR and reports the error code and type using the +SIS command.

10.16.3 Examples

AT+HTTPCMD=?

+HTTPCMD: (0-9),("GET","POST")

OK

AT+HTTPCMD=0,"GET",http://www.baidu.com:80/index.html

CONNECT

<!doctype html><html><head><meta http-equiv="Content-Type"
content="text/html;charset=gb2312"><title>百度一下，你就知道



```
</title><style>html{overflow-y:auto}body{font:12px arial;text-align:center;background:#fff}body,p,form,ul{margin:0;padding:0}body,form,#fm{position:relative}td{text-align:left}img{border:0}a{color:#00c}a:active{color:#f60}#u{padding:7px 10px 3px 0;text-align:right}#m{width:680px;margin:0 auto}#nv{font-size:16px;margin:0 0 4px;text-align:left;text-indent:117px}#nv a,#nv b,.btn,#lk{font-size:14px}#fm{padding-left:90px;text-align:left}#kw{width:404px;height:22px;padding:4px 7px;padding:6px 7px 2px\9;font:16px arial;background:url(http://www.baidu.com/img/i-1.0.0.png) no-repeat -304px 0;background-attachment:fixed;border:1px solid #cdcdcd;border-color:#9a9a9a #cdcdcd #cdcdcd #9a9a9a;vertical-align:top}.btn{width:95px;height:32px;padding:0;padding-top:2px\9;border:0;background:#ddd url(http://www.baidu.com/img/i-1.0.0.png) no-repeat;cursor:pointer}.btn_h{background-position:-100px 0}#kw,.bt
```

OK

^SIS: 0,3,200,OK

AT^HTTPCMD=0,POST,http://www.baidu.com:80/index.html,1500,"text/html"

CONNECT

<User inputs 1500 characters>

OK

AT^IPCFL=14,1

OK

AT^HTTPCMD=0,POST,http://www.baidu.com:80/index.html,1500,"text/html"

OK

^SISW: 0,1

AT^SISW=0,1500

^SISW: 0,1500,1500

<User inputs 1500 characters>

OK



10.17 AT^IPDATAPUSH-Command for Pushing TCP Data in the Socket Buffer

The AT^IPDATAPUSH command is used to push TCP data in the socket buffer to a remote end.

10.17.1 Checking Whether AT^IPDATAPUSH Is Supported

Test command	AT^IPDATAPUSH=?
Function	Checks whether AT^IPDATAPUSH is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

10.17.2 Pushing TCP Data in the Socket Buffer

Read command	AT^IPDATAPUSH=<srvProfileId>
Function	Pushes the TCP data whose ID is <srvProfileId>.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<srvProfileId>: numeric parameter; profile indicator for Internet services; ranging from 0 to 9.

- If the TCP connection is not set up, and manual retransmission mode is not enabled, ERROR will be returned.
- If there is no data in the socket buffer, the pushing cannot be executed, and ERROR will be returned.

10.17.3 Examples

The TCP connection is not set up or manual retransmission mode is not enabled.

```
AT^IPDATAPUSH=0
```

```
ERROR
```




Initiate manual retransmission when manual retransmission mode is enabled, the TCP connection is set up, and buffer for the ID <srvProfileId> is empty.

AT^IPDATAPUSH=0

ERROR

Initiate manual retransmission when manual retransmission mode is enabled, the TCP connection is set up, and no ACK package is received after the local ends the data transmission.

AT^IPDATAPUSH=0

OK

11

Commands for Short Messages

This chapter describes the AT commands related to short messages. Currently, the MG323/MG323-B does not support short messages in text mode.

11.1 AT+CMGD–Command for Deleting Short Messages

The AT+CMGD command deletes the short messages that are stored on the preferred memory<mem1> (for details, see AT+CPMS).

11.1.1 Checking the Parameter Range Supported by the Command

Test command	AT+CMGD=?
Function	Checks the supported indexes of short messages and deletes the parameters of short message type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGD: (list of supported <index>s),(list of supported <delflag>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.1.2 Deleting Short Messages

Set command	AT+CMGD=<index>[,<delflag>]
Function	Deletes the short messages that are stored on the storage media.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Note:

When the value of the <delflag> parameter is not 0, the first parameter <index> can be ignored and executed according to the <delflag> parameter.

Parameter description

<index>: numeric, which indicates the location for storing short messages. The value range is related to the storage media. The storage media is set by +CPMS. Currently, only SM is supported.

<delflag>: numeric, which indicates the short messages to be deleted.

0: Deletes the short messages that are specified by <index> (default value).

1: Deletes all the read short messages that are stored on the preferred memory <mem1>, and retains the unread short messages, sent short messages, and unsent short messages.

2: Deletes all the read short messages and sent short messages that are stored on the preferred memory <mem1>, and retains the unread short messages and unsent short messages.

3: Deletes all the read short messages, sent short messages, and unsent short messages that are stored on the preferred memory <mem1>, and retains the unread short messages.

4: Deletes all the short messages that are stored on the preferred memory <mem1>, including the unread short messages.

11.1.3 Examples

AT+CMGD=?

+CMGD:(1–255), (0–4)

OK *Note: Check the parameter range.*

AT+CMGD=1

OK *Note: Delete the first short message.*

AT+CMGD=1, 4



OK *Note: Delete all the short messages that are stored on the SIM card.*

11.2 AT+CMGF-Command for Setting the Format of Short Messages

The AT+CMGF command sets the format of short messages for the device. The format follows two modes, that is, the PDU mode and text mode, which are determined by the <mode> parameter. For details about the format of short messages, see the AT+CMGS Command.

11.2.1 Checking the Supported Format of Short Messages

Test command	AT+CMGF=?
Function	Checks the supported format of short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGF: (list of supported <mode>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<mode>: numeric, which indicates the format of short messages.

0: PDU mode (default value)

1: TEXT mode

11.2.2 Reading the Format of Short Messages

Read command	AT+CMGF?
Function	Reads the current format of short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGF: <mode><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.2.3 Setting the Format of Short Messages

Set command	AT+CMGF=<mode>
Function	Sets the format of short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Note:

If no parameters of this command are set, AT+CMGF= considers the previously set values valid for various parameters.

11.2.4 Examples

Example 1:

Set the format of short messages.

AT+CMGF=0

OK

Example 2:

Query the format of short messages.

AT+CMGF?

+CMGF: 0

OK

11.3 AT+CSMP–Command for Setting SMS TEXT Mode Parameters

The AT+CSMP command is used to set the SMS TEXT mode parameters.



11.3.1 Checking Whether Support Setting SMS TEXT Mode Parameters

Test command	AT+CSMP=?
Function	Checks whether support setting SMS TEXT mode parameters.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

11.3.2 Reading SMS TEXT Mode Parameters

Read command	AT+CSMP?
Function	Reads SMS TEXT mode parameters
Response	<CR><LF>+CSMP: <fo>,<vp>,<pid>,<dc>:<CR><LF><CR><LF>OK<CR><LF>

Parameter description

Parameter	Value	Description
<fo>	First Octet (not supported currently)	The parameter can adopt the first 8 characters in GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default value: 17), or integer-type SMS-COMMAND (default value: 2).
<vp>	0–255 (not supported currently)	Depends on the value of <fo> in SMS-SUBMIT. 3GPP TS 23.040 TP-Validity-Period either in integer format (default value: 167), time-string format, or if EVPF is supported, in enhanced format (hexadecimal coded string with double quotes).
<pid>	protocol identifier (not supported currently)	See GSM 03.40. Use integer-type TP-protocol-identifier (default value: 0).
<dc>	0: 7 bit code 4: 8 bit code (not supported currently) 8: UCS2 code	The parameter can adopt the SMS data encoding format in GSM 03.38 or integer-type cell broadcast data encoding format (default value: 0).

11.3.3 Setting SMS TEXT Mode Parameters

Set command	AT+CSMP=[<fo>],[[<vp>],[[<pid>],[<dc>]]]
Function	Sets SMS TEXT mode parameters.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>
Notes:	<ul style="list-style-type: none">• This command is valid only in SMS TEXT mode.• During the sending of a UCS2 message in TEXT mode, if the value of <dc> is UCS2 code, this command only supports IRA-type TE character sets (AT+CSCS="IRA") currently.• This command supports sudden power loss protection.

11.4 AT+CMGL–Command for Querying the List of Short Messages

The AT+CMGL command queries the list of short messages that are stored on the preferred memory <mem1>.

11.4.1 Checking the Supported Status of Short Messages

Test command	AT+CMGL=?
Function	Returns the status of short messages supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGL: (list of supported <stat>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<stat>: string, which indicates the status of short messages. The status is classified into two types.

1. AT+CMGF=1, that is, when short messages are in Text mode.



Value	Description
REC UNREAD	Unread short messages that are received.
REC READ	Read short messages that are received.
STO UNSENT	Unsent short messages that are stored.
STO SENT	Sent short messages that are stored.
ALL	All short messages.

2. AT+CMGF=0, that is, when short messages are in PDU mode.

Value	Description
0	Unread short messages that are received.
1	Read short messages that are received.
2	Unsent short messages that are stored.
3	Sent short messages that are stored.
4	All short messages.

11.4.2 Reading the List of Short Messages

Set command	AT+CMGL[=<stat>]
Function	Reads the list of short messages whose status is <stat>.
Response	<ul style="list-style-type: none"> When short messages are in PDU mode (+CMGF=0) and the command is successfully executed: [<CR><LF>+CMGL: <index>,<stat>,<reserved>,<length><CR><LF><pdu><CR><LF>[+CMGL:<index>,<stat>,<reserved>,<length><CR><LF><pdu><C R><LF>[...]]<CR><LF>OK<CR><LF> When short messages are in TEXT mode (+CMGF=1) and the command is successfully executed: [<CR><LF>+CMGL: <index>,<stat>,<oa/da>,<reserved>][,<year>, <month>, <day>, <hour>, <minute>, <second>]<CR><LF><data><CR><LF>[...]]<CR><LF>OK<CR><LF> In case of an error: <CR><LF>ERROR<CR><LF> In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Note:

If no parameters of this command are set, AT+CMGL is equivalent to AT+CMGL=0 or REC UNREAD.

Parameter description

Table 11-1 Structure of <pdu>

[<SCA>]			
<sc_len>	<type_addr>	<numbers>	TPDU

In the preceding table, for the <SCA>, <sc_len>, <type_addr>, and <numbers> fields, see the AT+CSCA Command.

For a sent short message, the data structure of TPDU has the same definition as that described in the section AT+CMGS Command. For a received short message, the data structure of TPDU is as follows:

Table 11-2 Data structure of TPDU

1 Oct								2 Oct to 12 Oct	1 Oct	1 Oct	7 Oct	1Oct	
TP-MTI		MMS	0	0	SRI	UDHI	RP	OA	PID	DCS	SCTS	UDL	UD
Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7						

11.4.3 Examples

In PDU mode, run the AT+CMGL command to list all short messages.

AT+CMGL=4

+CMGL: 1,1, , 160

...(Short messages in PDU mode)

OK

11.5 AT+CMGR–Command for Reading Short Messages

This command returns the short messages whose storage location is index from preferred memory <mem1>. If the status of short messages is "Unread short messages that are received", after the command is successfully executed, the status of short messages on the memory is changed to "Read short messages that are received".

11.5.1 Testing Whether the Command for Reading Short Messages Is Supported

Test command	AT+CMGR=?
Function	Checks whether the command for reading short messages is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.5.2 Reading Short Messages

Set command	AT+CMGR=<index>
Function	Reads the short messages whose storage location is index from the preferred memory <mem1>.
Response	<ul style="list-style-type: none"> When short messages are in PDU mode (+CMGR=0) and the command is successfully executed: <CR><LF>+CMGR: <stat>,[<alpha>],<length><CR><LF>[<pdu><CR><LF>]<CR><LF>OK<CR><LF> When short messages are in TEXT mode (+CMGF=1) and the command is successfully executed: +CMGR:<stat>,<oa/da>,[<reserved>][,<year>, <month>, <day>, <hour>, <minute>, <second>]<CR><LF><data><CR><LF><CR><LF>OK<CR><LF> In case of an error during command execution: <CR><LF>ERROR<CR><LF> In case of an error related to the MS during command execution: <CR><LF>+CMS ERROR: <err><CR><LF> When the index of the location to be read exceeds the maximum index of the SIM card: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>: integer; indicates the storage position of the short message in the memory.

<length>: integer; indicates the number of bytes in the TPDU.

<stat>: message type.

For messages in PDU mode (AT+CMGF=0):

0: Indicates messages that have been received but not read.

1: Indicates messages that have been received and read.

2: Indicates messages that have been stored but not sent.

3: Indicates messages that have been sent and stored

<alpha>: not supported currently

<pdu>: PDU. For details, see the AT+CMGL command.

11.5.3 Examples

Run AT+CMGR to read short messages.

Run AT+CMGR=1 to read the short message whose storage location is 1.



+CMGL: 1,,160

...(Short messages in PDU mode)

OK

11.6 AT+CMGS–Command for Sending Short Messages

The AT+CMGS command sends short messages in two steps:

In PDU mode (AT+CMGF=0):

First, send +CMGS=<length> that ends with (CR).

Then, upon receiving > that is returned by the MT, the TE sends a PDU data packet that ends with <CTRL-Z> (IRA 26).

In PDU mode (AT+CMGF=1):

First, send +CMGS=<oa/da>[,<type>] that ends with (CR).

Then, upon receiving > that is returned by the MT, the TE sends a DATA data packet that ends with <CTRL-Z> (IRA 26).

11.6.1 Testing Whether the Command for Sending Short Messages Exists

Test command	AT+CMGS=?
Function	Tests whether the command for sending short messages exists.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.6.2 Sending Short Messages

This command sends short messages in PDU mode (+CMGF=0).

Set command	AT+CMGS=<length><CR>PDU is given <Ctrl-Z/Esc>
Function	Sends short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGS: <mr>[,<ackpdu>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

This command sends short messages in TEXT mode (+CMGF=1).

Set command	AT+CMGS=<oa/da>[,<type>]<CR>DATA is given <Ctrl-Z/Esc>
Function	Sends short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGS: <mr>[,<ackpdu>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<mr>: identifier of short messages, which is a decimal number consisting of digits 0–9. Value range: 0–65535. For details, see 3GPP TS 23.040 TP-Message-Reference integer format.

<length>: number of characters of the actually sent TPDU / 2; a decimal number consisting of digits 0–9; GSM 7-bit coding; the maximum length is 160 characters; for Chinese characters in UCS2 coding, the maximum length is 70 characters; otherwise, ERROR is returned.

<oa/da>: number of the short message receiver and sender. Value range: 0–9 and +. This parameter consists of not more than 20 characters.

<type>: number type. The value 145 indicates an international phone number. The value 129 indicates a national phone number.

<ackpdu>: when the value of <service> in +CSMS is 1 and the network support is provided, this field is returned. Except for the lack of SCA, this field has the same format as PDU. (Not supported currently)

<Ctrl-Z>: indicates the end of a short message. The character is '0x1A'.

<Esc>: cancels the sending of the current short message. The character is '0x1B'.

11.6.3 Examples

Send short messages in PDU mode (+CMGF=0).

AT+CGSMS=1

OK

AT+CMGF=0

OK

AT+CNMI=1,2,0,0,0

OK

AT+CMGS=20

>07813108608805F911000B813109732008F70000FF06E8329BFD0E01 Contents
of short messages Ctrl-Z

+CMGS: 19

OK

11.7 AT+CMGW-Command for Storing Short Messages

The AT+CMGW command stores a short message to the <mem2> memory that is set by the +CPMS command. Currently, <mem2> supports only SM.

11.7.1 Checking Whether the Command for Storing Short Messages Is Supported

Test command	AT+CMGW=?
Function	Checks whether this command is supported.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.7.2 Storing Short Messages

This command stores short messages in PDU mode (+CMGF=0).

Set command	AT+CMGW=<length>[,<stat>]<CR>PDU is given <Ctrl-Z/ESC>
Function	Stores short messages in PDU mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGW: <index><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

This command stores short messages in TEXT mode (+CMGF=1).

Set command	AT+CMGW[=<oa/da>[,<type>]]<CR>TEXT is given <Ctrl-Z>
Function	Stores short messages in TEXT mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMGW: <index><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<stat>: storage status of short messages.

<length>: number of characters of the actually sent TPDU/2.

<index>: location number in the memory; a decimal number consisting of digits 0–9; value range: 0–(maximum capacity of the memory –1).

<oa/da>: number of the short message receiver and sender. Value range: 0–9 and +. This parameter consists of not more than 20 characters.

<type>: number type. The value 145 indicates an international phone number. The value 129 indicates a national phone number.

<Ctrl-Z>: indicates the end of an entry of PDU data. The character is '0x1A'.

<ESC>: cancels the sending of the current short message. The character is '0x1B'.

11.7.3 Examples

Store a short message in PDU mode.

```
AT+CMGF=0
```

```
AT+CMGW=56
```



```
>07813108608805F911000B813109732008F70000FF30547419347EBBE965371DF  
13683DAE5F93C7C2E83EE693A1A0427D741ED37B90C3ABFCB7310BA2C2F834  
2<Ctrl-Z>
```

+CMGW: 10

OK

11.8 AT+CMSS—Command for Selecting a Short Message from the Memory and Sending It

The AT+CMSS command sends a short message at the specified index location.

11.8.1 Checking Whether the Command for Sending Short Messages Is Available

Test command	AT+CMSS=?
Function	Checks whether the AT+CMSS command is available.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.8.2 Sending a Short Message at the Specified Location

Set command	AT+CMSS=<index>[,<da>[,<toda>]]
Function	Sends a short message at the specified index location.
Response	<ul style="list-style-type: none">• When the short message is successfully sent: <CR><LF>+CMSS: <mr>[,<ackpdu>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<index>: location of short messages on the SIM card.

<da>: number of the short message receiver. Value range: 0–9, +, *, and #. This parameter consists of not more than 20 characters. "+" must be the first character.



<tda>: a 1-byte number, which indicates the address coding mode. This parameter takes effect only when the address code has eight bits. The default value is 0.

The four most significant bits indicate the number type:

0: UNKNOWN

1: INTERNATIONAL

The four least significant bits indicate the number plan:

0: UNKNOWN

1: TELEPHONY

<mr>: identifier of short messages, which is a decimal number consisting of digits 0–9. Value range: 0–255.

<ackpdu>: when the value of <service> in AT+CSMS is 1 and network support is provided, this field is returned. Except for the lack of SCA, this field has the same format as PDU (Not supported currently).

11.8.3 Examples

Send a stored short message in PDU mode.

AT+CMGF=0

OK

AT+CMSS=8

Note: A short message whose status is 2 exists at the location whose index is 8.

+CMSS: 21

OK

11.9 AT+CNMI-Command for Setting the Notification for a New Short Message

The AT+CNMI command sets the notification that is used to report the received new short message to the TE.

11.9.1 Checking the Parameter Range Supported by the AT+CNMI Command

Test command	AT+CNMI=?
Function	Queries the parameters supported by the CNMI command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s) <CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<mode>: integer, which sets the short message notification mode.

0: Buffers the short message notification on the ME. The buffer size is 2 (that is, the buffer can store up to 2 messages). If the ME's buffer is full, the new notification oversets the oldest one (default value).

1: Sends the short message notification directly to the TE. When the notification fails to be sent (for example, in online data mode), the notification is discarded.

2: Sends the short message notification and the short message status report directly to the TE. When the notification fails to be sent (for example, in online data mode), the notification is buffered on the ME. When the buffered notification can be sent, it is sent to the TE at a time.

3: Sends the short message notification and the short message status report directly to the TE. In online data mode, if the first short message is received, the MT notifies the upper layer software by changing the voltage level at the RING pin (a high voltage level occurs at EIA for 1 second). After exiting the online data mode, the upper layer software can receive short message notifications or short message status reports.

<mt>: integer, which sets the rules for storing and notifying the received short messages.

0: No SMS-DELIVER indications are sent to the TE (default value).

Three methods of storing and notifying new short messages are as follows:

1: Stores the SMS-DELIVER on the MT and sends a storage location notification to the TE. +CMTI: <mem>,<index>.

2: Sends SMS-DELIVERS directly to the TE.

- In PDU mode, use command +CMT: [<reserved>],<length><CR><LF><pdu>.
- In TEXT mode, use command +CMT: <callerID>,<reserved>,<year>, <month>, <day>, <hour>, <minute>, <second>]<CR><LF><data><CR><LF>.

- When AT+CSMS=0, class 0 messages are reported to the TE and not stored on the MT. The unsolicited report mode for class 2 messages is the same as that when <mt>=1. Other messages are stored on the MT and reported to the TE.
- When AT+CSMS=1, No class 0 and class 1 messages are reported to the TE and not stored on the MT. The unsolicited report mode for class 2 messages is the same as that when <mt>=1. Other messages must be checked by AT+CNMA after report and are not stored on the MT.

3: Stores the SMS-DELIVER on the MT and does not send the SMS-DELIVER notification to the TE (not supported currently).

The following table describes the <mt> values and the corresponding indications.

Table 11-3 The <mt> values and the corresponding indications

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
0				
1	+CMTI	[+CMTI]	+CMTI	+CMTI
2	+CMT & +CNMA	+CMT [& +CNMA]	+CMTI	+CMT & +CNMA
3	+CMTI	[+CMTI]	+CMTI	+CMT & +CNMA

Notes:

- The SMS class is defined by the TP-DCS domain of the SMS. For details, see the description of <DCS> in 11.6 AT+CMGS—Command for Sending Short Messages.
- "+CMT & +CNMA" indicates that the TE is required to send the confirmation (+CNMA).

<bm>: integer, which sets the rules for storing and notifying the received cell broadcast messages (CBMs).

0: No CBM is reported to the TE (default value).

2: New CBMs are sent directly to the TE through unsolicited reporting:

PDU mode: +CBM: <length><CR><LF><pdu>

<ds>: integer, which sets the return receipt of short messages.

0: Does not send the return receipt of short messages to the TE.

1: Does not store the return receipt of short messages on the MT and sends it directly to the TE (default value).

In PDU mode: +CDS: <length><CR><LF><pdu>

In TEXT mode: +CDS: <fo>,<mr>,<ra>,<type>[[<scts>],<year>,<month>,<day>,<hour>,<minute>,<second>],<stat><CR><LF>

<bfr>: integer, which sets the buffer processing mode when the <mode>=0 mode is changed to the <mode>=1-2 mode.

0: Sends the buffered URCs to the TE at a time when the <mode>=0 mode is changed to the <mode>=1-2 mode (default value).

1: Clears the buffered URCs when the <mode>=0 mode is changed to the <mode>=1-2 mode.

11.9.2 Reading the Status of Short Message Notification

Read command	AT+CNMI?
Function	Reads the status of CNMI.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.9.3 Setting the Status of Short Message Notification

Set command	AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]
Function	Sets the status of short message notification.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Notes:

- After the MT restarts, the setting values of this command are cleared. In this case, no new short message is reported. It is not recommended that the setting mode of AT+CNMI=0,0,0,0,0 be used.
- The <mode> and <bfr> parameters set the mode of reporting the new short message notification to the TE.
- The <mt> parameter sets whether to report a new short message directly to the TE or stores it on the MT and reports the storage location to the TE when receiving the new short message.
- The <bm> parameter sets whether to report a new CBM directly to the TE or stores it on the MT and reports the storage location to the TE when receiving the new CBM. The <ds> parameter sets whether to report the short message status report (+CDS).
- When <mode> = 3, it is recommended to set <mt> to 2 so that messages will be stored on the MT. when a message is received and the voltage level on the RING pin changes, it is recommended to exit data mode to process the message notification.



11.9.4 Examples

Example 1:

Set the short message notification mode as follows: store the short message and send the storage location to the TE; do not send the short message status report.

AT+CNMI=1,1,0,0,0

OK

Example 2:

Set the short message notification mode as follows: do not store the short message and send it directly to the TE; do not send the short message status report.

AT+CNMI=1,2,0,0,0

OK

Example 3:

Set the short message notification mode as follows: store the short message on the MT and report the storage location to the TE; do not store the short message status report and report it directly.

AT+CNMI=1,1,0,1,0

OK

Example 4:

Set the short message notification mode as follows: store the short message on the MS and report the storage location to the TE; store the short message status report on the MS and report the storage location to the TE; if the short message status report fails to be reported, the status report is discarded.

AT+CNMI=1,1,0,2,0

OK

11.10 AT+CPMS–Command for Setting the Storage Location of Short Messages

The AT+CPMS command sets the storage location of short messages.



11.10.1 Checking the Storage Location of Short Messages

Test command	AT+CPMS=?
Function	Checks the available storage location of short messages.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description:

<mem1>: string value, the preferred memory, which indicates the media on which the operations of reading and deleting short messages are performed. Only "SM" that indicates the SIM card is supported. It is saved upon power failure.

<mem2>: string value, which indicates the media on which the operations of writing and sending short messages are performed. Value options of <mem2> are the same as those of <mem1>. It is saved upon power failure.

<mem3>: string value, which indicates the media on which the operations of receiving short messages are performed. Value options of <mem3> are the same as those of <mem1>. It is saved upon power failure.

<total1>: integer; indicates the capacity of <mem1> for storing short messages.

<total2>: integer; indicates the capacity of <mem2> for storing short messages.

<total3>: integer; indicates the capacity of <mem3> for storing short messages.

<used1>: integer; indicates the number of existing short messages in <mem1>.

<used2>: integer; indicates the number of existing short messages in <mem2>.

<used3>: integer; indicates the number of existing short messages in <mem3>.



11.10.2 Reading the Status of Storage Location

Read command	AT+CPMS?
Function	Reads the current status of storage location.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.10.3 Setting the Storage Location

Set command	AT+CPMS=<mem1>[,<mem2>[,<mem3>]]
Function	Sets the storage media on which the operations of reading and writing short messages are performed.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.10.4 Examples

Example 1:

Read the current status of storage location.

AT+CPMS=?

+CPMS: ("SM"),("SM"),("SM")

OK

Example 2:

Check the available storage location of short messages.

AT+CPMS?



+CPMS: "SM",12,20,"SM",12,20,"SM",12,2

OK

Example 3:

Set the first storage location of short message to SM.

AT+CPMS="SM"

+CPMS: 12,20,12,20,12,20

OK

11.11 AT+CSCA-Command for Setting the Number of the SMSC

The AT+CSCA command sets the number of the SMSC. For short messages in PDU mode, the settings performed through this command are used only when sc_len=0 (the parameter related to the number of the SMSC in the PDU). For details about the PDU format, see the AT+CMGS Command.

11.11.1 Checking Whether the Command Is Available

Test command AT+CSCA=?

Function Checks whether the command is available.

Response

- In case of available command: <CR><LF>OK<CR><LF>
- In case of unavailable command: <CR><LF>ERROR<CR><LF>
- In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>



11.11.2 Reading the Currently Registered Number of the SMSC

Read command AT+CSCA?

Function Reads the currently registered number of the SMSC.

Response

- When the SMSC has been registered:
<CR><LF>+CSCA:
<sca>,<tosca><CR><LF><CR><LF>OK<CR><LF>
- When the SMSC has not been registered: <CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MS: <CR><LF>+CMS ERROR:
<err><CR><LF>

Note:

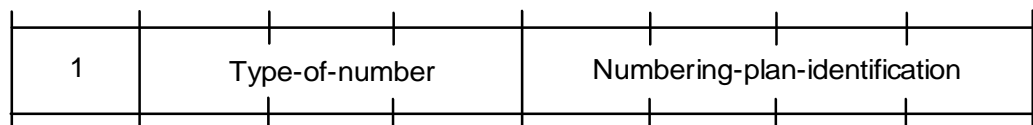
When the number of the SMSC is left empty, the returned value of <sca> is null.

Parameter description

<sca>: string, which indicates the number of the SMSC. The number consists of "+", and "0"–"9", and contains not more than 20 characters (excluding the "+" symbol) in length. It is saved upon power failure. "+" must be the first character.

<tosca>: numeric, saved upon power failure, which indicates the number type. The value 145 indicates an international number. For detailed values, see the definitions of type_addr.

<type_addr>: number address type, which consists of two characters. The following figure shows the structure of <type_addr>.



Values of Type-of-Number (bit6...bit4) are as follows:

0 0 0 This value is filled in when the subscriber does not understand the prior information about the target address number. In this case, the address number is organized by the network.

0 0 1 This value is used when the subscriber number is identified as an international number. This value can also be filled in when the subscriber number falls within the number range of the home country.

0 1 0 National phone number, to which no prefix or suffix can be added. This value is used when the subscriber sends an national phone number.

0 1 1 Special number on the local network, which is used for management or service. The subscriber cannot use this value.

1 0 1	Default 7-bit coding mode with the number type being GSM.
1 1 0	Short number, which is not used currently.
1 1 1	Reserved for extension. This value is not used currently.

Values of Numbering-plan-identification (bit3...bit0) are as follows:

Note:

bit3...bit0 is valid only when the value of bit6...bit4 is 000,001,010.

0 0 0 0	The number is determined by the numbering plan on the network.
0 0 0 1	ISDN/telephone numbering plan
0 0 1 1	Data numbering plan, which is not used currently.
0 1 0 0	Telex numbering plan, which is not used currently.
1 0 0 0	National numbering plan, which is not used currently.
1 0 0 1	Private numbering plan, which is not used currently.
1 0 1 0	ERMES numbering plan, which is not used currently.

If the command does not contain the <tosca> parameter, it indicates that the <tosca> parameter is not modified.

11.11.3 Setting the Number of the SMSC

Set command	AT+CSCA=<sca>[,<tosca>]
Function	Sets the number of the SMSC.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

11.11.4 Examples

Set the number of the SMSC.

```
AT+CSCA=1380063859
```

```
OK
```

Query the status of the SMSC.

```
AT+CSCA?
```

```
+CSCA: "1380063859",129
```



OK

11.12 AT+CSCB-Command for Selecting the Type of Cell Messages

The AT+CSCB command selects the type of cell messages.

11.12.1 Checking the Parameter Range Supported by the Command

Test command	AT+CSCB=?
Function	Checks the parameter range supported by the command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSCB: (list of supported <mode>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<mode>: numeric, which indicates the message type.

0: Adds the message type that is defined by <mids><dcss> from the previous settings.

1: Removes the message type that is defined by <mids><dcss> from the previous settings.



11.12.2 Reading the Current CBM Type

Read command	AT+CSCB?
Function	Reads the current CBM type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSCB: <mode>,<mids>,<dcss><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<mids>: string, which indicates the combination of all CBM identification codes. This parameter is stored in SIM card. For example, "0,1,5,320–478,922". A maximum of fifteen values are supported.

<dcss>: string, which indicates the combination of all CBM data coding schemes. The default value is 0–255. For example, "0-3,5". A maximum of five values are supported setting the current CBM type.

11.12.3 Setting the Current CBM Type

Set command	AT+CSCB=[<mode>[,<mids>[,<dcss>]]]
Function	Sets the current CBM type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- If no parameters of this command are set, AT+CSCB= considers the previously set values valid for various parameters.
- The settings specified by mids and dcss are added to or removed from the previous settings.
- AT+CSCB=0 deletes all mids and dcss settings that have been configured.
- AT+CSCB 1 keeps mids unchanged and sets dcss to the default value.

11.12.4 Examples

Query the current CBM information.

AT+CSCB=?

+CSCB: (0,1)

OK

11.13 AT+CSMS–Command for Setting the Message Service Type

The AT+CSMS command sets the message service type.

11.13.1 Checking Whether the Command Is Available

Test command	AT+CSMS=?
Function	Checks the parameter range supported by the command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSMS: (list of supported <service>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<service>: numeric, which indicates the message service type.

0: 3GPP TS 23.040, 3GPP TS 23.041 (The syntax structure of AT commands for short messages is compatible with GSM 07.05 Phase 2.) (default value)

1: GSM 03.40, GSM 03.41 (Messaging AT command syntax is compatible with GSM 07.05 Phase 2+ and <service> = 1 is required for AT+CNMA.)



11.13.2 Reading the Current Message Service Type

Read command	AT+CSMS?
Function	Reads the current message service type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSMS: <service>,<mt>,<mo><bm><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<mt>,<mo>,<bm>: integer values, which indicate whether the MT supports receiving short messages, sending short messages, and broadcasting message services respectively.

0: Does not support the preceding functions.

1: Supports the preceding functions (default value).

11.13.3 Setting the Message Service Type

Set command	AT+CSMS=<service>
Function	Sets the message service type.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CSMS: <mt>,<mo>,<bm><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MS: <CR><LF>+CMS ERROR: <err><CR><LF>

Note:

The settings of <service> remain effective after the module is powered off.

11.13.4 Examples

Example 1:

AT+CSMS=?

+CSMS: (0,1)

OK

Example 2:

AT+CSMS?

+CSMS: 0,1,1,1

OK

Example 3:

AT+CSMS=0

+CSMS: 1,1,1

OK

11.14 AT+CNMA–Command for Acknowledging a New Short Message

The AT+CNMA command is used to confirm reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT), which is routed directly to the TE.

11.14.1 Checking the Parameter Range Supported by This Command

Test command	AT+CNMA=?
Function	Returns the parameter range supported by this command.
Response	<CR><LF>+CNMA: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<n>: integer

Table 11-4 Values of <n>

Parameter	Value	Description
<n>	0	Not supported currently.
	1	Send RP-ACK (or buffered result code received correctly).

Parameter	Value	Description
	2	If the TP-FCS value is not specified in the PDU, the module will send the SMS-DELIVER-REPORT message in which the TP-FCS value is set to FF.

11.14.2 Acknowledging a New Message

Set command AT+CNMA[=<n>[,<length>[<CR>PDU is given <CTRL-Z/ESC>]]]

Function Acknowledges a new messages in PDU mode (+CMGF=0).

Response

- In the case of successful execution: <CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR/+CME ERROR: <err><CR><LF>

Notes:

- To acknowledge new messages using AT+CNMA, the following settings must be configured: use AT+CSMS=1 to set <service> to 1; and use AT+CNMI=,2 to set <mt> to 2, or use AT+CNMI=,,,1 to set <ds> to 1. After the settings are configured, if acknowledgement is not sent using AT+CNMA within 15s, the <mt> and <ds> parameters of the +CNMI command will be reset to 0, which consequently affects the transmission and reception of messages. During the 15s, the short message related commands such as +CPMS, +CMGL, +CMGD, +CMGS, +CMGW, +CMGR and +CNMI are not allowed to be sent.
- If no parameters is entered, AT+CNMA will be treated as AT+CNMA=1 by default.

Parameter description

<n>: integer

Table 11-5 Values of <n>

Parameter	Value	Description
<n>	0	Not supported currently.
	1	Send RP-ACK (or buffered result code received correctly).
	2	If the TP-FCS value is not specified in the PDU, the module will send the SMS-DELIVER-REPORT message in which the TP-FCS value is set to FF.

<length>: not supported currently.

<ackpdu>: not supported currently.

11.15 +CMTI-Command for Unsolicitedly Reporting SMS Arrival

The +CMTI command is used to indicate that a new SM is received.

URC When the value of <mt> in the AT+CNMI command is 1:
<CR><LF>+CMTI: <mem3><index><CR><LF>

Parameter description

<mem3>: character string, which indicates the memory for storing a new SM that is not directly sent to the TE.

"SM": indicates SIM card.

<index>: integer; indicates the storage position of an SM in the memory.

11.16 +CMT-Command for Unsolicitedly Reporting a New SM

The +CMT command is used to indicate that a new SM is received.

URC When the value of <mt> in the AT+CNMI command is 2 and the PDU mode is adopted:
<CR><LF>+CMT: [<reserved>],<length><CR><LF><pdu>
In TEXT mode:
<CR><LF>+CMT: <callerID>,[<reserved>],[<year>, <month>,
<day>, <hour>, <minute>, <second>]<CR><LF><data><CR><LF>

Parameter description

<reserved>: reserved byte.

<length>: integer; indicates the number of bytes in the TPDU.

<pdu>: PDU. For details, see the AT+CMGL command.

<callerID>: number of the short message sender.

<year>,<month>,<day>,<hour>,<minute>,<second>: the year, month, day, hour, minute, second of the received short message.

<data>: the received short message.

11.17 +CBM-Command for Unsolicitedly Reporting a Cell SM

The +CBM command is used to indicate that a new cell SM is received.

URC When the value of <bm> in the AT+CNMI command is 2 and the PDU mode is adopted:
<CR><LF>+CBM: <length><CR><LF><pdu>

Parameter description

<length>: integer; indicates the number of bytes in the TPDU.

<pdu>: PDU. For details, see the AT+CMGL command.

11.18 +CDS-Command for Unsolicitedly Reporting a New SM Status Report

The +CDS command is used to indicate that a new SM status report is received.

URC When the value of <ds> in the AT+CNMI command is 1 and the PDU mode is adopted:
<CR><LF>+CDS: <length><CR><LF><pdu><CR><LF>
In TEXT mode:
+CDS: <fo>,<mr>,<ra>,<type>[[<scts>],<year>,<month>,<day>,<hour>,<minute>,<second>],<stat><CR><LF>

Parameter description

<length>: integer; indicates the number of bytes in the TPDU.

<pdu>: PDU. For details, see the AT+CMGL command.

<fo>: first byte of GSM 03.40.

<ra>: number of the short message receiver.

<type>: number type. The value 145 indicates an international phone number. The value 129 indicates a national phone number.

<scts>: time stamp.

<stat>: the state of short message.

11.19 AT^HCMGL-Short Message List Command

Users can run this command to query the short message list's status.



11.19.1 Querying the HCMGL Modes Supported by the Module

Test command	AT^HCMGL=?
Function	Queries the HCMGL modes supported by the module.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^HCMGL: (list of supported <stat>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an illegal command or an invalid SIM card: <CR><LF>+CMS ERROR: <err><CR><LF>

Parameter description

<stat>: specifies the type of a short message. The values are as follows:

- 0: Received unread short messages
- 1: Received read short messages
- 2: Stored unsent short messages
- 3: Stored sent short messages
- 4: All short messages

11.19.2 Setting for HCMGL

Set command	AT^HCMGL[=<stat>]
Function	Queries the short message list's status. When <stat> is omitted, AT^HCMGL is equivalent to AT^HCMGL=4.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^HCMGL: <index1>,<tag1><CR><LF><CR><LF>^HCMGL:<index2>,<tag2> <CR><LF>...<CR><LF>OK<CR><LF>• In case of an illegal command or an invalid SIM card: <CR><LF>+CMS ERROR: <err><CR><LF>



Parameter description

<index>: an integer, identifying the position in the storage medium.

<tag>: an integer, specifying the status of a short message. The values are as follows:

0: Unread short messages

1: Read short messages

2: Unsent short messages

3: Sent short messages

11.19.3 Examples

AT^HCMGL=4

^HCMGL: 1,1

...(Short messages' status)

OK

12

Commands for STK Interface

12.1 AT^STSF-Command for Configuring the STK Interface Function

This command is used to configure the STK interface function, including:

- Active and de-active the STK interface function
- Configure STK command supported by SIM card

12.1.1 Querying the Supported STK Mode

Test command	AT^STSF=?
Function	Queries the supported STK mode.
Response	In case of successful execution: <CR><LF>^STSF: (list of supported <mode>s)<CR><LF><CR><LF>OK<CR><LF>

<mode>: integer, which is used to set the STK interface function.

0: Disable the STK interface function (default value).

1: Active the STK interface function.

2: Configure the STK interface function (not supported currently).

12.1.2 Querying the Current STK Mode

Read command	AT^STSF?
Function	Queries the current STK mode.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^STSF: <mode><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

12.1.3 Setting the STK Interface Function

Set command	AT^STSF=<Mode>[,<Config>][,<Timeout>]
Function	Sets the STK interface function.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<Config>: this parameter includes the coding of TERMINAL PROFILE. It is the list of STK functions supported by the UE (not supported currently).

<Timeout>: this parameter includes the time for a user to respond to a proactive command (not supported currently).

12.1.4 Examples

AT^STSF=0	<i>Note: Disable the STK interface function.</i>
OK	
AT^STSF=3	<i>Note: Incorrect syntax.</i>
ERROR	
AT^STSF=1	<i>Note: Active the STK interface function.</i>
OK	

12.2 ^STIN-Command for Reporting of the STK Event Notification

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

URC ^STIN: <CmdType>,<CmdIndex>,<isTimeOut>

Parameter description

<CmdType >:

- | | |
|---|---|
| 0 | The SIM card has sent a proactive command Setup Menu. |
| 1 | The SIM card has sent a proactive command Display Text. |

- | | |
|----|---|
| 2 | The SIM card has sent a proactive command Get Inkey. |
| 3 | The SIM card has sent a proactive command Get Input. |
| 4 | The SIM card has sent a proactive command Setup Call. |
| 5 | The SIM card has sent a proactive command Play Tone (not supported currently). |
| 6 | The SIM card has sent a proactive command Sel Item. |
| 7 | The SIM card has sent a proactive command Refresh. |
| 8 | The SIM card has sent a proactive command Send SS (not supported currently). |
| 9 | The SIM card has sent a proactive command Send SMS (not supported currently). |
| 10 | The SIM card has sent a proactive command Send USSD (not supported currently). |
| 11 | The SIM card has sent a proactive command LAUNCH BROWSER (not supported currently). |
| 12 | The SIM card has sent a proactive command SET UP IDLE MODE TEXT. |
| 99 | The SIM card has sent a command End Session to end the session. |

<CmdIndex>: it is the index of the proactive command, ranging from 0 to 12.

<isTimeOut>: indicates whether a proactive command is timeout (not supported currently and the value is 0 by default).

12.3 AT^STGI-Command for Obtaining Data of Proactive Command Data

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

12.3.1 Querying the Data of Proactive Command

Set command	AT^STGI=<CmdType>,<CmdIndex>
Function	Queries the data of proactive command.
Response	<ul style="list-style-type: none">• In case of successful execution:(see Table 12-1)• In case of an MT-related error: <CR><LF>+CME ERROR:<err><CR><LF>

Table 12-1 The values of <CmdType>

Cmd Type	Description	Possible response(s)
0	Obtain the data of proactive command "Setup Menu"	<CR><LF>^STGI: <Id>,<NbItems>,<Alpha Identifier menu><CR><LF> <CR><LF>^STGI: <Id1>,<NbItems>,<Alpha Id1 Label>,<Help Info> [,<NextActionId>] <CR><LF> <CR><LF>^STGI: <Id2>,<NbItems>,<Alpha Id2Label>,<HelpInfo>[,<NextActionId>]<CR><LF>[...]
1	Obtain the data of proactive command "Display Text"	<CR><LF>^STGI: <TextInfo>,<TextFormat>,<ClearMode>[,<DurationTime>]<CR><LF>
2	Obtain the data of proactive command "Get Inkey"	<CR><LF>^STGI: <TextInfo>,<textCode>,<rspFormat>,<HelpInfo>[,<Timeout>[,<Icon>]]<CR><LF>
3	Obtain the data of proactive command "Get Input"	<CR><LF>^STGI: <TextInfo>,<textCode>,<rspFormat>,<PackMode>,<EchoMode>,<SizeMin>,<SizeMax>,<HelpInfo>[,<DefaultTextInfo>,<textCode>]<CR><LF>
5	Obtain the data of proactive command "PLAY TONE"	<CR><LF>^STGI: <ToneType>[,<Duration>,<TextInfo>,<textCode>[,<icon>]]<CR><LF>
6	Obtain the data of proactive command "Sel Item"	<CR><LF>^STGI: <DefaultItem>,<NbItems>,<Alpha Identifier menu><CR><LF> <CR><LF>^STGI: <Id1>,<NbItems>,<Alpha Id1 Label>,<HelpInfo>[,<NextActionId>] <CR><LF> <CR><LF>^STGI: <Id2>,<NbItems>,<Alpha Id2 Label>,<HelpInfo>[,<NextActionId>] <CR><LF>[...]
7	Obtain the data of proactive command "Refresh"	<CR><LF>^STGI: <Refresh Type>[,<File List>]<CR><LF>
11	Obtain the data of proactive command "LAUNCH BROWSER" (not supported currently)	<CR><LF>^STGI: <URL>,<LaunchMode><CR><LF>
12	Obtain the data of proactive command "SET UP IDLE MODE TEXT"	<CR><LF>^STGI: <TextInfo>,<textCode>[,<icon>]<CR><LF>

Cmd Type	Description	Possible response(s)
99	Obtain the data of proactive command "End Session" (not supported currently)	

Parameter description

- Parameter Values in the Response When CmdType=0 (Setup Menu)
 - <CmdIndex>: it is consistent with the <CmdIndex> in the ^STIN notification.
 - <Alpha Identifier menu>: indicates the alpha identifier of the main menu, that is, the title of the main menu. The decoding method is as follows: Identify whether the first byte is 80, 81 or 82. If yes, decode the title according to the UCS2 coding scheme. If no, decode the title according to uncompressed GSM 7-bit coding scheme.
 - <Id> (0) indicates the main menu
 - <Idx> (1–255) indicates the identifier of the menu item
 - <NbItems> (1–255) indicates the number of options in the main menu
 - <Alpha Idx Label>: indicates the alpha identifier label of the menu option, that is, the name of the menu option. The decoding method is as follows: identify whether the first byte is 80, 81 or 82. If yes, decode the menu option according to the UCS2 coding scheme. If no, decode menu option according to uncompressed GSM 7-bit coding scheme.
 - <HelpInfo>:
 - 0: The help information is unavailable.
 - 1: The help information is available.
 - <NextActionId>: It includes a proactive command identifier. The customer can always obtain the information about the setup menu after receiving the notification of ^STIN:0.
- Parameter Values in the Response When CmdType=1 (Display Text)
 - <TextInfo>: indicates the text to be displayed.
 - <TextFormat>: indicates the coding scheme of the text to be displayed.
 - 0: Compressed GSM 7-bit coding
 - 4: 8-bit coding
 - 8: UCS2 coding
 - <ClearMode>: the user disables the prompt mode.
 - 0: The displayed text will be cleared after a certain period of time.
 - 1: The displayed text remains until it is cleared by the user.
 - <DurationTime>: indicates the displaying duration requested for the displayed text.
- Parameter Values in the Response When CmdType=2 (Get Inkey)
 - <TextInfo>: a character string that indicates the prompt information.

<textCode>:

0: Compressed GSM 7-bit coding

4: 8-bit coding

8: UCS2 coding

<rspFormat>: indicates the user's input mode or character type of the input contents.

0: GSM 7-bit coding

1: YES or NO mode

2: Digits (0–9, *, #, and +)

3: UCS2 coding

<HelpInfo>:

0: The help information is unavailable.

1: The help information is available.

<Timeout>: time-out time, in seconds

- Parameter Values in the Response When CmdType=3 (Get Input)

<TextInfo>: a character string that indicates the prompt information.

<textCode>:

0: Compressed GSM 7-bit coding

4: 8-bit coding

8: UCS2 coding

<rspFormat>: indicates the character type of contents that the user inputs.

0: GSM 7-bit coding characters

2: Digits (0–9, *, #, and +)

3: UCS2

<PackMode>:

0: Uncompressed mode

1: Compressed mode

<EchoMode>:

0: Disable the echo mode.

1: Enable the echo mode.

<SizeMin> (1–255): indicates the minimum input length

<SizeMax> (1–255): indicates the maximum input length

<HelpInfo>:

0: The help information is unavailable.

1: The help information is available.

<DefaultTextInfo>: text information. By default, it is the strings that the user inputs.

<Duration>: the duration (in seconds) of Play Tone. Parameter Values in the Response When CmdType=5 (Play Tone)

<ToneType>: indicates the type of the tone.

0: Tone Dial

1: Tone Busy

- 2: Tone Conestion
- 3: Tone Radio ack
- 4: Tone Dropped
- 5: Tone Error
- 6: Tone Call waiting
- 7: Tone Ringing
- 8: Tone General beep
- 9: Tone Positive beep
- 10: Tone Negative beep

When the tone is not specified, the ME uses the default tone "general beep".

<TextInfo>: indicates the text information to be displayed.

<textCode>: indicates the coding scheme of the text to be displayed.

0: Compressed GSM 7-bit coding

4: 8-bit coding

8: UCS2 coding

<icon>: indicates the icon information.

- Parameter Values in the Response When CmdType=6 (Sel Item)

<CmdIndex>: it is consistent with the <CmdIndex> in the STIN notification.

<DefaultItem> (1–255): default item identifier

<Alpha Identifier menu>: indicates the alpha identifier of the main menu, that is, the title of the main menu. The decoding method is as follows: Identify whether the first byte is 80, 81 or 82. If yes, decode the title according to the UCS2 coding scheme. If no, decode the title according to uncompressed GSM 7-bit coding scheme.

<Idx> (1–255): Identifier items

<NbItems> (1–255): indicates the number of the menu items.

<Alpha Idx Label>: indicates the alpha identifier label of the menu option, that is, the name of the menu option. The decoding method is as follows: identify whether the first byte is 80, 81 or 82. If yes, decode according to the UCS2 coding scheme. If no, decode the title according to uncompressed GSM 7-bit coding scheme.

<HelpInfo>:

0: The help information is unavailable.

1: The help information is available.

<NextActionId>: It includes a proactive command Identifier.

- Parameter Values in the Response When CmdType=7 (Refresh)

<Refresh Type>:

0: NAA initialization

1: NAA file change notification (FCN)

2: NAA initialization and FCN

3: NAA initialization and FCN of all files

4: UICC restart

5: NAA application restart

6: NAA session restart

- <File List>: indicates the file list to be refreshed.
- Parameter Values in the Response When CmdType=11 (Launch Browser)
<URL>: Uniform Resource Location
<LaunchMode>: indicates the launch mode to open browser
0: Launch browser without making a connection, if not already launched.
1: Launch browser, making a connection, if not already launched.
2: Use the existing browser (the browser shall not use the active existing secured session).
3: Close the existing browser session and launch new browser session, making a connection.
4: Close the existing browser session and launch new browser session, using a secure session.
 - Parameter Values in the Response When CmdType=12 (SET UP IDLE MODE TEXT)
<TextInfo>: indicates the text information to be displayed.
<textCode>
0: Compressed GSM 7-bit coding
4: 8-bit coding
8: UCS2 coding
<icon>: indicates the icon information.

12.3.2 Querying the Type and Index of Proactive Command Reported by SIM Card

Read command	AT^STGI?
Function	Queries the type and index of proactive command reported by SIM card.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^STGI: 0, 0<CR><LF>[...]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

12.3.3 Querying the Supported STK Commands

Test command	AT^STGI=?
Function	Returns the supported STK commands.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^STGI: (list of supported <CmdType>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Note:

To obtain the information about the main menu, the TE can perform the command AT^STGI=0,0 anytime. Other command information can be obtained only when the command is reported.

12.3.4 Examples

Precondition: All the STK-related functions are enabled; PIN is not required or has been verified; the STK function is enabled.

^STIN: 0,0 *Note: The SIM card has sent the main menu.*

AT^STGI=0,0 *Note: The information about the main menu is obtained.*

The main menu contains three items, including:

^STGI: "SIM TOOLKIT MAIN MENU"

^STGI: 1,3,"BANK", 0

^STGI: 2,3,"QUIZ", 0

^STGI: 3,3,"WEATHER",0

OK

12.4 AT^STGR–Command for STK Responding

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



12.4.1 Querying the Type and Index of Proactive Command Currently Supported

Test command	AT^STGR=?
Function	Queried the type and index of proactive command currently supported.
Response	In case of successful execution: <CR><LF>^STGR: (0–12, 99), (0–8)<CR><LF><CR><LF>OK<CR><LF>

12.4.2 Querying the Type and Index of Proactive Command to Be Responded by TE

Read command	AT^STGR?
Function	Queries the type and index of proactive command to be responded by TE.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^STGR: 0, 0<CR><LF>[...]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

12.4.3 Returning the Responses of Proactive Command to SIM Card

Set command	AT^STGR=<CmdType>,<CmdIndex>[,<Result>[,<Data>]]
Function	Returns the responses of proactive command to SIM card.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<CmdType>:

0: Setup the main menu

1: The response of 'Disp Text'

- 2: The response of 'Get Inkey'
- 3: The response of 'Get Input'
- 4: The response of 'Setup call'
- 5: The response of 'Play Tone'
- 6: The response of 'Sel Item'
- 11: The response of 'Launch Browser' (not supported currently)
- 12: The response of 'Setup Idle Mode Text'
- 99: exit (not supported currently)
- Parameter Values in the Response When CmdType=0 (Setup Menu)
 - <CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
 - <Result>:
 - 1: The menu selected by the user.
 - 2: The help information required by the user.
 - 3: Return to the upper level menu (not supported currently because the current menu is already the main menu).
 - <Data>: indicates that includes the item ID of the menu that user selects.
- Parameter Values in the Response When CmdType=1 (Display Text)
 - <CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
 - <Result>:
 - 0: The user terminated the session.
 - 1: The command is executed successfully.
 - 4: "Display Text" reported by SIM card is supported by MT.
 - For the response of display text, <Data> need not be specified when execute AT^STGR.
- Parameter Values in the Response When CmdType=2 (Get Inkey)
 - <CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
 - <Result>:
 - 0: The user terminated the session.
 - 1: The command is executed successfully.
 - 2: The help information required by the user.
 - 4: "Get Inkey" reported by SIM card is supported by MT.
 - <Data>: indicates that includes the contents that the user inputs.
- Parameter Values in the Response When CmdType=3 (Get Input)
 - <CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
 - <Result>:
 - 0: The user terminated the session.
 - 1: The command is executed successfully.
 - 2: The help information required by the user.
 - 4: "Get Input" reported by SIM card is supported by MT.
 - <Data>: indicates that includes the characters input by user.

- Parameter Values in the Response When CmdType=5 (Play Tone)
<CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
<Result>:
0: The user terminated the session.
1: The command is executed successfully.
4: "Tone" reported by SIM card is supported by MT.
- Parameter Values in the Response When CmdType=6 (Select Item)
<CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
<Result>:
0: The user terminated the session.
1: The menu selected by the user.
2: The help information required by the user.
3: Return to the upper level menu.
4: "Select Item" reported by SIM card is supported by MT.
<Data>: indicates that includes the item ID of the menu that user selects.
- Parameter Values in the Response When CmdType=11 (Launch Browser)
<CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
<Result>:
0: The user terminated the session.
1: The command is executed successfully.
4: Launch Browser is not supported by this command.
5: The browser on the MT is busy or the command cannot be parsed by the browser.
6: The MT is busy in SS (supplementary service) transmission.
- Parameter Values in the Response When CmdType=12 (Setup Idle Mode Text)
<CmdIndex>: it is consistent with <CmdIndex> reported by the ^STIN command.
<Result>:
0: The user terminated the session.
1: The command is executed successfully.
4: This command is not supported by TE.

Note:

While CmdType=1 (Display Text), there is no need to set <Data>.

12.4.4 Examples

Precondition: All the STK-related functions are enabled; PIN is not required or has been verified; the STK function is enabled.

^STIN: 0,0

Note: The SIM card has sent the main menu.

AT^STGI=0,0

Note: The information of the main menu is obtained.

^STGI: 0,3



The main menu contains three items, including:

^STGI: 1,3,"BANK", 0

^STGI: 2,3,"QUIZ", 0

^STGI: 3,3,"WEATHER",0

OK

AT^STGR=0,0,1,2

Note: Item2 of the main menu is selected.

OK

^STIN: 6,1
the main menu.

Note: The SIM card has sent the sub-menu of Item2 of

AT^STGI=6,1

Note: Obtain the information of the sub-menu.

The BANK menu contains two items, including:

^STGI:0,2, "BANK"

^STGI: 1,2, "PERSONAL ACCOUNT ENQUIRY", 1

^STGI: 2,2, "NEWS", 0

OK

13

Commands for the SIM Card

This chapter describes the AT commands related to the SIM card.

13.1 AT+CRSM-Command for Accessing a SIM Card Through Restricted SIM Access

The AT+CRSM command accesses a SIM card through restricted SIM access.

13.1.1 Checking Whether the +CRSM Command Is Available

Test command	AT+CRSM=?
Function	Checks whether the command exists.
Response	<ul style="list-style-type: none">• In case of available command: <CR><LF><CR><LF>OK<CR><LF>• In case of unavailable command: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

13.1.2 Accessing the SIM Database

Set command	AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]
Function	Accesses the SIM card through restricted permissions.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CRSM: <sw1>,<sw2>[,<response>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

This command can access the SIM database through restricted permissions. For example, the IMSI number cannot be changed without permission (authentication is required for change). In addition, the IMSI number cannot be modified through this command.

Parameter description

<command>: numeric, which indicates the command for SIM access. The value range is as follows:

176: Reads the contents on the SIM card in binary mode.

178: Reads records.

192: Reads responses.

214: Updates the contents on the SIM card in binary mode.

220: Records the updated contents.

242: Obtains the status.

<fileid>: integer; indicates the ID of the EF file. In addition to the command for status query, all other commands must send this parameter.

<P1>,<P2>,<P3>: in addition to the commands for obtaining the response and querying the status, other commands must specify these parameters. The value ranges from 0 to 255.

<data>: information field in hexadecimal mode.

<sw1>,<sw2>: response returned by the SIM card after the command is executed.

<response>: data reported after the command is successfully executed. For the commands for updating data in binary mode and updating records, the response is not returned.

13.2 AT+ICCID-Command for Querying the ICCID

The AT+ICCID command queries the ICCID of the SIM card.

13.2.1 Querying the ICCID

Read command	AT+ICCID?
Function	Queries the ICCID of the SIM card.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+ICCID: <iccid><CR><LF><CR><LF>OK<CR> <LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<iccid>: string type; ICCID of the SIM card; a string consists of decimal digits enclosed within double quotation marks at both ends.

13.2.2 Examples

Query the ICCID.

AT+ICCID?

+ICCID: "89860460097552010612"

OK

13.3 AT+CCID-Command for Querying the ICCID

The AT+CCID command queries the ICCID of the SIM card.

13.3.1 Checking Whether AT+CCID Is Supported

Test command	AT+CCID=?
Function	Checks whether AT+CCID is supported.
Response	<CR><LF>OK<CR><LF>

13.3.2 Querying the ICCID

Execution/Read command	AT+CCID/AT+CCID?
Function	Queries the ICCID of the SIM card.



Response

- In case of successful execution:
<CR><LF>+CCID: <iccid><CR><LF><CR><LF>OK<CR><LF>
- In case of an error related to the MT:
<CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<iccid>: string type; ICCID of the SIM card; a string consists of decimal digits enclosed within double quotation marks at both ends.

13.3.3 Examples

Query the ICCID.

AT+CCID

+CCID: "89860460097552010612"

OK

14

Commands for the Phone Book

This chapter describes the AT commands that can perform operations on the phone book.

14.1 AT+CPBR–Command for Reading the Phone Book

The AT+CPBR command reads the phone book.

14.1.1 Checking the Parameter Range Supported by This Command

Test command	AT+CPBR=?
Function	Checks the available phone book indexes and the supported length of phone number and name.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPBR: (list of supported<index>s),[<nlength>],[<tlength>]<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>, <index1>, <index2>: integer; indicates the location in the phone book memory. The values of index1 and index2 cannot be larger than the maximum index of the phone book, that is, the total field returned by the AT+CPBS? command.

<nlength>: integer; indicates the maximum length of a phone number.

<tlength>: integer; indicates the maximum length of the name field.

14.1.2 Reading the Phone Book

Set command	AT+CPBR=<index1>[,<index2>]
Function	Reads the currently selected phone book records between the index1 and index2 locations in the phone book memory.
Response	<ul style="list-style-type: none">• In case of successful execution: [<CR><LF>+CPBR: <index1>,<number>,<type>,<text>[<CR><LF>+CPBR: <index2>,<number>,<type>,<text>[...]<CR><LF>]]<CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>
Notes:	<ul style="list-style-type: none">• When only one parameter is entered, one phone book record specified by the parameter is returned.• When two parameters are entered, all phone book records between the two indexes are returned.

Parameter description

<number>: string, which indicates the phone number.

<type>: number type. The value 145 indicates an international phone number.

145: The telephone number contains the international access code "+".

129: The telephone number does not contain "+".

<text>: string, which indicates the name whose maximum length is <length>. The character type is specified by the AT+CSCS command.

14.1.3 Examples

Example 1:

Check the available phone book indexes and the supported length of phone number and name.

AT+CPBR=?

+CPBR: (1-250),40,16

OK

Example 2:

List all phone book records between index values 10-13.

AT+CPBR=10,13

+CPBR: 10,"13903702895","129"

+CPBR: 11,"13903702873","129"

+CPBR: 12,"13903702856","129"

+CPBR: 13,"13903702803","129"

OK

Example 3:

Read the nonexistent phone book records

AT+CPBR=1

OK

14.2 AT+CPBW–Command for Writing the Phone Book

The AT+CPBW command Sets a phone book record to the currently selected location that is specified by the index in the phone book memory. If the command parameter contains only the index field, the phone book record at the location specified by the index field is deleted. If the index field is omitted and the parameter contains the number field, the phone book record is written to the first empty location. <index> can be omitted only when <number> or <text> exists.

14.2.1 Checking the Parameter Range Supported by This Command

Test command AT+CPBW=?

Function Queries the parameter range supported by this command.

Response

- In case of successful execution:
<CR><LF>+CPBW: (list of supported <index>s),[<nlength>],[list of supported <type>s],[<tlength>]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<index>: integer; indicates the location in the phone book memory. The value of index cannot be larger than the total field returned by the AT+CPBS? command.

<nlength>: integer; indicates the maximum length of a phone number.

<tlength>: integer; indicates the maximum length of the name field.

14.2.2 Writing a Record into the Phone Book

Set command	AT+CPBW=[<index>][,<number>[,<type>]][,<text>]
Function	Sets a record into the phone book.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<number>: string, which indicates the phone number.

<type>: integer; indicates the format of a phone number.

145: The phone number contains the international access code "+".

129: The phone number does not contain the international access code "+".

<text>: string, which indicates the name whose maximum length is <tlength>. The character type is specified by the AT+CSCS command.

14.2.3 Examples

Example 1:

Query the parameter range supported by this command.

AT+CPBW=?

+CPBW: (1–250),40,(129,145),16

OK

Example 2:

Set a record into the phone book.

AT+CPBW=5,"13903702805",,"test"

OK

14.3 AT+CPBS–Command for Selecting the Phone Book Memory

The AT+CPBS command selects the phone book memory. After the MT restarts, the MT restores the initial setting to "SM". Other commands related to the phone book perform operations by using the phone book memory that is selected by this command.

14.3.1 Checking the Value Range Supported by This Command

Test command	AT+CPBS=?
Function	Checks the optional items of the phone book memory.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CPBS: (list of supported <storage>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR:<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<storage>: type of the phone book memory. The following table describes the value options of <storage>.

Table 14-1 Value options of <storage>

Value	Description
SM	Phone book on the SIM card (default value).
LD (not supported currently)	Dialed phone number on the MT.
EN (not supported currently)	Emergency call number on the SIM card or MT.
FD (not supported currently)	Fixed dial number on the SIM card. The PIN2 code must be verified when the option is used.
ON (not supported currently)	Local phone number on the SIM card.
RC (not supported currently)	List of recent caller IDs on the MT.
MC (not supported currently)	List of missing calls of the MT.
MT (not supported currently)	Combination of the ME phone book and the abbreviated dialing phone book (non-standard), including the ME phone book and the SIM phone book (the storage capacity depends on the SIM card).

14.3.2 Reading the Current Memory of the Phone Book

Read command AT+CPBS?

Function Reads the current memory of the phone book.

Response

- In case of successful execution:
<CR><LF>+CPBS:
<storage>[,<used>,<total>]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

Parameter description

<used>: integer value, which indicates the number of used entries in the currently selected memory.

<total>: integer; indicates the maximum number of entries in the currently selected memory.

14.3.3 Setting the Memory Type of the Phone Book

Set command AT+CPBS=<storage>

Function Sets the memory type of the phone book.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

14.3.4 Examples

Example 1:

AT+CPBS=?

+CPBS: ("FD","SM","ON","LD","MC","RC","EN","MT")

OK

Example 2:

AT+CPBS?

+CPBS: "SM",23,250



OK

Example 3:

AT+CPBS="SM"

OK

15

Commands for Unstructured Supplementary Service Data

This chapter describes AT commands in operations involving the unstructured supplementary service data.

15.1 AT+CUSD–Command for Controlling Unstructured Supplementary Service Data

Users can run Unstructured Supplementary Service Data (USSD) commands using mobile devices to request specific services from the network, and the network also can send USSD commands to devices to implement specific services. Unlike SMS, USSD allows real-time bidirectional data exchange so that it can be used in services, such as stock information query. Currently, many value-added services, such as stock, lottery, weather forecast, and flight information query, are provided using USSD.

15.1.1 Querying the CUSD Modes Supported by the Module

Test command	AT+CUSD=?
Function	Queries the CUSD modes supported by the module.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CUSD: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an illegal command or an invalid SIM card: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: disables or enables the reporting of a URC, which can be either the network's response to requests sent by devices or operations initiated by the network. The value range of the parameter is as follows:

0: Disables the reporting of the result code to the TE.

1: Enables the reporting of the result code to the TE.

2: Cancels session.

15.1.2 Querying the Current CUSD Report Mode

Read AT+CUSD?

command

Function Queries the current CUSD report mode.

Response

- In case of successful execution:
<CR><LF>+CUSD: <n><CR><LF><CR><LF>OK<CR><LF>
- In case of an illegal command or an invalid SIM card:
<CR><LF>ERROR<CR><LF>

Parameter description

<n>: indicates the current report mode.

0: Disables the result code presentation to the TE.

1: Enables the result code presentation to the TE.

Example

AT+CUSD?

+CUSD: 0

OK

15.1.3 Setting for Controlling USSD

Set AT+CUSD=[<n>[,<str>[,<dc>]]]

command

Function Controls USSD. USSD commands can be sent by mobile devices or the network.

Response

- In case of successful execution:
<CR><LF>OK<CR><LF>
- In case of an illegal command or an invalid SIM card:
<CR><LF>+CME ERROR: <err><CR><LF>



Parameter description

<str>: USSD string of the maximum length with 160 bytes.

<dc>: USSD encoding format. (72: UCS2 coding is not supported currently); indicates the encoding format and specifies the language . See 3GPP TS 23.038 Cell Broadcast Data Coding Scheme in integer format (default value: 0). (GSM/IRA can send a maximum of 160 characters and UCS2 can send a maximum of 40 characters.)

15.2 +CUSD–Command for Reporting a CUSD Session Sent by the Network

When the network responds to requests sent by devices or initiates a USSD operation, MT sends the following URC to TE: +CUSD: <m>[,<str>[,<dc>]]

Parameter description

<m>:

0: Devices do not need to reply USSDDATA to the network side (when the network initiates a USSD-Notify or no further information is needed after devices initiate a operation).

1: Devices need to reply USSDDATA (when the network initiates a USSD-Request, or further information is needed after devices initiate an operation).

2: The network side releases the USSD session.

3: TE has sent acknowledgments.

4: The operation is not supported (message returned from network).

5: Network connection timeout.

<str>: see CUSD command for controlling USSD.

<dc>: see CUSD command for controlling USSD.

16

Commands for Hardware Control

This chapter describes the AT commands that operate the hardware.

16.1 AT+CALA-Command for Setting the alarm time on the ME

The AT+CALA command sets the alarm time on the ME. When the set alarm time is reached, the alarm sends a URC, and the alarm time is reset to "00/01/01,00:00:00"

The alarm provides two functions:

- Timed notification SM: When the module is not powered off, a timed SM can be unsolicitedly reported through +CALA.
- Clock mode: When the module is powered off, the clock function can be used to wake up the module. When the module is powered off, and the set alarm time is reached, the module is waken up, and the +CALA is unsolicitedly reported.

16.1.1 Checking the Parameter Range Supported by This Command

Test command	AT+CALA=?
Function	Checks the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CALA: (list of supported<n>s),(list of supported<type>s),(list of supported<tlength>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR:<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: integer; indicates the index of the alarm clock array.

<type>: integer; indicates the type of the set alarm clock. The value of this parameter is as follows:

0: Alarm clock reporting text message

<length>: integer; indicates the maximum length of text. The value ranges from 1 to 16. The default value is 16.

16.1.2 Querying the Set Alarm Clock

Read command AT+CALA?

Function Queries the set alarm clock.

Response

- In case of successful execution:
<CR><LF>+CALA:
<time>[,<n>[,<type>[,<text>]]]<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>

Note:

The ME can set only one alarm clock at one time. When the second alarm clock is set, the setting of the first alarm clock is deleted. Therefore, during query, the value of <n> is always 0.

Parameter description

<time>: string, which indicates the alarm time to be set. The format is "yy/MM/dd,hh:mm:ss".

<text>: string, which indicates the text to be displayed when the alarm clock timer expires. The default value is a null string.

16.1.3 Setting an Alarm Clock

Set command AT+CALA=<time>[,<n>[,<type>[,<text>]]]

Function Sets an alarm clock.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR:
<err><CR><LF>



16.2 +CALA-Command for Reporting Unsolicitedly

- URC1** Reports a notification SM <CR><LF>+CALA: [<text>]<CR><LF>
- URC2** Indicates that the ME is waken up and enters into the alarm clock mode. If the module is in adaptive baud rate mode, <text> but not +CALA is displayed.
- <CR><LF>^SYSSTART ALARM MODE<CR><LF><CR><LF>+CALA:
<text><CR><LF>

16.2.1 Examples

Example 1:

Check the parameter range supported by the +CALA command.

AT+CALA=?

+CALA: (0),(0),(1-16)

OK

Example 2:

Query the current alarm clock.

AT+CALA?

+CALA: "10/03/03,15:20:00",0,0,"Alarm"

OK

Example 3:

Set an alarm clock.

AT+CALA="10/03/03,15:20:00"

OK

16.3 AT+CCLK-Command for Setting the System Time

The AT+CCLK command sets the system runtime of the ME. As long as the ME is powered on, the time works.

16.3.1 Checking Whether the Command for Setting the System Time Exists

Test command	AT+CCLK=?
Function	Checks whether this command exists.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

16.3.2 Querying the Current System Time

Read command	AT+CCLK?
Function	Queries the current system time.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CCLK: <time><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<time>: string, which indicates the current system time of the ME. The format is "yy/MM/dd,hh:mm:ss".

16.3.3 Setting the System Time

Set command	AT+CCLK=<time>
Function	Sets the system time.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>



16.3.4 Examples

Example 1:

Query the current system time.

AT+CCLK?

+CCLK: "10/02/15,12:10:04"

OK

Example 2:

Set the system time.

AT+CCLK="10/02/15,12:10:50"

OK

17

Commands for Audio Control

This chapter describes the AT commands for audio control.

17.1 AT^SWSPATH-Command for Switching Between Audio Channels

The AT^SWSPATH command is used to switch the audio channel.

17.1.1 Querying the Supported Audio Channel

Test command	AT^SWSPATH=?
Function	Queries the supported audio channel.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SWSPATH: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: integer; indicates the audio channel.

0: Indicates that the first audio channel is supported (default value).

1: Indicates that the second audio channel is supported.

17.1.2 Reading the Current Audio Channel

Read command	AT^SWSPATH?
Function	Reads the current audio channel.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^SWSPATH: <n><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

17.1.3 Switching the Audio Channel

Set command	AT^SWSPATH=<n>
Function	Switches the audio channel.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

The audio channel is kept in the channel that is used in the last call after the call ends. If the module is restarted, the audio channel will be reset to the first channel.

17.2 AT+CMIC-Command for Adjusting the Microphone Gain Level

The AT+CMIC command is used to adjust the the microphone gain level.

17.2.1 Querying the Supported Microphone Gain Levels

Test command	AT+CMIC=?
Function	Queries the supported microphone gain levels.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMIC: [list of supported <level>s]<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<level>: integer; indicates the microphone gain level; the value ranges from –12 to +13; The default value is 0.

–12: Minimum gain

12: Maximum gain

13: Microphone muted

17.2.2 Querying the Current Microphone Gain Level

Read command	AT+CMIC?
Function	Queries the current microphone gain level.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMIC: <level><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

17.2.3 Setting the Microphone Gain Level

Set command	AT+CMIC=<level>
Function	Sets the microphone gain level
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

This command applies to both audio channels, but it can be executed only before a voice call is initiated.

17.3 AT^ECHO–Command for Suppressing the Echo

The AT^ECHO command is used to suppress the echo.



17.3.1 Querying the Supported Echo Suppressing Functions

Test command	AT^ECHO=?
Function	Queries the supported echo suppressing functions.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^ECHO: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error:<CR><LF>ERROR<CR><LF>

Parameter description

<n>: integer

0: Disables the echo suppressing function.

1: Enables the echo suppressing function (default value).

17.3.2 Reading the Current Settings of the Echo Suppressing Function

Read command	AT^ECHO?
Function	Reads the current settings of the echo suppressing function.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^ECHO: <n><CR><LF><CR><LF>OK<CR><LF>• In case of an error:<CR><LF>ERROR<CR><LF>

17.3.3 Setting the Echo Suppressing Function

Set command	AT^ECHO=<n>
Function	Sets the echo suppressing function.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

This command applies to both audio channels, but it can be executed only before a voice call is initiated (for the caller, it can be executed before a voice call is originated; for the called party, it can be executed before call is connected)



17.4 AT+CLVL-Command for Adjusting the Speaker Volume

The AT+CLVL command is used to adjust the speaker volume.

17.4.1 Querying the Supported Speaker Volume Level

Test command	AT+CLVL=?
Function	Queries the supported speaker volume levels.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CLVL: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<n>: integer; the value ranges from 0 to 5 (smallest value represents the lowest sound level). 0 means mute. Default value is 4.

17.4.2 Reading the Current Speaker Volume

Read command	AT+CLVL?
Function	Reads the current speaker volume.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CLVL: <n><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>

17.4.3 Setting the Speaker Volume

Set command	AT+CLVL=<n>
Function	Sets the speaker volume.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error: related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

This command applies to both audio channels. You can set the volume level to 1, 2, 3, 4, or 5 before or during a call and the setting remains effective even after the module is powered off. You can set the volume level to 0 to mute the speaker only during a call. After the call ends, the speaker volume is restored to the volume level before the speaker is muted.

17.5 AT+CMUT-Command for Muting and Unmuting the Microphone

The AT+CMUT command is used to mute and unmute the microphone.

17.5.1 Querying the Supported Muting Settings for the Microphone

Test command	AT+CMUT=?
Function	Queries the supported muting settings for the microphone.
Response	<CR><LF>+CMUT: (list of supported <n>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<n>: integer

0: Unmutes the microphone (default value).

1: Mutes the microphone.



17.5.2 Reading the Current Muting Settings of the Microphone

Read command	AT+CMUT?
Function	Reads the current muting settings of the microphone.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>+CMUT: <n><CR><LF><CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

The Read command can be used only when the module is the called party and receives an incoming call indication or when the module is the calling party and the called party answers the call.

17.5.3 Setting the Muting Function of the Microphone

Set command	AT+CMUT=<n>
Function	Sets the muting function of the microphone.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT:<CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- This command applies to both audio channels. The microphone will be restored to its default setting after a call.
- The Set command can be used only when the module is the called party and receives an incoming call indication or when the module is the calling party and the called party answers the call.

17.6 AT^STN-Command for Setting the Sidetone

The AT^STN command disables or enables the sidetone.

17.6.1 Checking the Parameter Range Supported by This Command

Test command	AT^STN=?
---------------------	----------

Function Returns the parameter range supported by this command.

Response <CR><LF>^STN: (list of supported
<vol>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<vol>: integer; indicates that enable and disable the sidetone before a voice call.

Table 17-1 Values of <vol>

Parameter	Value	Description
<vol>	0 (default value)	Sidetone off
	1	Sidetone on

17.6.2 Reading the Current Settings for Sidetone

Read command AT^STN?

Function Reads the current settings for sidetone.

Response <CR><LF>^STN: <vol><CR><LF><CR><LF>OK<CR><LF>

17.6.3 Setting Sidetone

Set command AT^STN=<vol>

Function Sets sidetone.

Response

- In the case of successful execution: <CR><LF>OK<CR><LF>
- In the case of an error during command execution:
<CR><LF>ERROR/+CME ERROR: <err><CR><LF>

Note:

The sidetone settings remain effective after the module is powered off. The sidetone settings must be configured before a call and cannot be changed during a call.

17.6.4 Examples

Example 1:

Obtain the parameter range.

AT^STN=?

^STN: (0,1)

OK

Example 2:

Disable sidetone

AT^STN=0

OK

17.7 ^AUDEND-Command for Reporting the End of Audio Playback

The ^AUDEND is used to report the end of audio playback to users.

URC <CR><LF>^AUDEND:
 <end_type>,<end_cause>[,<len>]<CR><LF>

Parameter description

<end_type>: integer

0: Audio recording ends.

1: Audio playback ends.

2: The TTS playback ends.

The value of <end_cause> varies according to the value of <end_type>.

- When <end_type>=0, values of <end_cause> are as follow:
 - 0: The user stops recording.
 - 1: The memory to store audio recordings is full.
 - 2: The module receives an incoming call.
 - 3: The module initiates a call.
- When <end_type>=1, values of <end_cause> are as follow:
 - 0: The user stops recording.
 - 1: Recordings playing stops when finished.
 - 2: The module receives an incoming call.
 - 3: The module initiates a call.
 - 255: Unknown reason.
- When <end_type>=2, values of <end_cause> are as follow:
 - 0: The TTS playback ends.
 - 1: The user runs a TTS command to end the TTS playback.
 - 2: A call interrupts the playback.

3: Audio playback timed out and an error is reported. <len>: integer; indicating the data length after audio recording ends. The unit is Byte.

17.8 AT^AUDREC-Command for Audio Recording Command

The AT^AUDREC command is used to record and play recording files.

17.8.1 Querying the Supported Audio Recording Parameters

Test command	AT^AUDREC=?
Function	Queries the supported audio recording parameters.
Response	<CR><LF>^AUDREC: (list of supported <op>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<op>: integer, indicates recording and playback.

0: Stops recording.

1: Starts recording.

2: Plays recordings.

3: Stops playing recordings.

17.8.2 Querying the Information of Recordings

Read command	AT^AUDREC?
Function	Queries the information of recordings.
Response	<ul style="list-style-type: none">In case of successful execution: <CR><LF>[^AUDREC: <file_name1>,<len1><CR><LF>[^AUDREC: <file_name2>,<len2><CR><LF>[...]]<CR><LF>OK<CR><LF>In case of an error: <CR><LF>ERROR<CR><LF>

Parameter description

<file_name>: file name with string type.

17.8.3 Recording or Playing Audio

Set command AT^AUDREC=<op>[,<file_name>]

Function Recording or playing audio.

Response

- In case of successful execution: <CR><LF>OK<CR><LF>
- In case of an error: <CR><LF>ERROR<CR><LF>
- In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Notes:

- If recording files are stored in the RAM, the value of <file_name> is RAM by default. If recording files are stored in the flash memory, the value of <file_name> can be REC1.AMR, REC2.AMR, REC3.AMR, REC4.AMR, or REC5.AMR.
- The flash memory can store a maximum of 5 recordings whose total size must not exceed 300 KB. The recording stops when the size of recordings reaches 300 KB.
- Recordings stored in the RAM must not exceed 60 KB. The recording stops when the size of recordings reaches 60 KB.
- If you set <op> to 1 or 2, <file_name> cannot be left blank. If you set <op> to 0 or 3, <file_name> is not configurable.

17.9 AT^RECCFG–Command for Changing Recording Settings

This command is used to change recording settings.

17.9.1 Checking the Supported Recording Settings

Test command AT^RECCFG=?

Function Checks the supported recording settings.

Response

- In case of successful execution:
<CR><LF>^RECCFG: (list of supported <op>s)<CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

<op>: integer, indicates the recording settings. Value range: 0–1.

0: DSP sampling compression format (see the values of <codec_type> in 17.9.2)

1: DSP sampling rate (see the values of <codec_rate> in 17.9.2)

17.9.2 Querying the Current Recording Settings

Read command AT^RECCFG?

Function Queries the current recording settings.

Response

- In case of successful execution:
<CR><LF>[^RECCFG: <op1><value1><CR><LF>[^RECCFG:
<op2><value2><CR><LF>[...]]<CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

<value>: The value of this parameter varies with the value of <op>.

<codec_type>:

- 0: FR format (not supported currently)
- 1: HR format (not supported currently)
- 2: EFR format (not supported currently)
- 3: AMR format

...

<codec_rate>:

- 0: Mode 0 - AMR 4.75 - Encodes at 4.75 kbit/s
- 1: Mode 1 - AMR 5.15 - Encodes at 5.15 kbit/s
- 2: Mode 2 - AMR 5.9 - Encodes at 5.9 kbit/s
- 3: Mode 3 - AMR 6.7 - Encodes at 6.7 kbit/s
- 4: Mode 4 - AMR 7.4 - Encodes at 7.4 kbit/s
- 5: Mode 5 - AMR 7.95 - Encodes at 7.95 kbit/s
- 6: Mode 6 - AMR 10.2 - Encodes at 10.2 kbit/s
- 7: Mode 7 - AMR 12.2 - Encodes at 12.2 kbit/s

17.9.3 Changing Recording Settings

Execution command	AT^RECCFG=<op>,<value>
Function	Changes recording settings.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

17.9.4 Examples

```
AT^RECCFG=?  
^RECCFG: (0-1)
```

```
OK  
AT^RECCFG?  
^RECCFG: 0,3  
^RECCFG: 1,0
```

```
OK  
AT^RECCFG=0,1  
ERROR  
AT^RECCFG=1,0  
OK
```

17.10 AT^FILEREAD-Command for Reading the Data in File

The AT^FILEREAD is used to read the data in file.

17.10.1 Checking Whether This Command Is Supported

Test command	AT^FILEREAD=?
Function	Checks whether this command is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

17.10.2 Reading the Specified File Information

Execution command	AT^FILEREAD=<file_name>[,<offset>,<req_len>]
Function	Reads the specified file information.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^FILEREAD: <file_name>,<read_len>,<file_size><CR><LF><file content><CR><LF>OK<CR><LF> Or <CR><LF>^FILEREAD: <file_name>,<file_size>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<file_name>: file name with string type.

<offset>: reads the offset of data (unit: byte).

<req_len>: request to read the length of data of the maximum length with 1500 (unit: byte).

<readed_len>: the readed length of data (unit: byte).

<file_size>: the total size of data (unit: byte).

Notes:

- When <offset> and <req_len> are not specified, the file information is returned by default.
- When the readed file does not exist, ERROR is returned.
- When data is stored in RAM, every time a piece of data has been read, this data will be automatically deleted.
- When data is stored in RAM, <offset> must be 0. Otherwise, ERROR is returned.

17.10.3 Examples

```
AT^FILEREAD=?  
OK  
AT^FILEREAD="REC1.AMR",0,1500  
^FILEREAD:1500,5000  
*****  
OK
```

17.11 AT^FILEDEL–Command for Deleting Files

The AT^FILEDEL command is used to delete files.

17.11.1 Checking Whether This Command Is Supported

Test command	AT^FILEDEL=?
Function	Checks whether this command is supported.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

17.11.2 Delete the Specified File

Execution command	AT^FILEDEL=<file_name>
Function	Delete the specified file.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<file_name>: string.

Note:

The specified file does not exist, OK is returned.

17.11.3 Examples

```
AT^FILEDEL="REC1.AMR"  
OK
```

17.12 AT^AUDIOCFG-Command for Configuring Tone Volume Level

This command is used to set the volume of specific type tone.

17.12.1 Checking the Parameter Range Supported by This Command

Test command	AT^AUDIOCFG=?
Function	Checks the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^AUDIOCFG: (list of supported <tone_type>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>



Parameter description

<tone_type>: integer

1: DTMF tone

17.12.2 Querying the Current Tone Configuration

Read command AT^AUDIOCFG?

Function Queries the current tone type and tone volume.

Response

- In case of successful execution:
<CR><LF>^AUDIOCFG:
<tone_type>,<tone_volume><CR><LF><CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

<tone_volume>: integer; ranges from 0–3.

0: Mute

1: Level 1 volume

2: Level 2 volume (default value)

3: Level 3 volume

The default value is 2. The volume increases with the level.

17.12.3 Setting Tone Configuration

Set command AT^AUDIOCFG=<tone_type>,<tone_volume>

Function Sets the tone type and tone volume.

Response

- In case of successful execution:
<CR><LF>OK<CR><LF>
- In case of an error during command execution:
<CR><LF>ERROR<CR><LF>



Note:

The settings configured by this command are effective even after the module is powered off. Module updating will reset the value to default value.

17.12.4 Examples

AT^AUDIOCFG=?

^AUDIOCFG: (1)

OK

AT^AUDIOCFG?

^AUDIOCFG: 1,2

OK

AT^AUDIOCFG=1,3

OK

AT^AUDIOCFG?

^AUDIOCFG: 1,3

OK

17.13 AT^KEYTONE-Command for Playing Local DTMF Key Tone

This command is used to play the DTMF key tone. And the range is 0–9, #, and *.

17.13.1 Checking the Parameter Range Supported by This Command

Test command	AT^KEYTONE=?
Function	Checks the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^KEYTONE: (list of supported <key>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<key>: string; the range is 0–9, #, and *.

17.13.2 Playing Local DTMF Key Tone

Set command	AT^KEYTONE=<key>
Function	Plays the DTMF key tone.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

17.14 AT^ECHOPARA—Commands for Configuring Echo-Related Settings

The AT^ECHOPARA command configures the echo-related settings.

17.14.1 Querying the Parameter Range Supported by This Command

Test command	AT^ECHOPARA=?
Function	Queries the parameter range supported by this command.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^ECHOPARA: (list of supported <para>s)<CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<para>: integer

1: Codecupgain

17.14.2 Querying the Parameters Supported by the Command

Read command	AT^ECHOPARA?
---------------------	--------------

- Function** Queries the parameters and value ranges supported by the command.
- Response**
- In case of successful execution:
<CR><LF>^ECHOPARA:
<para>,<value><CR><LF><CR><LF>OK<CR><LF>
 - In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

<value>:

If <para> is set to 1, the value of <value> is an integer ranging from 0 to 15. While you increase the value of <value> by one, codecupgain for the microphone circuit is increased by 2 dB. The default value of <value> is 14.

17.14.3 Setting Echo-Related Parameters

- Set command** AT^ECHOPARA=<para>,<value>
- Function** Sets the echo-related parameters.
- Response**
- In case of successful execution:
<CR><LF>OK<CR><LF>
 - In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Notes:

- The settings configured by this command are effective even after the module is powered off or upgraded.
- This command applies to both audio channels, but it can be executed only before a voice call is initiated.)

17.15 AT^FILEIO-File Operation Command

The AT^FILEIO command is used by the host computer to deliver files to modules.

17.15.1 Querying the Parameter Range Supported by This Command

- Test command** AT^FILEIO=?
- Function** Queries the parameter range supported by this command.

- Response**
- In case of successful execution:
<CR><LF>^FILEIO: (list of supported <mode>s),(list of supported <mem>s),(list of supported <file_type>s),(list of supported <pkg_id>s),(list of supported <total_no_of_pkgs>s)<CR><LF><CR><LF>OK<CR><LF>
 - In case of an error during command execution:
<CR><LF>ERROR<CR><LF>

Parameter description

<mode>: integer

1: (not supported currently) Indicates the operation for reading the packet data corresponding to <pkg_id>. When <mode> is set to 1, the AT^FILEIO command must include <pkg_id> and exclude <pkg_data> and <total_no_of_pkgs>. The size of each packet is 1024 bytes. The offset value is equal to the following: (Packet ID – 1) x 1024. If the size of the last packet is smaller than 1024 bytes, the actual size of the packet is returned.

2: Indicates the write operation. When <mode> is set to 2, the AT^FILEIO command must include all the parameters. If files already exist, they are replaced directly, and no error is returned.

3: Indicates the delete operation. When <mode> is set to 3, the AT^FILEIO command only needs to include <mode> and <file_name>.

<mem>: integer.

0: RAM (not supported currently) . Only one file can be saved, and its name is fixed at RAM. This file is not saved upon a power-off. For the MG323's recorded file access function, the maximum size of each file is 60 KB.

1: Flash memory. Multiple files can be saved, and they are saved upon a power-off. The maximum number of files that can be saved depends on products. For the MG323's recorded file access function, a maximum of five files can be saved, and each file's size does not exceed 60 KB.

<file_type>: integer.

The value ranges from 0 to 255. This parameter helps to distinguish various files for a product that supports the function to download these files. (This parameter is not supported currently and is reserved.)

<pkg_id>: integer.

The value ranges from 1 to 2147483647 ($2^{31} - 1$). For the MG323's recorded file access function, this parameter's value ranges from 1 to 120

<total_no_of_pkgs>: integer.

Total number of packets for the current file. The value ranges from 1 to 2147483647. For the MG323's recorded file access function, this parameter's value ranges from 1 to 120.



17.15.2 Operating Files

Set command	AT^FILEIO=<mode>,<file_name>[,<mem>,<file_type>],<pkg_id>[,<total_no_of_pkgs>,<pkg_data>]]
Function	Operates files.
Response	<ul style="list-style-type: none">• In case of successful execution:<ol style="list-style-type: none">1. When <mode> is set to 1 (not supported currently): <CR><LF>^FILEIO: <pkg_data><CR><LF><CR><LF>OK<CR><LF>2. When <mode> is set to 2: <CR><LF>^FILEIO: <pkg_id>,<rcv_len><CR><LF><CR><LF>OK<CR><LF>3. When <mode> is set to 3: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<pkg_id>: integer.

The value ranges from 1 to 2147483647 ($2^{31} - 1$). For the MG323's recorded file access function, this parameter's value ranges from 1 to 120.

<rcv_len>: integer.

Length of the received data, in bytes.

17.15.3 Examples

AT^FILEIO=?

^FILEIO: (1-3),,(0-1),(0-255),(1-120),(1-120)

OK

AT^FILEIO=2,"RAM",0,,1,1,"34353637383031323334353637383031323334353637"

^FILEIO: 1,44

OK

18 Other Commands

This chapter describes auxiliary commands that are not covered by the preceding chapters.

18.1 A/-Command for Executing the Previous Command Again

The A/ command executes the previous command again.

Execution command	A/
Function	Executes the previous command.
Response	Same as the output result of the previous command.

18.1.1 Examples

Execute the previous command.

AT+CREG?

+CREG: 0,1

OK

A/

+CREG: 0,1

OK



18.2 ATS3-Command for Setting the Command Line Ending Character

This command sets the command line ending character S3, which saves the command line ending character as an ASCII code. This character is sent by the TE, indicating the end of a command line.

18.2.1 Querying the Current Command Line Ending Character

Read command	ATS3?
Function	Queries the current command line ending character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><n><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: integer; indicates the ASCII code of the command line ending character. Value range: 1–7, 10–64, 66–83, 85–96, 98–115, 117–127. The default value is 13.

18.2.2 Setting the Command Line Ending Character

Set command	ATS3=<n>
Function	Sets the command line ending character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

<n> is not allowed starting with "0x", or regarding as ATS3=0.

18.2.3 Examples

Example 1:

Query the current command line ending character.

ATS3?

013

OK

Example 2:

Set the command line ending character.

ATS3=13

OK

18.3 ATS4–Command for Setting the Response Format Character

This command sets the response format character. This character is sent by the TE and is involved in the head, tail, and end tags of the result code and information response. If the S4 character in a command line is changed, the result code in this command line uses the new S4 character immediately.

18.3.1 Querying the Current Format Character

Read command	ATS4?
Function	Queries the current response format character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><n><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: integer; indicates the ASCII code of the response format character. The value ranges from 0 to 127. The default value is 10.

18.3.2 Setting the Response Format Character

Set command	ATS4=<n>
Function	Sets the response format character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

<n> is not allowed starting with "0x", or regarding as ATS4=0.

18.3.3 Examples

Example 1:

Query the current response format character.

ATS4?

010

OK

Example 2:

Set the response format character.

ATS4=10

OK

18.4 ATS5-Command for Setting the Backspace Character

This command sets the backspace character S5. This character is sent by the TE, indicating the operation of deleting the previous character. This character is identified and acknowledged by the MS.

18.4.1 Querying the Current Backspace Character

Read command	ATS5?
Function	Queries the current backspace character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF><n><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Parameter description

<n>: integer; indicates the ASCII code of the backspace character. Value range: 0–127. Default value: 8. It is saved upon power failure.

18.4.2 Setting the Current Backspace Character

Set command	ATS5=<n>
Function	Sets the backspace character.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

<n> is not allowed starting with "0x", or regarding as ATS5=0

18.4.3 Examples

Example 1:

Query the current backspace character.

ATS5?

008

OK

Example 2:

Set the backspace character.

ATS5=8

OK

18.5 ^THERM-Command for Unsolicitedly Reporting Temperature Protection

The ^THERM command is used to unsolicitedly report the temperature protection. The URC cannot be disabled currently.

URC <CR><LF>^THERM: <mode><CR><LF>

Note:

The temperature protection report is submitted automatically when the RF is enabled or disabled by the temperature protection function.

Parameter description

<mode>: indicates the action performed by the current temperature protection function.

0: Indicates that the temperature exceeds the temperature limit and that the module deregisters with the network and disables the RF.

1: Indicates that the temperature falls back to the safe temperature range and the module enables the RF.

18.6 AT^VOLT-Command for Querying Module's Power Voltage

This command is used to query the module's current power voltage.

18.6.1 Querying the Value of the Voltage

Read command	AT^VOLT?
Function	Queries the current power voltage.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^VOLT: <volage><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<volage>: module's current power voltage; unit is mV.

18.6.2 Examples

AT^VOLT?

^VOLT: 3790

OK

18.7 AT^CHIPTEMP-Command for Querying the Temperature of the Oscillator

This command is used to query the temperature of the PA, SIM card, battery, and crystal oscillator.

18.7.1 Querying the Value of the Voltage

Read command	AT^CHIPTEMP?
Function	Queries the temperature of the oscillator.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>^CHIPTEMP: <G PAtemp>,<W PAtemp>,<L PAtemp>,<SIMtemp>,<BATTERYtemp>,<CRYSTALtemp><CR><LF><CR><LF>OK<CR><LF>• In case of an error during command execution: <CR><LF>ERROR<CR><LF>

Parameter description

<G PAtemp>: An integer indicates the GSM PA chip's current temperature.

<W PAtemp>: An integer indicates the WCDMA PA chip's current temperature.

<L PAtemp>: An integer indicates the LTE PA chip's current temperature.

<SIMtemp>: An integer indicates the SIM card's current temperature.

<BATTERYtemp>: An integer indicates the battery's current temperature.

<CRYSTALtemp>: An integer indicates the crystal's current temperature.

18.7.2 Examples

AT^CHIPTEMP?

^CHIPTEMP: 65535,65535,65535,65535,65535,390

OK

18.8 AT^TTSCFG–Command for Setting TTS Parameters

The AT^TTSCFG command sets TTS parameters.

18.8.1 Querying the Parameters Supported by the TTS Function

Test command	AT^TTSCFG=?
Function	Queries the parameters supported by the TTS function.
Response	<CR><LF>^TTSCFG: (list of supported <op>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<op>: integer

0: Enables or disables the TTS function.

1: Adjusts the volume.

2: Adjusts the speed.

3: Adjusts the tone.

4: Second-line volume of TTS, which can adjust the volume more accurately.

18.8.2 Querying the Current TTS Function Settings

Read command	AT^TTSCFG?
Function	Queries the current TTS function settings.
Response	<CR><LF>^TTSCFG: <op0>,<on_off><CR><LF>^TTSCFG: <op1>,<vol_value><CR><LF>^TTSCFG: <op2>,<speed_value><CR><LF>^TTSCFG: <op3>,<tone_value><CR><LF>^TTSCFG: <op4>,<vol_value_second><CR><LF><CR><LF>OK<CR><LF>

Parameter description

<on_off>: integer

0: Disables TTS function (default value)

1: Enables TTS function

<vol_value>: integer

1: Level 1 volume

2: Level 2 volume (default value)

3:Level 3 volume

<speed_value>: integer

1: Level 1 speed

2: Level 2 speed (default value)

3: Level 3 speed

<tone_value>: integer

1: Level 1 tone

2: Level 2 tone (default value)

3: Level 3 tone

<vol_value_second>: integer

0: Disables second-line volume (default value)

1: Level 1 second-line volume

2: Level 2 second-line volume

3: Level 3 second-line volume

4: Level 4 second-line volume

5: Level 5 second-line volume

6: Level 6 second-line volume

7: Level 7 second-line volume

8: Level 8 second-line volume

9: Level 9 second-line volume

18.8.3 Setting Parameters for the TTS Function

Set command	AT^TTSCFG=<op>,<value>
Function	Sets parameters for the TTS function.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

Because the set command cannot be executed when the TTS function is enabled, the volume, speed, and tone can only be set only before you enable the function. Modules without the TTS function return ERROR upon receiving ^TTSCFG commands.

Parameter description

<value>: integer. The value of this parameter varies according to different <op> values. When <op> is set to be 0, 1, 2, 3 and 4, <value> will be <on_off>, <vol_value>, <speed_value>, <tone_value>, and <vol_value_second> respectively.



18.8.4 Examples

AT^TTSCFG=?

^TTSCFG: (0-4)

OK

AT^TTSCFG?

^TTSCFG: 0,0

^TTSCFG: 1,2

^TTSCFG: 2,2

^TTSCFG: 3,2

^TTSCFG: 4,0

OK

AT^TTSCFG=1,3

OK

AT^TTSCFG?

^TTSCFG: 0,0

^TTSCFG: 1,3

^TTSCFG: 2,2

^TTSCFG: 3,2

^TTSCFG: 4,0

OK

18.9 AT^TTS–Text-to-Speech Command

The AT^TTS command is used to enable and disable the text-to-speech (TTS) function.

18.9.1 Querying Settings Supported by the TTS Function

Test command	AT^TTS=?
Function	Queries the settings supported by the TTS function.
Response	<CR><LF>^TTS: (list of supported <op>s)<CR><LF><CR><LF>OK<CR><LF>

Parameter description

<op>: integer

0: Cancels the TTS playing.

1: Converts character strings and plays them.

18.9.2 Setting the TTS Function

Set command	AT^TTS=<op>[,<text>]
Function	Sets the TTS function.
Response	<ul style="list-style-type: none">• In case of successful execution: <CR><LF>OK<CR><LF>• In case of an error: <CR><LF>ERROR<CR><LF>• In case of an error related to the MT: <CR><LF>+CME ERROR: <err><CR><LF>

Note:

The TTS function applies to both voice channels, but cannot be enabled during ongoing calls, audio recording, or audio playback. The set command cannot be issued again until the ^AUDEND command which indicates the audio playback ends is reported. For those modules without the TTS function, ERROR is returned upon receiving any ^TTS commands.

Parameter description

- **If the firmware version supports Chinese TTS:**

<text>: hexadecimal format, GBK encoded characters enclosed within a double quotation mark. The maximum length is 1200 bytes and the number of bytes must be an integer multiple of 2 (0 is excluded).

Notes:

- Adding a double quotation mark to the value of the second parameter is optional for MG323&MG323-B.
- If the rapid playing is set on a MG323 or MG323-B using the ^TTSCFG command, issuing a TTS command with plenty of ASCII characters may abort the playback.

- **If the firmware version supports Italy TTS:**

<text>: the Unicode number (Unicode-lit format) of the Italy sentence. The max Unicode number length of <text> is 500.

Notes:

- Adding a double quotation mark to the value of the second parameter is optional for MG323&MG323-B.
- If a long Italy sentence TTS is played, it is suggested to separate the long Italy sentence into short sentences. Otherwise, the MG323&MG323-B module may not play the TTS function properly.

18.9.3 Examples

AT^TTS=?

^TTS: (0–1)

OK

AT^TTS=1,"C4E3BAC3"

OK

^AUDEND: 2,0

AT^TTS=1,"CED2C3C7CAC7C4A3BFE9D7E9A1A3"

OK

AT^TTS=0

OK

^AUDEND: 2,1



19 Appendix

19.1 List of Effects on AT Commands Imposed by SIM PIN

- Ø The command is unavailable.
- The PIN1 code does not need to be verified for the command.
- + The PIN1 code needs to be verified for the command.
- ± The PIN1 code needs to be verified for the command in certain cases.

Table 19-1 List of effects on AT commands imposed by SIM PIN

AT Command	Execution Command	Test Command	Read Command	Set Command
Commands for configuration				
AT&F	-	Ø	Ø	Ø
AT&V	-	Ø	Ø	Ø
AT&W	-	Ø	Ø	Ø
ATQ	-	Ø	Ø	Ø
ATV	-	Ø	Ø	Ø
ATZ	-	Ø	Ø	Ø
ATE	-	Ø	Ø	Ø
AT+CFUN	Ø	-	-	-
AT^SMSO	-	-	Ø	Ø
AT+GCAP	-	-	Ø	Ø
AT+CMEE	Ø	-	-	-



AT+CSCS	Ø	-	-	-
AT^SCFG	Ø	-	-	-
AT^PWROFFCFG	Ø	-	-	-
Commands for status control				
AT+CMER	Ø	+	+	+
AT+CIND	Ø	-	-	-
AT^SIND	Ø	-	-	-
AT+WS46	Ø	-	-	-
Commands for serial port control				
AT\Q	-	Ø	Ø	Ø
AT&C	-	Ø	Ø	Ø
AT&D	-	Ø	Ø	Ø
AT&S	-	Ø	Ø	Ø
AT^HRIM	Ø	-	-	-
AT+IPR	Ø	-	-	-
AT+ICF	Ø	-	-	-
AT+IFC	Ø	-	-	-
Commands for security control				
AT+CPIN	Ø	-	-	-
AT+CLCK	Ø	+	Ø	+
AT+CPWD	Ø	+	Ø	+
Commands for identification				
ATI	-	Ø	Ø	Ø
AT+CGMI/AT+GMI	-	-	Ø	Ø
AT+CGMM/AT+GMM	-	-	Ø	Ø
AT+CGMR/AT+GMR	-	-	Ø	Ø
AT+CGSN/AT+GSN	-	-	Ø	Ø
AT+CIMI	+	+	Ø	Ø
Commands for call control				
ATD	±	Ø	Ø	Ø
ATD*99#	+	Ø	Ø	Ø



ATD*98#	+	Ø	Ø	Ø
ATH	-	Ø	Ø	Ø
ATA	+	Ø	Ø	Ø
ATS0	Ø	Ø	-	-
ATS7	Ø	Ø	-	-
AT+CRLP	Ø	-	-	-
AT+CBST	Ø	-	-	-
+++	-	Ø	Ø	Ø
ATO	-	Ø	Ø	Ø
AT+CHUP	-	-	Ø	Ø
AT+CR	Ø	+	+	+
AT+CRC	Ø	-	-	-
AT+VTS	Ø	Ø	Ø	-
AT+CLIP	Ø	+	+	+
AT+CPAS	-	-	Ø	Ø
AT^VOLRING	Ø	-	-	-
AT+CLCC	+	+	Ø	Ø
Commands for network services				
AT+COPN	+	+	Ø	Ø
AT+COPS	Ø	-	±	±
AT+CREG	Ø	-	-	-
AT+CSQ	-	-	Ø	Ø
AT^SMONC	+	+	Ø	Ø
AT^SMOND	+	+	Ø	Ø
AT^MONI	-	-	Ø	-
AT^MONP	-	-	Ø	-
AT^SMONG	+	+	Ø	+
AT^SPLM	+	+	Ø	Ø
AT+CPOL	Ø	+	+	+
AT^SPLR	Ø	+	Ø	+
AT^SPLW	Ø	+	Ø	+



AT+CNUM	+	+	Ø	Ø
AT^FREQLOCK	Ø	+	+	+
AT^NTCT	Ø	+	+	+
AT^NWTIME	Ø	Ø	+	Ø
Commands for data services				
AT+CGACT	Ø	+	+	+
AT+CGATT	Ø	+	+	+
AT+CGREP	Ø	+	+	+
AT+CGDATA	Ø	+	Ø	+
AT+CGDCONT	Ø	+	+	+
AT+CGPADDR	Ø	+	Ø	+
AT+CGQMIN	Ø	+	+	+
AT+CGQREQ	Ø	+	+	+
AT+CGREG	Ø	+	+	+
AT+CGSMS	Ø	+	+	+
Commands for Internet services				
AT^SICS	Ø	-	-	-
AT^SICI	Ø	-	-	-
AT^SISS	Ø	-	-	-
AT^SISI	Ø	-	-	-
AT^SISO	Ø	-	-	+
AT^SISC	Ø	-	Ø	+
AT^SISR	Ø	-	Ø	+
AT^SISW	Ø	-	Ø	+
AT^IOMODE	Ø	-	-	-
AT^IPENTRANS	Ø	Ø	Ø	+
AT^IPCFL	Ø	Ø	-	-
AT^FTPCMD	Ø	-	Ø	+
AT^HTTPCMD	Ø	+	Ø	+
AT^IPDATAPUSH	Ø	+	Ø	+



Commands for short messages				
AT+CMGD	Ø	+	Ø	+
AT+CMGF	Ø	-	-	-
AT+CMGL	+	+	Ø	+
AT+CMGR	Ø	+	Ø	+
AT+CMGS	Ø	+	Ø	+
AT+CMGW	+	+	Ø	+
AT+CMSS	Ø	+	Ø	+
AT+CNMI	Ø	+	+	+
AT+CPMS	Ø	+	+	+
AT+CSCA	Ø	+	+	+
AT+CSCB	Ø	+	+	+
AT+CSMP	Ø	+	+	+
AT+CSMS	Ø	+	+	+
AT+CNMA	+	+	Ø	+
AT^HCMGL	Ø	+	Ø	+
Commands for STK Interface				
AT^STSF	Ø	+	+	+
AT^STGI	Ø	+	+	+
AT^STGR	Ø	+	+	+
Command related to the SIM card				
AT+CRSM	Ø	+	Ø	+
AT^ICCID	Ø	Ø	+	Ø
AT+CCID	+	+	+	Ø
Commands for the phone book				
AT+CPBR	Ø	+	Ø	+
AT+CPBS	Ø	+	+	+
AT+CPBW	Ø	+	Ø	+
Commands for Unstructured Supplementary Service Data				
AT+CUSD	Ø	+	+	+



Commands related to the hardware				
AT+CALA	Ø	-	-	-
AT+CCLK	Ø	-	-	-
Commands for audio control				
AT^SWSPATH	-	-	-	-
AT+CMIC	-	-	-	-
AT^ECHO	-	-	-	-
AT+CLVL	-	-	-	-
AT+CMUT	-	-	-	-
AT^STN	Ø	-	-	-
AT^AUDREC	Ø	-	-	-
AT^RECCFG	Ø	-	-	-
AT^FILEREAD	Ø	-	Ø	-
AT^FILEDEL	Ø	-	Ø	-
AT^AUDIOCFG	Ø	-	-	-
AT^KEYTONE	Ø	-	Ø	-
AT^ECHOPARA	Ø	-	-	-
AT^FILEIO	Ø	-	Ø	-
Other commands				
ATA/	-	Ø	Ø	Ø
ATS3	Ø	Ø	-	-
ATS4	Ø	Ø	-	-
ATS5	Ø	Ø	-	-
AT^VOLT	Ø	Ø	-	Ø
AT^CHIPTMP	Ø	Ø	-	Ø
AT^TTSCFG	Ø	-	-	-
AT^TTS	Ø	-	Ø	-



19.2 List of URC Commands

Table 19-2 List of URC commands

AT Command	URC
Commands for configuration	
AT+CFUN	^SYSSTART
AT+CFUN	^SYSSTART CHARGE ONLY MODE
AT^SMSO	^SHUTDOWN
Commands for status control	
AT+CMER	+CIEV: <indDescr>, <indValue>1[, <indValue>2]
AT^SIND	+CIEV: <indDescr>, <indValue>
AT^SIND	+CIEV: <indDescr>, <nitzUT>, <nitzTZ>, <nitzDST>
Commands for call control	
AT+CRC	RING
AT+CRC	+CRING: <type>
Commands for Call Status	
^ORIG	^ORIG:<call_x>,<call_type>
^CONF	^CONF:<call_x>
^CONN	^CONN: <call_x>,<call_type>
^CEND	^CEND: <call_x>,<duration>,<end_status>[,<cc_cause>]
AT^TTS	^AUDEND: <end_type>,<end_cause>
AT^AUDREC	^AUDEND: <end_type>,<end_cause>[,<len>]
Commands for network services	
AT+CREG	+CREG: <stat>
AT+CREG	+CREG: <stat>[, <lac>, <ci>]
^NWTIME	^NWTIME: <date>,<time>,<dt>
Commands for Internet services	
AT^SISO	^SISW: <srvProfileId>, <urcCauseId>
AT^SISR	^SISR: <srvProfileId>, <urcCauseId>
AT^SISW	^SISW: <srvProfileId>, <urcCauseId>
^SIS	^SIS: <srvProfileId>, <urcCause>[, [<urcInfoId>][, <urcInfoText>]]

Commands for data services	
AT+CGEREP	+CGEV: REJECT <PDP_type>, <PDP_addr>
AT+CGEREP	+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]
AT+CGEREP	+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]
AT+CGEREP	+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]
AT+CGEREP	+CGEV: NW DETACH
AT+CGEREP	+CGEV: ME DETACH
AT+CGEREP	+CGEV: NW CLASS <class>
AT+CGEREP	+CGEV: ME CLASS <class>
AT+CGREG	+CGREG: <stat>
Commands for short messages	
AT+CNMI	+CMTI: <mem3>, <index>
AT+CNMI	+CMT: <length><CR><LF><pdu>
AT+CNMI	+CBM: <length><CR><LF><pdu>
AT+CNMI	+CDS: <length><CR><LF><pdu>
Commands related to the hardware	
AT+CALA	+CALA: [<text>]
AT+CALA	^SYSSTART ALARM MODE +CALA: <text>

19.3 List of CME/CMS ERROR Codes

Table 19-3 Common "CME ERROR" codes

<err> Code	Text (AT+CMEE=2)
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



<err> Code	Text (AT+CMEE=2)
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
99	No text information is available currently.

<err> Code	Text (AT+CMEE=2)
100	Unknown
101	PUK1 blocked
102	PUK2 blocked
132	Service option not supported
133	Requested service option not subscribed
134	Service option temporarily out of order

Table 19-4 "CME ERROR" codes related to the GPRS

<err> Code	Text (AT+CMEE=2)
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
148	Unspecified GPRS error
149	PDP authentication failure
150	Invalid mobile class

Table 19-5 "CMS ERROR" codes related to the SMS

<err> Code	Text (AT+CMEE=2) (Not Supported Currently)
0...127	3GPP TS 24.011 clause E.2 values
128...255	3GPP TS 23.040 clause 9.2.3.22 values
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



<err> Code	Text (AT+CMEE=2) (Not Supported Currently)
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network service
332	Network timeout
340	NO +CNMA ACK EXPECTED
500	Unknown error

Table 19-6 "CME ERROR" codes related to the MG323/MG323-B only

<err> Code	Text (AT+CMEE=2)
615	Network failure
616	Network is down
639	Service type not yet available
640	Operation of service temporary not allowed
764	Missing input value
765	Invalid input value
767	Operation failed



19.4 How to Use the MG323/MG323-B's Transparent Transmission Function

19.4.1 Function Description

Transparent transmission involves no data compression or conversion, enabling direct data transmission at the TCP/UDP layer and simplifying the operations for transmitting data. Users can configure the parameters for transparent transmission according to the application scenarios. The transparent transmission can neither replace or simplify the procedures of activating GPRS PDP and establishing socket connections nor increase the data transmission rate.

19.4.2 Function Usage and Precautions

The MG323-B/MG323-B's transparent transmission function is developed and improved based on Huawei's existing transparent transmission solutions, providing two AT commands: one for configuring transparent transmission parameters; the other for enabling transparent transmission mode.

19.4.3 Configuring Transparent Transmission Parameters

Users can use the Set command `AT+IPCFL=<parameter_id>,<value>` to configure transparent transmission parameters and the Read command `AT+IPCFL?` to read the current transparent transmission parameters.

Currently, the following modes are supported by the transparent transmission parameters:

- Triggered by the timer (<parameter_id>=5. <value> ranges from 1 to 100 seconds, and <value>=10 by default.)
- Triggered by the length of entered data (<parameter_id>=10. <value> ranges from 1 to 1460 bytes, and <value>=1024 by default)

Example:

```
AT+IPCFL=1,30
```

```
ERROR
```

```
AT+IPCFL=5,30
```

```
OK
```

```
AT+IPCFL=10,100
```

```
OK
```

```
AT+IPCFL?
```

```
+IPCFL: 5,30
```

```
+IPCFL: 10,100
```

```
OK
```

Notes:

- If parameters are set incorrectly, ERROR will be returned.
- Set different timer and data length threshold for different application scenarios. To ensure proper transparent transmission, the following settings are recommended:
For scenarios where high real-time performance is required, set the timer or data length threshold to a smaller value.
For scenarios where large amount of data is transmitted and lower real-time performance is required, set the timer or data length threshold to a larger value.

Enabling Transparent Transmission Mode

Before using the transparent transmission function, run the AT^SICS, AT^SISS and AT^SISO commands to establish a link and set the module as a client or server. Then, run the AT^IPENTRANS=<srvProfileId> command to enable transparent transmission mode. If OK is returned in response to the AT^IPENTRANS=<srvProfileId> command, data can be directly transmitted between the module and the other end of the link. To exit transparent transmission mode after data transmission, enter +++.

Example:

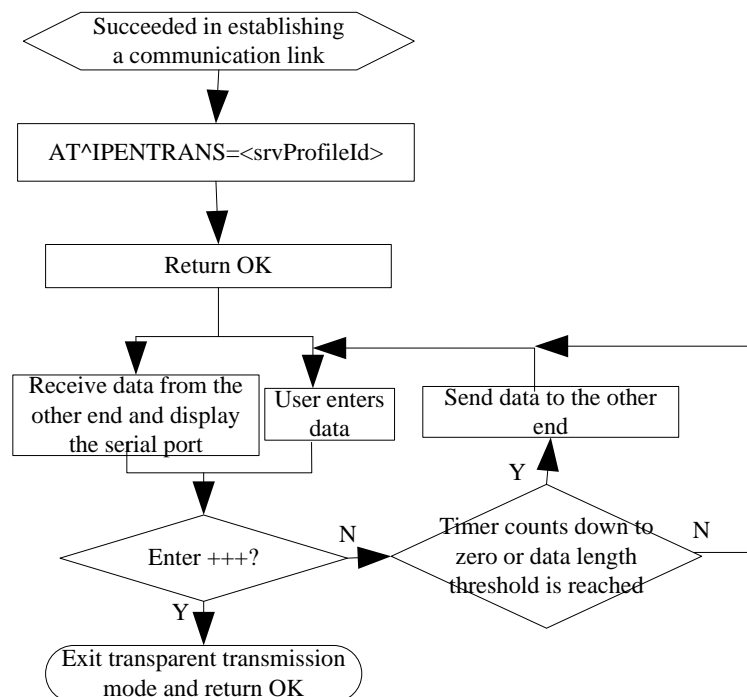
AT^IPENTRANS=0

OK

1234ABCD

OK

Flowchart:



Notes:

- The transparent transmission function supports TCP and UDP.
- Before entering transparent transmission mode, if the entered link number is incorrect, ERROR is returned, and transparent transmission mode cannot be enabled.
- Transmitted data is not displayed but received data is displayed on the serial port.
- The "+++" string for exiting transparent transmission mode must meet the following requirements:
 - No data is entered 900 ms before and after +++ is entered.
 - After a plus sign (+) is entered, the next plus signs must be entered within 900 ms.
- After exiting transparent transmission mode using +++, OK is returned. +++ will not be transmitted to the other end.
- If you use +++ to exit transparent transmission mode when data is being sent, the module continues to send data in the buffer.
- In transparent transmission mode, all entries except +++ will be sent, including common control commands such as the Enter and Esc keys.
- If the link is disconnected during transparent transmission, the module will return ERROR and exit transparent transmission mode.

19.5 Acronyms and Abbreviations

Table 19-7 Acronyms and abbreviations

Acronym and Abbreviation	Full Spelling
3GPP	Third Generation Partnership Project
APN	Access Point Name
ARFCN	Absolute Frequency Channel Number
BCC	Base station Color Code
BCCH	Broadcast Control Channel
BER	Bit Error Rate
CDMA	Code Division Multiple Access
CS	Circuit Switched (CS) domain
CUG	Closed User Group
DCE	Data Circuit Equipment
DCS	Data Coding Scheme
DTE	Data Terminal Equipment
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IMEI	International Mobile Equipment Identity



Acronym and Abbreviation	Full Spelling
IMSI	International Mobile Subscriber Identity
IP	internet Protocol
ITU-T	International Telecommunication Union-Telecommunication Standardization Sector
MCC	Mobile Country Code
ME	Mobile Equipment
MNC	Mobile Network Code
MS	Mobile Station
MSIN	Mobile Station Identification Number
MSISDN	Mobile Station International ISDN Number
MT	Mobile Terminal
NCC	Network Color Code
NOM	Network Operation Mode
PAT	Priority Access Threshold
PBCCH	Packet Broadcast Control Channel
PD	Position Determination
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PUK	PIN Unblocking Key
PS	Packet Switched (PS) domain
QoS	Quality of Service
RAC	Routing Area Code
RPLMN	Registered PLMN
RSSI	Receive Signal Strength Indicator
SCA	Service Center Address
SDU	Service Data Unit
SIM	GSM Subscriber Identity Module
SM	Short Message



Acronym and Abbreviation	Full Spelling
SMS	Short Message Service
SMSC	Short Message Service Center
SNDCP	Subnetwork Dependent Convergence Protocol
TA	Timing Advance Value
TA	Terminal Adapter
TE	Terminal Equipment
TPDU	Transfer Protocol Data Unit
TCH	Traffic Channel
UIM	User Identity Module
URC	Unsolicited Result Code
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
VP	Validity Period
XCD	Carrier Detection Signal
XER	DTE Ready Signal
WCDMA	Wideband CDMA

19.6 List of Reference

- [1] 3GPP TS 27.005 320
- [2] 3GPP TS 27.007 3d0
- [3] ITU-T V.250
- [4] 3GPP TS 23.038
- [5] GSM 03.38
- [6] ISO/IEC10646
- [7] GSM 22.101
- [8] GSM 05.08
- [9] 3GPP TS 05.08
- [10] 3GPP TS 44.065
- [11] 3GPP TS 25.323
- [12] 3GPP TS 23.040



- [13] 3GPP TS 23.041
- [14] GSM 07.05 Phase 2
- [15] GSM 07.05 Phase 2+
- [16] GSM 03.40
- [17] GSM 03.41
- [18] 3GPP TS 24.011
- [19] GSM 04.08