HUAWEI

Huawei GTM900 Wireless Module

AT Command Reference

V100R001

Huawei GTM900 Wireless Module

AT Command Reference

Manual Version	T2-031915-20060613-C-1.11
Product Version	V100R001
BOM	31190315

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Summary of Updates

This section provides the update history of this manual and introduces the contents of subsequent updates.

Update History

This manual is updated for a major product version to maintain consistency with system hardware or software versions and to incorporate customer suggestions.

Manual Version	Notes
T2-031915-2005320-C-1.10	Initial field trial release
T2-031915-20051020-C-1.11	Update version,the content was modified.

Updates of Contents

Chapter 7 TCPIP AT Commands describes the TCPIP AT commands.

About This Manual

Release Notes

The product version that corresponds to the manual is GTM900 V100R001.

Related Manuals

The manuals related to Huawei GTM900 Wireless Module are introduced in the table below:

Manual name	Description
Huawei GTM900 Wireless Module Product Description	Introduces Huawei GTM900 Wireless Module in terms of specifications and interface signals
Huawei GTM900 Wireless Module AT Command Reference	Describes the AT commands related to Huawei GTM900 Wireless Module

Organization

The manual consists of eight chapters.

Chapter 1 Overview gives a introduction to AT commands.

Chapter 2 Standardized AT Command Specified by GSM Rec.07.07 describes the standardized AT command specified by GSM Rec. 07.07.

Chapter 3 Commands Specified by ITU-T Rec. V25ter as Referenced by GSM Rec.07.07 describes the AT Commands specified by ITU-T Rec. V25ter as referenced by GSM Rec. 07.07.

Chapter 4 Standardized GPRS AT Commands describes the standardized GPRS AT commands.

Chapter 5 Commands Specified by GSM Rec.07.05 describes the AT commands specified by GSM Rec.07.05.

Chapter 6 Enhanced AT Commands describes the Enhanced AT command.

Chapter 7 TCPIP AT Commands describes the TCPIP AT commands.

Intended Audience

The manual is intended for the following readers:

- Developers of wireless terminals

Conventions

The manual uses the following conventions:

I. General conventions

Convention	Description
Arial	Normal paragraphs are in Arial.
Arial Narrow	Warnings, Cautions, Notes and Tips are in Arial Narrow.
Boldface	Headings are in **Boldface**.
Terminal Display	Terminal Display is in Courier New; message input by the user via the terminal is in boldface.

II. Symbols

Eye-catching symbols are also used in the manual to highlight the points worthy of special attention during the operation. They are defined as follows:

⚠ **Caution** : Means reader be extremely careful during the operation.

🕮 **Note**: Means a complementary description.

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Chapter 1 Overview

1.1 About This Chapter

This chapter gives a introduction to AT commands, including:

- Introduction
- AT Command Type
- AT Command Syntax

1.2 Introduction

Throughout the document, the GSM engines are referred to as ME (Mobile Equipment), MS (Mobile Station), TA (Terminal Adapter), DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board).

To operate your GSM engine you can simply send AT Commands via its serial interface. The operating device at the other end of the serial line is referred to as TE (Terminal Equipment), DTE (Data Terminal Equipment) or plainly the application. (probably running on an embedded system). This abstract structure can be figure out as:

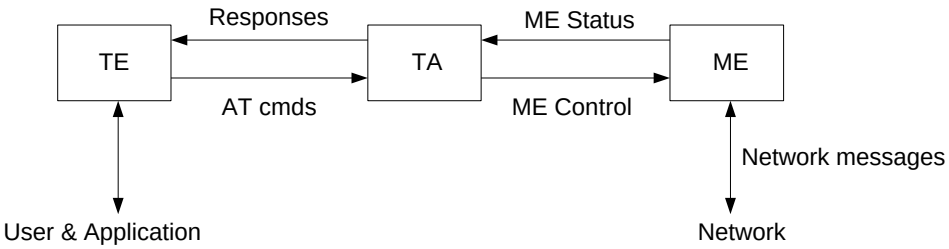

Figure 1-1 System structure overview

1.3 AT Command Type

This clause summarizes general aspects on AT commands and issues related to them. For further information, refer to ITU-T Recommendation V.25ter [14].

The “AT” or “at” prefix must be set at the beginning of each command line. The <CR> is used to terminate a command line.

Usually there are four types of AT commands, as shown in Table 1-1.

Table 1-1 AT command Type

Type	Description	Example
Set command	This command is used to set user-definable parameter values.	AT+CXXX=<…..>
Test command	This command is used to list the parameters and value ranges set with the corresponding Set commands or by internal processes.	AT+CXXX=?
Read command	This command returns the current set value of the parameters.	AT+CXXX?
Execution command	This command reads non-variable parameters affected by internal processes in the GSM engine.	AT+CXXX

1.4 AT Command Syntax

- Default values are enclosed in square brackets.
- To ensure the correct sequence of optional and mandatory parameters, a comma must be kept for each omitted parameter that is followed by further parameters.

Example: AT+CPWD=<fac>,<oldpwd>,<newpwd>

This command sets a new password for the facility lock function defined by command Facility Lock+CLCK.

- If the parameter is a character string, such as <number>, the string must be enclosed in quotation marks. For example, “12345”. “cmnet”. Symbols within quotation marks will be recognized as strings.
- Optional subparameter of a command or an optional part of TA information response is enclosed in square brackets.
- All spaces will be ignored when using strings without quotation marks.
- In practice, it is unnecessary to enter <> or [].
- All AT commands are not case sensitive, but the respective parameters are sensitive to cases.

Chapter 2 Standardized AT Command Specified by GSM Rec. 07.07

2.1 About This Chapter

This chapter describes the standardized AT command specified by GSM Rec. 07.07, including:

- General Commands
- Call Control Command
- Network Service Related Command
- ME Control and Status Commands
- ME Error
- Commands from TIA IS-101

2.2 General Commands

2.2.1 Request Manufacturer Identification: AT+CGMI

Table 2-1 AT+CGMI action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CGMI	HUAWEI OK	TA returns manufacturer identification text.
Test command	AT+CGMI=?	OK	--

Reference:

- GSM 07.07
- 3.2.5 TA Manufacturer ID: AT+GMI

2.2.2 Request Model Identification: AT+CGMM

Table 2-2 AT+CGMM action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CGMM	GTM900X OK	TA returns product model identification text.'X' is one character of {A,B,C}.

Type	Command	Possible response(s)	Description
Test command	AT+CGMM=?	OK	--

Reference:

- GSM 07.07
- 3.2.6 TA Model Identification: AT+GMM

2.2.3 Request Revision Identification: AT+CGMR

Table 2-3 AT+CGMR action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CGMR	HW REVISION: X SW REVISION: XX.YYY OK	TA returns product firmware version identification text. XX.YYY--variant of software release
Test command	AT+CGMR=?	OK	--

Reference:

- GSM 07.07
- 3.2.7 TA Revision Number: AT+GMR

2.2.4 Request Product Serial Number Identification: AT+CGSN

Table 2-4 AT+CGSN action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CGSN	<SN> OK	TA returns identification text for determination of individual ME.
Test command	AT+CGSN=?	OK	--

Table 2-5 Parameter description

Parameter	Description
<SN>	Product serial number

Reference:

- GSM 07.07
- 3.2.8 Request TA serial Number: AT+GSN

2.2.5 Select TE Character Set: AT+CSCS

Set command informs TA which character set <chset> is used by the TE. TA is then able to convert character strings correctly between TE and ME character sets.

Table 2-6 AT+CSCS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSCS=<chset>	OK	--
Read command	AT+CSCS?	+CSCS: <chset> OK	--
Test command	AT+CSCS=?	+CSCS: (list of supported <chset>s) OK	--

Table 2-7 Parameter description

Parameter	Value	Description
<chset>	"GSM"	GSM default alphabet (GSM 03.38 subclause 6.2.1);
	["IRA"]	International reference alphabet (ITU-T T.50[13])
	"PCCP437"	PC character set Code Page 437
	"PCDN"	PC Danish/Norwegian character set
	"8859-*1*"	ISO 8859 Latin *1* character set
	"HEX"	Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "052FE6" equals three 8-bit characters with decimal values 5, 47 and 230; no conversions to the original ME character set shall be done.
	"UCS2"	16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004200620063" equals three 16-bit characters with decimal values 66, 98 and 99, $(AT R97)$

Reference:

- GSM 07.07

2.2.6 Request International Mobile Subscriber Identity: AT+CIMI

Execution command causes TA to return <IMSI>, which is intended to permit the TE to identify the individual SIM which is attached to ME.

Table 2-8 AT+CIMI action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CIMI	<IMSI> OK	--
Test command	AT+CIMI=?	OK	--

Table 2-9 Parameter description

Parameter	Description
<IMSI>	IMSI (International Mobile Subscriber Identity), string without double quotes

Reference:

- GSM 07.07

2.2.7 Select Wireless Network: AT+WS46

Table 2-10 AT+WS46 action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+WS46=[<n>]	OK	If set successful
		ERROR/+CME ERROR	If failed
Read command	AT+WS46?	+WS46: <n> OK	--
Test command	AT+ WS46=?	+WS46: (list of supported <n>s) OK	--

Table 2-11 Parameter description

Parameter	Value	Description
<n>	12	GSM digital cellular

Reference:

- GSM 07.07

2.3 Call Control Command

2.3.1 Select Type of Address: AT+CSTA

Set command selects the type of number for further dialing commands (D) according to GSM specifications.

Test command returns values supported by the TA as a compound value.

Table 2-12 AT+CSTA action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSTA=[<type>]	OK	--
Read command	AT+CSTA?	+CSTA: <type> OK	--
Test command	AT+CSTA=?	+CSTA: (list of supported <type>s) OK	--

Table 2-13 Parameter description

Parameter	Value	Description
<type> type of address octet in integer format	145	When dialing string includes international access code character"+"
	[129]	Default
	Others	See 10.5.4.7 in “GSM 04.08 [8]”

Reference:

- GSM 07.07
- GSM 04.08 [8] subclause 10.5.4.7

2.3.2 Mobile Originated Call to a Number: ATD

Execution command can be used to set up outgoing voice, data or fax calls. It also serves to control supplementary services.

This command may be aborted generally when receiving an ATH command during execution. Abortion is not possible during some states of connection setup such as handshaking.

Note:

The current states of all calls can be easily checked at any time by using the AT+CLCC command.

Table 2-14 ATD action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATD[<dial_string>][;]	+CME ERROR: <err>	This error depends on ME functions.
		BUSY	If busy (parameter setting ATX3)
		NO CARRIER	If a connection cannot be set up.
		CONNECT<text>	If successfully connected and non-voice call, TA switches to data state. Note: <text> output only if ATX parameter setting with value > 0.
		OK	The first OK indicated the ATD Command executed successful. And TA returns to command mode.
		OK	The second OK will return if successfully connected a voice call.

Table 2-15 Parameter description

Parameter	Description
<dial_string>	String of dialing digits and optionally V.25ter modifiers (dialing digits): 0-9, * , #, +, A, B, C V.25ter modifiers: these are ignored: ,(comma), T, P, !, W, @
	If for emergency call, standardized emergency number 112 (no SIM needed)
[;]	Only required to set up voice calls. TA remains in command mode.

Example:

ATD02150991234;

OK

OK

ATH

OK

ATD02150991234;

OK

NO CARRIER

Reference:

- GSM 07.07
- GSM 02.07 Annex A
- V.25 ter

2.3.3 Originating Call to Phone Number in Memory Which Corresponding Alphanumeric Field is <str>: ATD><str>[I][G]

Execution command searches the active phonebook for a given string <str> and dials the corresponding phone number if the entry exists. The active phonebook is the one set with AT command AT+CPBS.

TA attempts to set up an outgoing call to stored number.

Abortion is not possible during some states of connection setup such as handshaking.

Table 2-16 ATD><str>[I][G] action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATD><str>[I][G][;]	+CME ERROR: <err>	If error is related to ME functionality

Type	Command	Possible response(s)	Description
		BUSY	If busy (parameter setting ATX3)
		NO CARRIER	If a connection cannot be set up
		OK	The first OK indicate t the ATD Command executed successful. And TA returns to command mode.
		OK	The second OK will return if successfully connected a voice call.

Table 2-17 Parameter description

Parameter	Description
<str>	String type value, which should equal an alphanumeric field in at least one phonebook entry in the searched memories; used character set should be the one selected with AT+CSCS <str> must be enclosed in quotation marks (""), if escape sequences or parameter [I] or [G] are used or if the alphanumeric strings contains a blank. If not, quotation marks are optional.
[I]	Override the CLIR(Calling line identification restriction) supplementary service subscription default value for this call; I=invocation (disables presentation of own phone number to called party) and i=suppression (enables presentation of own phone number to called party); refer subclause "AT+CLIR Calling line identification restriction"
[G]	Control the CUG supplementary service information for this call; uses index and info values set with command AT+CCUG; G = Activates Closed User Group invocation for this call only. g = Deactivates Closed User Group invocation for this call only. refer subclause "AT+CCUG Closed user group"
[;]	The semicolon is mandatory since dialing from a phonebook is only supported for voice calls

Example:

ATD>”JACK”;

OK

OK

ATH

OK

ATD>”TOM”;

ERROR

Reference:

- GSM 07.07
- V.25 ter
- 2.3.4 Originate Call to Phone Number in Memory Mem Entry location<n>: ATD>mem<n>[I][G][;]

2.3.4 Originate Call to Phone Number in Memory Mem Entry location<n>: ATD>mem<n>[I][G][;]

Execution command allows you to dial a phone number from a given phonebook. To initiate a call, enter a two letter abbreviation for the phonebook <mem>, followed by the memory location <n> of the desired entry. The location range of each phonebook can be queried with AT+CPBR.

TA attempts to set up an outgoing call to the specified number.

Abortion is not possible during some states of connection setup such as handshaking.

🕮 **Note:**

- There is no <mem> for emergency call.
- The command is not applicable to data calls. Any attempt to dial a data call number from <mem> causes the result code “NO CARRIER” to appear.
- Parameter [I] or [G] only if no *# code is within the dial string.
- *# codes sent with ATD are treated as voice calls. Therefore, the command must be terminated with a semicolon.
- See ATX command in Chapter 3 Commands Specified by ITU-T Rec. V25ter as Referenced by GSM Rec. 07.07 for setting result code and call monitoring parameters.
- See also .ATD Mobile originated call to a number.

Table 2-18 ATD>mem<n>[I][G] action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATD>mem<n>[I][G][;]	+CME ERROR: <err>	If error is related to ME functionality
		BUSY	If busy (parameter setting ATX3)

Type	Command	Possible response(s)	Description
		NO CARRIER	If connection cannot be set up
		OK	The first OK indicated the ATD Command executed successful. And TA returns to command mode.
		OK	The second OK will return If successfully connected a voice call.

Table 2-19 Parameter description

Parameter	Value	Description
<mem> phonebook	“MT”	Combined ME and SIM phonebook (storage depending on SIM card) In fact no ME phonebook in GTM900
	“FD”	SIM fixdialing phonebook (storage depending on SIM card)
	“”DC”	Last-dialing-phonebook (list of most recently dialed numbers. Depending on the SIM card, the storage is located either on the SIM card only or shared by SIM and ME).
	“MC”	ME missed (unanswered received) calls list
	“RC”	Received calls list
	“ON”	Own numbers (MSISDNs) list. Storage depending on SIM card.
<n>	--	Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by AT+CPBR.
[I]	--	Override the CLIR(Calling line identification restriction) supplementary service subscription default value for this call; I=invocation (disables presentation of own phone number to called party) and i=suppression (enables presentation of own phone number to called party); refer subclause "AT+CLIR Calling line identification restriction"

Parameter	Value	Description
[G]	--	Control the CUG supplementary service information for this call; uses index and info values set with command AT+CCUG; G = Activates Closed User Group invocation for this call only. g = Deactivates Closed User Group invocation for this call only. Refer subclause "AT+CCUG Closed user group"
[;]	--	The semicolon is mandatory since dialing from a phonebook is only supported for voice calls

Reference:

- GSM 07.07
- V.25 ter

Example:

To query the location number of the phonebook entry.

AT+CPBR=1,xx	**TA returns the entries available in the active phonebook.**

To dial a number from the SIM phonebook, for example the number stored to location 11.

ATD>MT11;

OK

OK

To dial a phone number stored in the last dial memory on the SIM card.

ATD>DC6;

OK

OK

2.3.5 Originate Call to Phone Number in Entry location <n>: ATD><n>[I][G]

Execution command can be used to dial a phone number selected from the active memory. Available memories may be queried with Select Phonebook Storage test command AT+CPBS=? To begin a call simply, enter the memory location of the desired entry. The memory location range of each phonebook can be queried by AT command AT+CPBR.

TA attempts to set up an outgoing call to the specified number.

This command may be aborted generally by receiving a character during execution. Abortion is not possible during some states of connection setup such as handshaking.

Table 2-20 ATD><n>[I][G] action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATD>n[I][G][;]	+CME ERROR: <err>	If error is related to ME functionality
		BUSY	If busy (parameter setting ATX3)
		NO CARRIER	If connection cannot be set up
		OK	The first OK indicate t the ATD Command executed successful. And TA returns to command mode.
		OK	The second OK will return If successfully connected a voice call.

Table 2-21 Parameter description

Parameter	Description
<n>	Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by AT+CPBR.
[I]	Override the CLIR(Calling line identification restriction) supplementary service subscription default value for this call; I=invocation (disables presentation of own phone number to called party) and i=suppression (enables presentation of own phone number to called party); refer subclause "AT+CLIR Calling line identification restriction"
[G]	Control the CUG supplementary service information for this call; uses index and info values set with command AT+CCUG; G = Activates Closed User Group invocation for this call only. g = Deactivates Closed User Group invocation for this call only. Refer subclause "AT+CCUG Closed user group"
[;]	The semicolon is mandatory since dialing from a phonebook is only supported for voice calls

Example:

ATD>1;

OK

OK

ATH

OK

ATD>”DC”5;

ERROR

Reference:

- GSM 07.07
- V.25 ter
- 2.3.4 Originate Call to Phone Number in Memory Mem Entry location<n>: ATD>mem<n>[I][G][;]

2.3.6 Redial last number: ATDL[;]

This command redials last number used by ATD.

Table 2-22 ATDL action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATDL[;]	ERROR / +CME ERROR	If there is no last number or number is not valid
		BUSY	If busy (parameter setting ATX3)
		NO CARRIER	If a connection cannot be set up
		CONNECT<text>	If successfully connected and non-voice call, TA switches to data state. Note: <text> output only if +ATX parameter setting with value > 0.
		OK	The first OK indicate t the ATD Command executed successful. And TA returns to command mode.
		OK	The second OK will return ,If successfully connected and voice call,

2.3.7 Call Mode: AT+CMOD

Set command selects the call mode of further dialling commands (ATD) or for next answering command (ATA). Mode can be either single or alternating (refer to GSM bearer and teleservices that can incorporate more than one basic service (voice, data, fax) within one call)). When single mode is selected the call originating and hang up procedures are similar to procedures specified in ITU-T Recommendations V.25ter [14].

Read command returns current <mode> values.

Test command returns values supported by the TA as a compound value.

Note:

AT+CMOD is set to zero after a successfully completed alternating mode call. It is set to zero also after a failed answering. The power-up, factory (&F) and user resets (Z) shall set the value to zero.

Table 2-23 AT+CMOD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMOD=[<mode>]	+CME ERROR: <err>	If error is related to ME functionality
		OK	If successfully set
Read command	AT+CMOD?	+CMOD: <mode>	--
Test command	AT+CMOD=?	+CMOD: (list of supported <mode>s)	--

Table 2-24 Parameter description

Parameter	Value	Description
<mode>	[0]	Single mode
	1	Alternating voice/fax (teleservice 61)
	2	Alternating voice/data (bearer service 61)
	3	Voice followed by data (bearer service 81)

Reference:

- GSM 07.07

2.3.8 Hang Up Call: AT+CHUP

Table 2-25 AT+CHUP action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CHUP	OK	Cancel the active call or held call
		ERROR	If failed
Test command	AT+CHUP=?	OK	--

Reference:

- GSM 07.07

Note:

This command implements the same behave as ATH.

2.3.9 Select Bearer Service Type: AT+CBST

Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated (refer GSM 02.02 [1]). Values may also be used during mobile terminated data call setup, especially in case of single numbering scheme calls (refer AT+CSNS).

Test command returns values supported by the TA as compound values.

Table 2-26 AT+CBST action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CBST=[<speed>[,<name>[,<ce>]]]	OK	--
Read command	AT+CBST?	+CBST: <speed>,<name>,<ce> OK	--
Test command	AT+CBST=?	+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s) OK	--

Table 2-27 Parameter description

Parameter	Value	Description
<speed>	0	Autobauding
	1	300 bps (V.21)
	2	1200 bps (V.22)
	3	1200/75 bps (V.23)
	4	2400 bps (V.22bis)
	5	2400 bps (V.26ter)
	6	4800 bps (V.25)
	[7]	9600 bps (V.25)
	12	9600 bps (V.34)
	14	14400 bps (V.34)
	65	300 bps (V.110)
	66	1200 bps (V.110)
	68	2400 bps (V.110 or X.31 flag stuffing)
	70	4800 bps (V.110 or X.31 flag stuffing)
	71	9600 bps (V.110 or X.31 flag stuffing)
	75	14400 bps (V.110 or X.31 flag stuffing)
<name>	0	Data circuit asynchronous (UDI or 3.1 kHz modem)
	1	Data circuit synchronous (UDI or 3.1 kHz modem)
<ce>	0	Transparent
	[1]	Non-transparent
	2	Both, transparent preferred
	3	Both, non-transparent preferred

Reference:

- GSM 07.07

2.3.10 Radio Link Protocol: AT+CRLP

Set command may be used when non-transparent data calls are originated.

Read command return current settings for the supported RLP version 1.

Table 2-28 AT+CRLP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>]]]]	OK	--
Read command	AT+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2> OK	--
Test command	AT+CRLP=?	+CRLP: (list of supported <iws>s),(list of supported <mws>s), (list of supported <T1>s),(list of supported <N2>s) OK	--

Table 2-29 Parameter description

Parameter	Value	Description
<iws>	0~[61]	Interworking window size (IWF to MS)
<mws>	0~[61]	Mobile window size (MS to IWF)
<T1>	39~[48]-255	Acknowledgement timer
<N2>	1~[6]-255	Re-transmission attempts N2

Reference:

- GSM 07.07

2.3.11 Service Reporting Control: AT+CR

Set command controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE. If enabled, the intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before the intermediate result code CONNECT is transmitted.

Note:

This command replaces V.25ter [14] command Modulation Reporting Control +MR, which is not appropriate for use in the GSM network. Possible error control (other than radio link protocol) and data compression reporting can be enabled with V.25ter commands Error Control Reporting +ER and Data Compression Reporting+DR.

Table 2-30 AT+CR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CR=[<mode>]	OK	--
Read command	AT+CR?	+CR: <mode> OK	--
Test command	AT+CR=?	+CR: (list of supported <mode>s) OK	--

Table 2-31 Parameter description

Parameter	Value	Description
<mode>	[0]	Disables reporting
	1	Enables reporting

Reference:

- GSM 07.07

2.3.12 Extended Error Report: AT+CEER

Execution command causes the TA to return one or more lines of information text <report>, determined by the ME manufacturer, which should offer the user of the TA an extended report of the reason for:

- the failure in the last unsuccessful call setup (originating or answering) or in-call modification
- the last call release
- the last unsuccessful GPRS attach or unsuccessful PDP context activation
- the last GPRS detach or PDP context deactivation

Table 2-32 AT+CEER action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CEER	+CEER: <report> OK	--
Test command	AT+CEER=?	OK	--

Table 2-33 Parameter description

Parameter	Description
<report>	Including line terminators, in the information text shall not exceed 2041 characters. Text shall not contain the sequence O<CR> or OK<CR>.

Reference:

- GSM 07.07

2.3.13 Cellular Result Codes: AT+CRC

Set command controls whether or not the extended format of incoming call indication or GPRS network request for PDP context activation is used. When enabled, an incoming call is indicated to the TE with unsolicited result code+CRING: <type> instead of the normal RING.

Table 2-34 AT+ CRC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CRC=[<mode>]	OK	--
Read command	AT+CRC?	+CRC: <mode> OK	--
Test command	AT+CRC=?	+CRC: (list of supported <mode>s) OK	--

Table 2-35 Parameter description

Parameter	Value	Description
<mode>	[0]	Disables extended format
	1	Enables extended format

Reference:

- GSM 07.07

2.3.14 Single Numbering Scheme: AT+CSNS

Set command selects the bearer or teleservice to be used when mobile terminated single numbering scheme call is established. Parameter values set with +CBST command shall be used when <mode> equals to a data service. If +CBST parameter is set to a value that is not applicable to single numbering calls, ME/TA shall map the value to the closest valid one.

Table 2-36 AT+CSNS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSNS=[<mode>]	OK	--
Read command	AT+CSNS?	+CSNS: <mode> OK	--
Test command	AT+CSNS=?	+CSNS: (list of supported <mode>s) OK	--

Table 2-37 Parameter description

Parameter	Value	Description
<mode>	[0]	Voice
	1	Alternating voice/fax, voice first (TS 61)
	2	Fax (TS 62)
	3	Alternating voice/data, voice first (BS 61)
	4	Data
	5	Alternating voice/fax, fax first (TS 61)
	6	Alternating voice/data, data first (BS 61)
	7	Voice followed by data (BS 81)

Reference:

- GSM 07.07

2.4 Network Service Related Command

2.4.1 Subscriber Number: AT+CNUM

Execution command returns the MSISDNs related to the subscriber (this information can be stored in the SIM or in the ME). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

Table 2-38 AT+CNUM action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CNUM	+CNUM:[<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]][<CR><LF>+CNUM:[<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]][...]] OK	--
		+CME ERROR <err>	If failed
Test command	AT+CNUM=?	OK	--

Table 2-39 Parameter description

Parameter	Value	Description
<alpha*x*>	--	Optional alphanumeric string associated with <number*x*>; used character set should be the one selected with command Select TE Character Set +CSCS
<number*x*>	--	String type phone number of format specified by <type*x*>
<type*x*>	--	Type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)
<speed>	--	Refer AT+CBST
<service> service related to the phone number	0	Asynchronous modem
	1	Synchronous modem
	2	PAD Access (asynchronous)
	3	Packet Access (synchronous)
	4	Voice
	5	Fax
<itc> information transfer capability	0	3.1kHz
	1	UDI

Reference:

- GSM 07.07

2.4.2 Network Registration Info: AT+CREG

Set command controls the presentation of an unsolicited result code+CREG.

Read command returns the current value of <stat>.

Table 2-40 AT+CREG action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CREG=[<n>]	OK	When n=1
Read command	AT+CREG?	+CREG: <n>,<stat> OK	--
		+CME ERROR <err>	If failed
Test command	AT+CREG=?	+CREG: (list of supported <n>s) OK	--

Table 2-41 Parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code +CREG
	2	Enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>])
<stat>	0	Not registered, ME is not currently searching a new operator to register to
	1	Registered, home network
	2	Not registered, but ME is currently searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming

Reference:

- GSM 07.07

2.4.3 Operator Selection: AT+COPS

Set command forces an attempt to select and register the GSM network operator. <mode> is used to select whether the selection is done automatically by the ME or is forced by this command to operator <oper>. If the selected operator is not available, no other operator shall be selected (except <mode>=4). <mode>=2 forces an attempt to deregister from the network. The selected mode affects to all further network registration (e.g. after <mode>=2, ME shall be unregistered until <mode>=0 or 1 is selected).

Table 2-42 AT+COPS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+COPS=[<mode>[,<format>[,<oper>]]]	OK	--
		+CME ERROR: <err>	If error is relate to ME functionality
Read command	AT+COPS?	+COPS: <mode>[,<format>,<oper>] Ok	--
		+CME ERROR: <err>	If error is relate to ME function
Test command	AT+COPS=?	+COPS: [list of supported (<stat>s, long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>)s] [,,(list of supported <mode>s),(list of supported <format>s)] OK	--
		+CME ERROR: <err>	If error is relate to ME function

Table 2-43 Parameter description

Parameter	Value	Description
<mode>	[0]	Automatic (<oper> field is ignored)
	1	Manual (<oper> field shall be present)
	2	Deregister from network
	3	Set only<format> (for read command +COPS?), do not attempt registration/deregistration (<oper> field is ignored); This value is not applicable in read command response
	4	Manual/automatic (<oper> field shall be present); If manual selection fails, automatic mode (<mode>=0) is entered
<format>	[0]	Long format alphanumeric <oper>, up to 16 characters
	1	Short format alphanumeric <oper>, 8 characters
	2	Numeric <oper>
<oper>	--	String type; <format> indicates if the format is alphanumeric or numeric; numeric format is the GSM Location Area Identification number (refer GSM 04.08 [8] subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A [10], plus a two BCD digit network code, which is administration specific
<stat>	0	Unknown
	1	Available
	2	Current
	3	Forbidden

Reference:

- GSM 07.07

2.4.4 Facility Lock: AT+CLCK

Execution command is used to lock, unlock or interrogate a ME or a network facility <fac>. Password is normally needed to do such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>. This command should be abortable when network facilities are set or interrogated.

Table 2-44 AT+CLCK action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	OK	--
		+CLCK: <status>[,<class1>[<CR><LF>+CLCK: <status>,<class2>[...]] OK	When <mode>=2 and command successful
		+CME ERROR <err>	If failed
Test command	AT+CLCK=?	+CLCK: (list of supported <fac>s) OK	--
		+CME ERROR: <err>	If failed

Table 2-45 Parameter description

Parameter	Value	Description
<fac> values reserved by the present document	"AO"	Barr All Outgoing Calls
	"OI"	Barr Outgoing International Calls
	"OX"	Barr Outgoing International Calls except to Home Country
	"AI"	Barr All Incoming Calls
	"IR"	Barr Incoming Calls when Roaming outside the home country
	“PS”	PH-SIM (lock PHone to SIM card) (ME asks password when other than current SIM card inserted; ME may remember certain amount of previously used cards thus not requiring password when they are inserted)
	“PN”	Network Personalisation (refer GSM 02.22 [33])
	“PP”	Service Provider Personalisation (refer GSM 02.22 [33])
	“PU”	Network sUbset Personalisation (refer GSM 02.22 [33])
	“PC”	Corporate Personalisation (refer GSM 02.22 [33])

Parameter	Value	Description
	“PF”	Llock Phone to the very First inserted SIM card (also referred in the present document as PH-FSIM) (ME asks password when other than the first SIM card is inserted)
	"SC"	SIM
	"FD"	SIM fixed dialing feature
<mode>	0	Unlock
	1	Lock
	2	Query status
<status>	0	Not active
	1	Active
<passwd>	--	String type; Shall be the same as password specified for the facility from the ME user interface or with command Change Password +CPWD
<class*x*>	1	Voice (telephony)
	2	Data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)
	4	Fax (facsimile services)
	8	Short message service
	16	Data circuit sync
	32	Data circuit async
	64	Dedicated packet access

Reference:

- GSM 07.07

2.4.5 Change Password: AT+CPWD

Set command sets a new password for the facility lock function defined by command Facility Lock +CLCK.

Table 2-46 AT+CPWD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK	--
		+CME ERROR <err>	If failed
Test command	AT+CPWD=?	+CPWD: list of supported (<fac>s, <pwdlength>)s OK	--
		+CME ERROR: <err>	If failed

Table 2-47 Parameter description

Parameter	Value	Description
<fac> values reserved by the present document	"AO"	Barr All Outgoing Calls
	"OI"	Barr Outgoing International Calls
	"OX"	Barr Outgoing International Calls except to Home Country
	"AI"	Barr All Incoming Calls
	"IR"	Barr Incoming Calls when Roaming outside the home country
	“PS”	PH-SIM (lock PHone to SIM card) (ME asks password when other than current SIM card inserted; ME may remember certain amount of previously used cards thus not requiring password when they are inserted)
	“PN”	Network Personalisation (refer GSM 02.22 [33])
	“PP”	Service Provider Personalisation (refer GSM 02.22 [33])
	“PU”	Network sUbset Personalisation (refer GSM 02.22 [33])
	“PC”	Corporate Personalisation (refer GSM 02.22 [33])
	“PF”	Lock Phone to the very First inserted SIM card (also referred in the present document as PH-FSIM) (ME asks password when other than the first SIM card is inserted)
	"P2"	SIM PIN 2

Parameter	Value	Description
	“SC”	SIM
<oldpwd>, <newpwd>	--	String type; <oldpwd> shall be the same as password specified for the facility from the ME user interface or with command Change Password +CPWD and <newpwd> is the new password.
<pwdlength>	--	Integer type ,maximum length of the password for the facility

Reference:

- GSM 07.07

2.4.6 Calling Line Identification Presentation: AT+CLIP

This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call.

Set command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.

If the presentation of the CLI at the TE is enabled (and calling subscriber allows), +CLIP:<number>,<type>[,<subaddr>,<satype>[,[<alpha>][,<CLI validity>]]] response is returned after every RING (or +CRING: <type>;) result code sent from TA to TE. It is manufacturer specific if this response is used when normal voice call is answered.

Read command gives the status of <n>, and also triggers an interrogation of the provision status of the CLIP service according to GSM 02.81 [3].

Table 2-48 AT+CLIP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CLIP=<n>	OK	--
Read command	AT+CLIP?	+CLIP: <n>,<m> OK	--
Test command	AT+CLIP=?	+CLIP: (list of supported <n>s) OK	--

Table 2-49 Parameter description

Parameter	Value	Description
<n> sets/shows the result code presentation status in the TA	[0]	Disable
	1	Enable
<m> shows the subscriber CLIP service status in the network	0	CLIP not provisioned
	1	CLIP provisioned
	2	Unknown (e.g. no network, etc.)
<number>	--	String type, phone number of format specified by <type>
<type>	--	Type of address octet in integer format
<subaddr>	--	String type subaddress of format specified by <satype>
<satype>	--	Type of subaddress octet in integer format
<alpha>	--	Optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; Used character set should be the one selected with command Select TE Character Set AT+CSCS
<CLI validity>	0	Valid
	1	CLI has been withheld by the originator
	2	CLI is not available due to interworking problems or limitations of originating network

Reference:

- GSM 07.07

2.4.7 Calling Line Identification Restriction: AT+CLIR

This command refers to CLIR-service according to GSM 02.81 [3] that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call.

Read command gives the status of <n>, and also triggers an interrogation of the provision status of the COLP service according to GSM 02.81 [3] (given in <m>).

Table 2-50 AT+CLIR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CLIR=[<n>]	OK	--
Read command	AT+CLIR?	+CLIR: <n>,<m> OK	--
Test command	AT+CLIR=?	+CLIR: (list of supported <n>s) OK	--

Table 2-51 Parameter description

Parameter	Value	Description
<n> set the adjustment for outgoing calls	[0]	Presentation indicator is used according to the subscription of the CLIR service
	1	CLIR invocation
	2	CLIR suppression
<m> show the subscriber CLIR service status in the network	0	CLIR not provisioned
	1	CLIR provisioned in permanent mode
	2	Unknown (e.g. no network, etc.)
	3	CLIR temporary mode presentation restricted
	4	CLIR temporary mode presentation allowed

Reference:

- GSM 07.07

2.4.8 Connected Line Identification presentation: AT+COLP

This command refers to CLIR-service according to GSM 02.81 [3] that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call.

Read command gives the status of <n>, and also triggers an interrogation of the provision status of the COLP service according to GSM 02.81 [3] (given in <m>).

Table 2-52 AT+COLP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+COLP=[<n>]	OK	--

Type	Command	Possible response(s)	Description
Read command	AT+COLP?	+COLP: <n>,<m> OK	--
Test command	AT+COLP=?	+COLP: (list of supported <n>s) OK	--

Parameter description, refer to command: AT+CLIR.

Reference:

- GSM 07.07

2.4.9 Closed User Group: AT+CCUG

This command allows control of the Closed User Group supplementary service (refer GSM 02.85 [21]).

Set command enables the served subscriber to select a CUG index, to suppress the Outgoing Access (OA), and to suppress the preferential CUG.

Table 2-53 AT+CCUG action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CCUG=[<n>[,<index>[,<info>]]]	OK	--
Read command	AT+CCUG?	+CCUG: <n>,<index>,<info> OK	--
Test command	AT+CCUG=?	+CCUG: (<n>),(<index>),(<info>) OK	--

Table 2-54 Parameter description

Parameter	Value	Description
<n>	[0]	Disable CUG temporary mode
	1	Enable CUG temporary mode
<index>	[0]~9	CUG index
	10	No index (preferred CUG taken from subscriber data)

Parameter	Value	Description
<info>	[0]	No information
	1	Suppress OA
	2	Suppress preferential CUG
	3	Suppress OA and preferential CUG

Reference:

- GSM 07.07

2.4.10 Call Forwarding Number and Conditions: AT+CCFC

This command allows control of the call forwarding supplementary service according to GSM 02.82 [4]. Registration, erasure, activation, deactivation, and status query are supported.

Table 2-55 AT+CCFC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	OK	--
		+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][<CR><LF>+CCFC: <status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][...]] OK	When <mode>=2 and command successful
		+CME ERROR: <err>	If failed
Test command	AT+CCFC=?	+CCFC: (list of supported <reason>s) OK	--

Reference:

- GSM 07.07

Table 2-56 Parameter description

Parameter	Value	Description
<reason>	0	Unconditional
	1	Mobile busy
	2	No reply
	3	Not reachable
	4	All call forwarding (refer GSM 02.30 [19])
	5	All conditional call forwarding (refer GSM 02.30 [19])
<mode>	0	Disable
	1	Dnable
	2	Query status
	3	Registration
	4	Erasure
<number>	--	String type phone number of forwarding address in format specified by <type>
<type> type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)	145	Default, when dialling string includes international access code character "+"
	129	--
<subaddr>	--	String type subaddress of format specified by <satype>
<satype> type of subaddress octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.8)	128	Default
<class*x*> sum of integers each representing a class of information	1	Voice (telephony)
	2	Data (refers to all bearer services; With <mode>=2 this may refer only to some bearer service if TA does not support values 16)
<time>	1-30	When "no reply" is enabled or queried, this gives the time in seconds to wait before call is forwarded, default value 20

Parameter	Value	Description
<status>	0	Not active
	1	Active

2.4.11 Call Waiting: AT+CCWA

This command allows control of the Call Waiting supplementary service according to GSM 02.83 [5].

Table 2-57 AT+CCWA action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CCWA=[<n>[,<mode>[,<class>]]]	OK	--
		+CCWA: <status>,<class1>[<CR><LF>+CCWA: <status>,<class2>[...]] OK	If <mode>=2 and command successful
		+CME ERROR: <err>	If failed
Read command	AT+CCWA?	+CCWA: <n> OK	--
Test command	AT+CCWA=?	+CCWA: (list of supported <n>s) OK	

Table 2-58 Parameter description

Parameter	Value	Description
<n> sets/shows the result code presentation status in the TA	[0]	Disable
	1	Enable
<mode> if <mode> parameter is not given, network is not interrogated	0	Disable
	1	Enable
	2	Query status
<class*x*>	1	Voice (telephony)

Parameter	Value	Description
sum of integers each representing a class of information	2	Data
	4	Fax
	[7]	Voice, data and fax (1+2+4)
	8	Short message service
	16	Data circuit sync
	32	Data circuit async
	64	Dedicated packet access
	128	Dedicated PAD access
<status>	0	Not active
	1	Active

Reference:

- GSM 07.07

2.4.12 Call Hold and Multiparty: AT+CHLD

Use this command, a call can be temporarily disconnected from the ME but the connection is retained by the network and multiparty conversation. The served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection.

Table 2-59 AT+CHLD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CHLD=[<n>]	OK	--
		+CME ERROR: <err>	If set failed
Test command	AT+CHLD=?	[+CHLD: (list of supported <n>s)] OK	--

Table 2-60 Parameter description

Parameter	Value	Description
<n> integer type; equals to numbers entered before SEND button in GSM 02.30 [19] subclause 4.5.5.1	0	Releases all held calls or sets User Determined User Busy (UDUB) for a waiting call.
	1	Releases all active calls (if any exist) and accepts the other (held or waiting) call.
	1X	Releases a specific active call X.
	2	Places all active calls (if any exist) on hold and accepts the other (held or waiting) call.
	2X	Places all active calls on hold except call X with which communication shall be supported.
	3	Adds a held call to the conversation.
	4	Connects the two calls and disconnects the subscriber from both calls (ECT).

Reference:

- GSM 07.07

2.4.13 Unstructured Supplementary Service: AT+CUSD

This command allows control of the Unstuctured Supplementary Service Data (USSD) according to GSM 02.90 [23].

Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) +CUSD: <m>[,<str>,<dcs>] to the TE.

When <str> is given, a mobile initiated USSD-string or a response USSD-string to a network initiated operation is sent to the network. The response USSD-string from the network is returned in a subsequent unsolicited +CUSD result code.

Table 2-61 AT+CUSD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CUSD=[<n>[,<str>[,<dcs>]]]	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CUSD?	+CUSD: <n> OK	--
Test command	AT+CUSD=?	+CUSD: (list of supported <n>s) OK	--

Table 2-62 Parameter description

Parameter	Value	Description
<n>	[0]	Disable the result code presentation in the TA
	1	Enable the result code presentation in the TA
	2	Cancel session (not applicable to read command response)
<str>	--	String type USSD-string (If <str> parameter is not given, network is not interrogated): If <dcs> indicates that GSM 03.38[25] default alphabet is used, ME/TA converts GSM alphabet into current TE character set according to rules of GSM 07.05[24] Annex A.
<dcs>	--	GSM 03.38 [25] Cell Broadcast Data Coding Scheme in integer format (default 0)
<m>	0	No further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)
	1	Further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)
	2	USSD terminated by network

Reference:

- GSM 07.07

2.4.14 Advice of Charge: AT+CAOC

This command refers to Advice of Charge supplementary service (GSM 02.24 [26] and GSM 02.86 [27]) that enables subscriber to get information about the cost of calls.

Table 2-63 AT+CAOC action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CAOC[=<mode>]	[+CAOC: <ccm>] OK	--
		+CME ERROR: <err>	If setting failed
Read command	AT+CAOC?	+CAOC: <mode> OK	--
Test command	AT+CAOC=?	[+CAOC: (list of supported <mode>s] OK	--

Table 2-64 Parameter description

Parameter	Value	Description
<mode>	0	Query CCM value
	[1]	Deactivate the unsolicited reporting of CCM value
	2	Activate the unsolicited reporting of CCM value
<ccm>	--	String type; Three bytes of the current call meter value in hexadecimal format (e.g. "00001E" indicates decimal value 30); Value is in home units and bytes are similarly coded as ACM max value in the SIM

Reference:

- GSM 07.07

2.4.15 Supplementary Service Notification: AT+CSSN

This command refers to supplementary service related network initiated notifications. Set command enables/disables the presentation of notification result codes from TA to TE.

When <n>=1 and a supplementary service notification is received during a mobile originated call setup, intermediate result code +CSSI: <code1>[,<index>] is sent to TE. When <m>=1 and a supplementary service notification is received during a mobile

terminated call setup or during a call, or when a forward check supplementary service notification is received, unsolicited result code

+CSSU:<code2> [,<index>[,<number>,<type>[,<subaddr>,<satype>]]] is sent to TE.

Table 2-65 AT+CSSN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSSN=[<n>[,<m>]]	OK	--
Read command	AT+CSSN?	+CSSN: <n>,<m> OK	--
Test command	AT+CSSN=?	+CSSN: (list of supported <n>s),(list of supported <m>s) OK	--

Table 2-66 Parameter description

Parameter	Value	Description
<n> sets/shows the +CSSI result code presentation status in the TA	[0]	Disable
	1	Enable
<m> sets/shows the +CSSU result code presentation status in the TA	[0]	Disable
	1	Enable
<index>	[0]~9	CUG index
	10	No index (preferred CUG taken from subscriber data)
<code1>	0	Unconditional call forwarding is active
	1	Some of the conditional call forwardings are active
	2	Call has been forwarded
	3	Call is waiting
	4	This is a CUG call (also <index> present)
	5	Outgoing calls are barred

Parameter	Value	Description
	6	Incoming calls are barred
	7	CLIR suppression rejected
	8	Call has been deflected
<code2>	0	This is a forwarded call (MT call setup)
	1	This is a CUG call (also <index> present) (MT call setup)
	2	Call has been put on hold (during a voice call)
	3	Call has been retrieved (during a voice call)
	4	Multiparty call entered (during a voice call)
	5	Call on hold has been released (this is not a SS notification) (during a voice call)
	6	Forward check SS message received (can be received whenever)
	7	Call is being connected (alerting) with the remote party in alerting state in explicit call transfer operation (during a voice call)
	8	Call has been connected with the other remote party in explicit call transfer operation (also number and subaddress parameters may be present) (during a voice call or MT call setup)
	9	This is a deflected call (MT call setup)

Reference:

- GSM 07.07

2.4.16 List Current Calls: AT+CLCC

TA list the current calls of ME to TE

Table 2-67 AT+CLCC action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CLCC	[+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[, <number>,<type>[,<alpha>]][<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>]][...]]] OK	--
		+CME ERROR: <err>	If list failed
Test command	AT+CLCC=?	OK	--

Table 2-68 Parameter description

Parameter	Value	Description
<id*x*>	--	Integer type; Call identification number as described in GSM 02.30 [19] subclause 4.5.5.1
<dir>	0	Mobile originated (MO) call
	1	Mobile terminated (MT) call
<stat> call state	0	Active
	1	Held
	2	Dialing (MO call)
	3	Alerting (MO call)
	4	Incoming (MT call)
	5	Waiting (MT call)
<mode> (bearer/teleservice)	0	Voice
	1	Data
	2	Fax
	3	Voice followed by data, voice mode
	4	Alternating voice/data, voice mode
	5	Alternating voice/fax, voice mode
	6	Voice followed by data, data mode

Parameter	Value	Description
	7	Alternating voice/data, data mode
	8	Alternating voice/fax, fax mode
	9	Unknown
<mpty>	0	Call is not one of multiparty (conference) call parties
	1	Call is one of multiparty (conference) call parties
<number> string type phone number in format specified by <type>	--	--

Reference:

- GSM 07.07

2.4.17 Preferred Operator List: AT+CPOL

This command is used to edit the SIM preferred list of networks. Execution command writes an entry in the SIM list of preferred operators (EFPLMNsel). If <index> is given but <oper> is left out, entry is deleted. If <oper> is given but <index> is left out, <oper> is put in the next free location. If only <format> is given, the format of the <oper> in the read command is changed.

Table 2-69 AT+CPOL action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPOL=[<index>][,<format>[,<oper>]]	OK	--
		+CME ERROR: <err>	If failed
Read command	AT+CPOL?	+CPOL: <index1>,<format>,<oper1>[<CR><LF>+CPOL: <index2>,<format>,<oper2>[...]] OK	--
		+CME ERROR: <err>	If error is relate to ME

Type	Command	Possible response(s)	Description
Test command	AT+CPOL=?	+CPOL: (list of supported <index>s),(list of supported <format>s) OK	--
		+CME ERROR: <err>	If error is relate to ME

Table 2-70 Parameter description

Parameter	Value	Description
<index*n*>	-	integer type; the order number of operator in the SIM preferred operator list
<format>	0	Long format alphanumeric <oper>
	1	Short format alphanumeric <oper>
	2	Numeric <oper>
<oper*n*>	-	string type; <format> indicates if the format is alphanumeric or numeric (see+COPS)

Reference:

- GSM 07.07

2.4.18 Read Operator Names: AT+COPN

Execution command returns the list of operator names from the ME. Each operator code <numericn> that has an alphanumeric equivalent <alphan> in the ME memory shall be returned.

Table 2-71 AT+COPN action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+COPN	+COPN: <numeric1>,<alpha1>[<CR><LF>+COPN: <numeric2>,<alpha2>[...]] OK	--
		+CME ERROR: <err>	If error is relate to ME

Type	Command	Possible response(s)	Description
Test command	AT+COPN=?	OK	--

Table 2-72 Parameter description

Parameter	Value	Description
<numeric*n*>	--	String type; Operator in numeric format (see+COPS)
<alpha*n*>	--	String type; Operator in long alphanumeric format (see+COPS)

Note:

- After the execution of the AT+COPN command, the system returns the operator list and prompts "OK".
- During the execution of the AT+COPN command, the command cannot be executed again before the system prompts "OK". Otherwise, the module may reset.

Reference:

- GSM 07.07

2.5 ME Control and Status Commands

2.5.1 Phone Activity Status: AT+CPAS

Execution command returns the activity status <pas> of the ME.

Table 2-73 AT+CPAS action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CPAS	+CPAS: <pas> OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CPAS=?	+CPAS: (list of supported <pas>s) OK	--
		+CME ERROR: <err>	If error is relate to ME

Table 2-74 Parameter description

Parameter	Value	Description
<pas>	0	ME is ready
	1	ME is unavailable
	2	Unknown, ME is not ready
	3	Ringing
	4	Call in progress
	5	Asleep, ME is not ready

Reference:

- GSM 07.07

2.5.2 Set Phone Functionality: AT+CFUN

Set command selects the level of functionality <fun> in the ME. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn.

Table 2-75 AT+CFUN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CFUN=[<fun>[,<rst>]]	OK	--
		+CME ERROR: <err>	If error is relate to ME
Read command	AT+CFUN?	+CFUN: <fun> OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CFUN=?	+CFUN: (list of supported <fun>s), (list of supported <rst>s) OK	--
		+CME ERROR: <err>	If error is relate to ME

Table 2-76 Parameter description

Parameter	Value	Description
<fun>	0	Minimum functionality
	[1]	Full functionality
	4	Disable phone both transmit and receive RF circuits
<rst>	0	Do not reset the ME before setting it to <fun> power level

Note:

It is manufacturer specific does this command affect network registration. Command Operator Selection “AT+COPS” OR “AT%NRG” is used to force registration/deregistration.

Reference:

- GSM 07.07

2.5.3 Enter PIN: AT+CPIN

Set command sends to the ME a password which is necessary before it can be operated.

Read command returns an alphanumeric string indicating whether the password is required or not.

Table 2-77 AT+CPIN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPIN=<pin>[,<newpin>]	OK	--
		+CME ERROR: <err>	If error is relate to ME
Read command	AT+CPIN?	+CPIN: <code> OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CPIN=?	OK	--

Table 2-78 Parameter description

Parameter	Value	Description
<pin>	--	Password (string type), for example SIM PIN or, if requested, one of the unblocking keys, such as SIM-PUK or PH-SIM PUK
<new pin>	--	Password (string type)
<code>	READY	ME is not pending for any password
	SIM PIN	ME is waiting SIM PIN to be given
	SIM PUK	ME is waiting SIM PUK to be given
	PH-SIM PIN	ME is waiting phone-to-SIM card password to be given
	PH-FSIM PIN	ME is waiting phone-to-very first SIM card password to be given
	PH-FSIM PUK	ME is waiting phone-to-very first SIM card unblocking password to be given
	SIM PIN2	ME is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that ME does not block its operation)
	SIM PUK2	ME is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that ME does not block its operation)
	PH-NET PIN	ME is waiting network personalisation password to be given
	PH-NET PUK	ME is waiting network personalisation unblocking password to be given
	PH-NETSUB PIN	ME is waiting network subset personalisation password to be given
	PH-NETSUB PUK	ME is waiting network subset personalisation unblocking password to be given
	PH-SP PIN	ME is waiting service provider personalisation password to be given
	PH-SP PUK	ME is waiting service provider personalisation unblocking password to be given
	PH-CORP PIN	ME is waiting corporate personalisation password to be given
	PH-CORP PUK	ME is waiting

Reference:

- GSM 07.07

2.5.4 Battery Charge: AT+CBC

Execution command returns battery connection status <bcs> and battery charge level <bcl> of the ME.

Table 2-79 AT+CBC action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CBC	+CBC: <bcs>,<bcl> OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CBC=?	+CBC: (list of supported <bcs>s),(list of supported <bcl>s) OK	--

Table 2-80 Parameter description

Parameter	Value	Description
<bcs>	0	ME is powered by battery
	1	ME has a battery connected, but is not powered by it
	2	ME does not have a battery connected
	3	Recognized power fault, calls inhibited
<bcl>	0	Battery is exhausted, or ME does not have a battery connected
	1~100	Battery has 1-100 percent of capacity remaining

Reference:

- GSM 07.07

2.5.5 Signal Quality: AT+CSQ

Execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the ME.

Table 2-81 AT+CSQ action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CSQ	+CSQ: <rssi>,<ber> OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s) OK	--

Table 2-82 Parameter description

Parameter	Value	Description
<rssi>	0	-113 dBm or less
	1	-111 dBm
	2~30	-109~-53 dBm
	31	-51 dBm or greater
	99	Not known or not detectable
<ber>	0~7	Refer to the value of RXQUAL in GSM 05.08.8.2.4
	99	Not known or not detectable

Reference:

- GSM 07.07

2.5.6 Select Phonebook Memory Storage: AT+CPBS

Set command selects phonebook memory storage <storage>, which is used by other phonebook commands.

Read command returns currently selected memory.

Table 2-83 AT+CPBS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPBS=<storage>	OK	--
		+CME ERROR: <err>	If error is relate to ME
Read command	AT+CPBS?	+CPBS: <storage>[,<used>,<total>] OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CPBS=?	+CPBS: (list of supported <storage>s) OK	--

Table 2-84 Parameter description

Parameter	Value	Description
<storage>	"ON"	SIM (or ME) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also) $(AT R97)$
	"FD"	SIM fixed-dialling-phonebook
	"DC"	SIM last-dialling-phonebook
	"RC"	Last received numbers (nonstandard)
	"MC"	Last missed numbers (nonstandard)
	“MT”	Combined ME and SIM phonebook (storage depending on SIM card, In fact no ME phonebook in GTM900)
<used>	--	Integer type value indicating the number of used locations in selected memory
<total>	--	Integer type value indicating the total number of locations in selected memory

Reference:

- GSM 07.07

2.5.7 Read Phonebook Entries: AT+CPBR

Execution command returns phonebook entries in location number range <index1>~<index2> from the current phonebook memory storage selected with +CPBS. If <index2> is empty, only location <index1> is returned.

Table 2-85 AT+CPBR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPBR=<index1>[,<index2>]	[+CPBR: <index1>,<number>, <type>,<text>[[...] <CR><LF>+CPBR: <index2>,<number>, <type>,<text>]] OK	--
		+CME ERROR: <err>	If error is relate to ME
Test command	AT+CPBR=?	+CPBR:(list of supported <index>s), [<nlength>], [<tlength>] OK	--

Table 2-86 Parameter description

Parameter	Description
<index1>	Integer type values in the range of location numbers of phonebook memory
<index2>	Integer type values in the range of location numbers of phonebook memory
<number>	String type phone number of format <type>
<type>	Type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)
<text>	String type field of maximum length <tlength>; Character set as specified by command Select TE Character Set +CSCS
<nlength>	Integer type value indicating the maximum length of field <number>
<tlength>	Integer type value indicating the maximum length of field <text>

Reference:

- GSM 07.07

2.5.8 Find Phonebook Entries: AT+CPBF

Execution command returns phonebook entries (from the current phonebook memory storage selected with +CPBS).

The alphanumeric field start with string <findtext>.

Table 2-87 AT+CPBF action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPBF=<findtext>	[+CPBF: <index1>,<number>, <type>,<text>[[...] <CR><LF>+CBPF: <index2>,<number>, <type>,<text>]] OK	--
		+CME ERROR: <err>	If list failed
Test command	AT+CPBF=?	+CPBF: [<nlength>],[<tlength>] OK	--
		+CME ERROR: <err>	If list failed

Table 2-88 Parameter description

Parameter	Description
<index1>	Integer type values in the range of location numbers of phonebook memory
<index2>	Integer type values in the range of location numbers of phonebook memory
<number>	String type phone number of format <type>
<type>	Type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)
<text>,<findtext>	String type field of maximum length <tlength>; Character set as specified by command Select TE Character Set +CSCS
<nlength>	Integer type value indicating the maximum length of field <number>
<tlength>	Integer type value indicating the maximum length of field <text>

Reference:

- GSM 07.07

2.5.9 Write Phonebook Entries: AT+CPBW

Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text> associated with the number. If those fields are omitted, phonebook entry is deleted. If <index> is left out, but <number> is given, entry is written to the first free location in the phonebook.

Table 2-89 AT+CPBW action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]	OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CPBW=?	+CPBW: (list of supported <index>s),[<nlength>], (list of supported <type>s),[<tlength>] OK	--
		+CME ERROR: <err>	If list failed

Table 2-90 Parameter description

Parameter	Description
<index>	Integer type values in the range of location numbers of phonebook memory
<number>	String type phone number of format <type>
<type>	• Type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7) ; default 145 when dialling string includes international access code character "+", otherwise 129
<text>	String type, field of maximum length <tlength>; Character set as specified by command Select TE Character Set +CSCS
<nlength>	Integer type value indicating the maximum length of field <number>
<tlength>	Integer type value indicating the maximum length of field <text>

Reference:

- GSM 07.07

2.5.10 Restricted SIM access: AT+CRSM

Set command transmits to the ME the SIM <command> and its required parameters.

Table 2-91 AT+CRSM action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <sw1>,<sw2>[,<response>] OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CRSM=?	OK	--

Table 2-92 Parameter description

Parameter	Value	Description
<command> command passed on by the ME to the SIM; refer GSM 11.11 [28]	176	READ BINARY
	178	READ RECORD
	192	GET RESPONSE
	214	UPDATE BINARY
	220	UPDATE RECORD
	242	STATUS
<fileid>	--	Integer type; This is the identifier of a elementary datafile on SIM
<P1>	--	Integer type; Parameters passed on by the ME to the SIM. Refer to GSM 11.11 [28]
<P2>	--	Refer to <P1>
<P3>	--	Refer to <P1>
<data>	--	Information which shall be written to the SIM (hexadecimal character format; refer +CSCS)
<sw1>, <sw2>	--	Integer type; Information from the SIM about the execution of the actual command
<response>	--	Response of a successful completion of the command previously issued (hexadecimal character format; refer to +CSCS)

Reference:

- GSM 07.07

2.5.11 Mute Control: AT+CMUT

This command is used to enable/disable the uplink voice muting during a voice call.

Table 2-93 AT+CMUT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMUT=<n>	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CMUT?	+CMUT: <n> OK	--
		+CME ERROR: <err>	If list failed
Test command	AT+CMUT=?	+CMUT: (list of supported <n>s) OK	--

Table 2-94 Parameter description

Parameter	Value	Description
<n>	[0]	Mute off
	1	Mute on

Reference:

- GSM 07.07

2.5.12 Accumulated Call Meter: AT+CACM

Set command resets the Advice of Charge related accumulated call meter value in SIM file EFACM. ACM contains the total number of home units for both the current and preceding calls.

Table 2-95 AT+ CACM action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CACM=[<passwd>]	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CACM?	+CACM: <acm> OK	---
		+CME ERROR: <err>	If failed
Test command	AT+CACM=?	OK	--

Table 2-96 Parameter description

Parameter	Description
<passwd>	String type; SIM PIN2
<acm>	String type; Accumulated call meter value similarly coded as <ccm> under +CAOC

Reference:

- GSM 07.07

2.5.13 Accumulated Call Meter Maximum: AT+CAMM

Set command sets the Advice of Charge related accumulated call meter maximum value in SIM file EFACMmax. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber.

Table 2-97 AT+CAMM action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CAMM=[<acmmax>[,<passwd>]]	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CAMM?	+CAMM: <acmmax> OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CAMM=?	OK	--

Table 2-98 Parameter description

Parameter	Description
<acmmax>	String type; Accumulated call meter maximum value; value 0 disables ACMmax feature
<passwd>	String type; SIM PIN2

Reference:

- GSM 07.07

2.5.14 Price per unit and currency table: AT+CPUC

Set command sets the parameters of Advice of Charge related price per unit and currency table in SIM file EFPUCT.

PUCT information can be used to convert the home units (as used in +CAOC, +CACM and +CAMM) into currency units.

Table 2-99 AT+CPUC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPUC=<currency>,<ppu>[,<passwd>]	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CPUC?	+CPUC: <currency>,<ppu> OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CPUC=?	OK	--

Table 2-100 Parameter description

Parameter	Description
<currency>	String type; Three-character currency code (e.g. "GBP", "DEM"); Character set as specified by command Select TE Character Set +CSCS
<ppu>	String type; Price per unit; Dot is used as a decimal separator (e.g. "2.49")
<passwd>	String type; SIM PIN2

Reference:

- GSM 07.07

2.5.15 Call Meter Maximum Event: AT+CCWE

This command determines whether or not the unsolicited result code +CCWV will be sent, shortly before the ACM (Accumulated Call Meter) maximum value is reached.

Table 2-101 AT+CCWE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CCWE=<mode>	OK	--
		+CME ERROR: <err>	If failed
Read command	AT+CCWE?	+CCWE: <mode> OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CCWE=?	+CCWE: (list of supported<mode>s) OK	--
		+CME ERROR: <err>	If failed

Table 2-102 Parameter description

Parameter	Value	Description
<mode>	[0]	Disable the call meter warning event
	1	Enable the call meter warning event

Reference:

- GSM 07.07

2.5.16 Set Voice Mail Number: AT+CSVM

This command is used to set the voice mail number.

Table 2-103 AT+CSVM action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSVM=<mode>[,<number>[,<type>]]	OK	--
		+CME ERROR: <err>	If failed
Read command	AT+CSVM?	+CSVM:<mode>,<number>,<type> OK	--
Test command	AT+CSVM=?	+CSVM: (list of supported <mode>s), (list of supported <type>s) OK	--

Table 2-104 Parameter description

Parameter	Value	Description
<mode>	[0]	Disable the voice mail number
	1	Enable the voice mail number
<number>	--	String type; Character string <0..9,+>
<type> integer type; Type of address octet. (refer GSM 04.08 section 10.5.4.7)	129	ISDN / telephony numbering plan, national / international unknown
	145	ISDN / telephony numbering plan, international number
	161	ISDN / telephony numbering plan, national number
	128~255	Other values refer GSM 04.08 section 10.5.4.7

Reference:

- GSM 07.07

2.5.17 Set Event: AT+CLAE

This command is used to enable and disable unsolicited result code +CLAV: <code>.

Table 2-105 AT+CLAE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CLAE=<mode>	OK	--
		+CME ERROR: <err>	If failed
Read command	AT+CLAE?	+CLAE: <mode> OK	--
		+CME ERROR: <err>	If failed
Test command	AT+CLAE=?	+CLAE: (list of supported <mode>s) OK	--
		+CME ERROR: <err>	If failed

Table 2-106 Parameter description

Parameter	Value	Description
<mode>	[0]	Disable
	1	Enable

Reference:

- GSM 07.07

2.5.18 Set language: AT+CLAN

This command sets the language in ME. The set-command must confirm the selected language with the MMI-module in the ME.

Table 2-107 AT+CLAN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CLAN=<code>	OK	--
		+CME ERROR: <err>	If set failed
Read command	AT+CLAN?	+CLAN: <code> OK	--
		+CME ERROR: <err>	If failed

Type	Command	Possible response(s)	Description
Test command	AT+CLAN=?	+CLAN:(list of supported <code>s) OK	--
		+CME ERROR: <err>	If failed

Table 2-108 Parameter description

Parameter	Value	Description
<code>	"AUTO"	Read language from SIM. But "Auto" is never returned by the read-command.
	"en"	English
	"fr"	French
	"de"	German
	"it"	Italian
	"es"	Spanish
	"no"	Norwegian
	“el”	Greek
	“pl”	Polish
	“in”	Indonesian
	“cs”	Czech
	“zh”	Chinese
	“ar”	Arabic

Reference:

- GSM 07.07

2.5.19 List All Available AT Commands: AT+CLAC

This command lists one or more lines of AT Commands from ME.

Table 2-109 AT+CLAC action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CLAC	<AT Command1> [<CR> <LF> <ATCommand2>[…]] OK	--
		+CME ERROR: <err>	If failed

Table 2-110 Parameter description

Parameter	Description
<AT Command >	Defines the AT command including the prefix AT

Reference:

- GSM 07.07

2.5.20 Real time clock: AT+CCLK

TA returns the current time of module.

Table 2-111 AT+CCLK action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CCLK= <time>	OK	Set the module time, if set successfully
		ERROR	Set the module time, if failed
Read command	AT+CCLK?	+CCLK: YY/MM/DD,hh:mm:ss OK	--

Table 2-112 Parameter description

Parameter	Value	Description
<time>	YY/MM/DD,hh:mm:ss	String type

Example

Time set to:

16:20:30 on December 31, 2004

Time input as:

AT+CCLK=”04/12/31,16:20:30”

2.6 ME Error

2.6.1 Report Mobile Equipment error +CMEE: AT+CMEE

Set command disables/enables the result code +CME ERROR: <err> as an indication of an error relating to the functionality of the ME.

Table 2-113 AT+CMEE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMEE=[<n>]	OK	--
Read command	AT+CMEE?	+CMEE : <n> OK	--
Test command	AT+CMEE=?	+CMEE: (list of supported <n>s) OK	--

Table 2-114 Parameter description

Parameter	Value	Description
<n>	[0]	Disable + CME ERROR: <err> result code and use ERROR instead
	1	Enable + CME ERROR: <err> result code and use numeric <err> values
	2	Enable + CME ERROR: <err> result code and use verbose <err> values

Reference:

- GSM 07.07

2.6.2 Mobile Equipment Error Result Code: +CME ERROR

I. General errors Errors

0	phone failure
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
40	network personalisation PIN required
41	network personalisation PUK required

42	network subset personalisation PIN required
43	network subset personalisation PUK required
44	service provider personalisation PIN required
45	service provider personalisation PUK required
46	corporate personalisation PIN required
47	corporate personalisation PUK required
100	unknown

II. GPRS-related errors

1) Errors related to a failure to perform an Attach

103	Illegal MS (#3)
106	Illegal ME (#6)
107	GPRS services not allowed (#7)
111	PLMN not allowed (#11)
112	Location area not allowed (#12)
113	Roaming not allowed in this location area (#13)

2) Errors related to a failure to Activate a Context

132	service option not supported (#32)
133	requested service option not subscribed (#33)
134	service option temporarily out of order (#34)
149	PDP authentication failure

3) Other GPRS errors

150	invalid mobile class
148	unspecified GPRS error

2.7 Commands from TIA IS-101

2.7.1 Select Mode: AT+FCLASS

This command puts the TA into a particular mode(data, fax, voice etc) of operation. TA process information in a manner suitable for that type of information.

Table 2-115 AT+FCLASS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT +FCLASS=<n>	OK	--
Read command	AT+FCLASS?	+FCLASS: <n> OK	--
Test command	AT+FCLASS=?	+FCLASS: (list of supported <n>s) OK	--

Table 2-116 Parameter description

Parameter	Value	Description
<n>	0	Data
	2.0	Fax class 2 (ITU-T T.32 [12] and TIA-592)
	8	Voice

2.7.2 DTMF and Tone Generation: AT+VTS

The set command is intended for sending one or more ASCII characters which cause the MSC (Mobile Switching Center) to transmit DTMF tones to a remote subscriber.

1) Allows the user to send a sequence of DTMF tones with a duration.
2) Allow the user to send a single DTMF tone. In this case, the duration can be individually determined during the call.

Note:

The Set command can only be used during an active voice call.

Table 2-117 AT+VTS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+VTS=<dtmf-string> AT+VTS=<dtmf>[,<duration>]	OK	--
		+CME ERROR: <err>	If error is related to ME functionality

Type	Command	Possible response(s)	Description
Test command	AT+VTS=?	+VTS: (list of supported <dtmf>s)[, (list of supported <duration>s)] OK	--

Table 2-118 Parameter description

Parameter	Description
<dtmf-string>	String of ASCII characters in the set 0-9,#,*,A, B, C,D. Maximal length of the string is 29. The string must be enclosed in quotation marks (..).
<dtmf>	ASCII character in the set 0-9,#,*, A, B, C, D
<duration>	1-255 duration of a tone in 1/10 second

Reference:

- GSM 07.07

Chapter 3 Commands Specified by ITU-T Rec. V25ter

3.1 About This Chapter

This chapter describes the AT Commands specified by ITU-T Rec. V25ter as referenced by GSM Rec. 07.07, including:

- Generic TA Control Commands
- Call Control Commands
- Data Compression Commands

3.2 Generic TA Control Commands

3.2.1 Repeat Previous Commands: A/

Repeat previous command line. Line does not need to end with terminating character.

Table 3-1 A/ action command syntax

Type	Command	Possible response(s)	Description
Execution command	A/	--	--

Reference:

- v.25

3.2.2 Reset to Default Configuration: ATZ

Table 3-2 ATZ action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATZ<value>	OK	TA sets all parameters to their factory default as specified by the manufacturer. Any call in progress will be terminated.
		ERROR	If <value> is not recognized.

Table 3-3 Parameter description

Parameter	Value	Description
<value>	[0]	Restores to the default value.
	1	Restores the command parameter saved by AT&W[1].
	2	Restores the command parameter saved by AT&W2.

The ATZ1 and ATZ2 commands are used to restore the command parameter saved by the AT&W command.

When you restore the command parameter by using ATZ2, the following information is displayed:

+CSMS: 1.1.1

OK

OK

Among this, the first OK indicates that the parameter of the AT+CSMS command is restored successfully; the second OK indicates that all the command parameters are restored successfully by the ATZ2 command.

Table 3-4 Command parameters that can be saved by the AT&W command

AT Command	Saved Command Parameter
ATE	<value>
ATQ	<value>
ATS0	<n>
ATS3	<n>
ATS4	<n>
ATS5	<n>
ATS6	<n>
ATS7	<n>
ATS8	<n>
ATS10	<n>
ATV	<value>
ATX	<value>
AT&C	<value>
AT&D	<value>
AT+ILRR	<value>
AT+FCLASS	<n>
AT+CBST	<speed>,<name>,<ce>

AT Command	Saved Command Parameter
AT+CMEE	<n>
AT+COPS	<mode>,<format>,<oper>
AT+CR	<mode>
AT+CRC	<mode>
AT+CRLP	<iws>,<mws>,<T1>,<N2>
AT+CMGF	<mode>
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>
AT+CSDH	<show>
AT+CSMS	<service>
AT+CGREG	<n>
AT+CLIP	<n>
AT+CLIR	<n>
AT+COLP	<n>
AT+CREG	<n>
AT%ALS	<mod>
AT%CGAATT	<att_m>,<det_m>
AT%CGREG	<mode>
AT%CPI	<n>
AT%CREG	<n>

Table 3-5 The command parameters that are saved by the AT&W command and can be recovered by the ATZ command

AT Command	Recovered Command Parameter
ATE	<value>
ATQ	<value>
ATS0	<n>
ATS3	<n>
ATS4	<n>
ATS5	<n>
ATS6	<n>
ATS7	<n>
ATS8	<n>
ATS10	<n>
ATV	<value>

AT Command	Recovered Command Parameter
ATX	<value>
AT&C	<value>
AT&D	<value>
AT+ILRR	<value>
AT+FCLASS	<n>
AT+CBST	<speed>,<name>,<ce>
AT+CMEE	<n>
AT+COPS	<mode>,<format>,<oper>
AT+CR	<mode>
AT+CRC	<mode>
AT+CRLP	<iws>,<mws>,<T1>,<N2>
AT+CMGF	<mode>
AT+CNMI	<mode>,<mt>,<bm>,<ds>,<bfr>
AT+CSDH	<show>
AT+CSMS	<service>
AT+CGREG	<n>
AT+CLIP	<n>
AT+CLIR	<n>
AT+COLP	<n>
AT+CREG	<n>
AT%ALS	<mod>
AT%CGAATT	<att_m>,<det_m>
AT%CGREG	<mode>
AT%CPI	<n>
AT%CREG	<n>

Reference:

- v.25

3.2.3 Set all TA parameters to factory defined config: AT&F

Table 3-6 AT&F action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT&F<value>	OK	TA sets all of parameters to the default that manufacturer defined.
		ERROR	If <value> is not recognized

Table 3-7 Parameter description

Parameter	Value	Description
<value>	0	Set all TA parameter to manufacture default.
	1	An other manufacturer specific parameter set

Table 3-8 Command parameters whose factory defaults can be restored by the AT&F0 command

AT Command	Value
ATS0	0
ATS1	0
ATS3	13
ATS4	10
ATS5	8
ATS6	2
ATS7	60
ATS8	2
ATS10	1
ATS30	1
ATS99	1
AT+CMEE	<n=0>
AT+COLP	<n=0>
AT+CCWA	<n=0>

AT Command	Value
ATV	<value=1>
ATE	<value=1>
ATQ	<value=0>
ATX	<value=0>
AT+CR	<mode=0>
AT+CRC	<mode=0>
AT+CLIP	<n=0>
AT+DR	<mode=0>
AT+ILRR	<value=0>
AT+CSDH	<show=1>
AT+CSSN	<n=0,m=0>
AT+CUSD	<n=0>
AT%CPI	<n=0>
AT+CCWE	<mode=0>
AT+CAOC	<mode=0>
AT+CGREG	<n=0>
AT%CGREG	<n=0>
AT+CREG	<n=0>
AT%CREG	<n=0>

Table 3-9 Command parameters whose factory defaults can be restored by the AT&F1 command

AT Command	Value
ATS0	0
ATS1	0
ATS3	13
ATS4	10
ATS5	8
ATS6	2
ATS7	60
ATS8	2
ATS10	1

AT Command	Value
ATS30	1
ATS99	1
AT+CMEE	<n=0>
AT+COLP	<n=1>
AT+CCWA	<n=0>
ATV	<value=1>
ATE	<value=1>
ATQ	<value=0>
ATX	<value=0>
AT+CR	<mode=1>
AT+CRC	<mode=1>
AT+CLIP	<n=1>
AT+DR	<mode=1>
AT+ILRR	<value=0>
AT+CSDH	<show=1>
AT+CSSN	<n=0,m=0>
AT+CUSD	<n=0>
AT%CPI	<n=0>
AT+CCWE	<mode=0>
AT+CAOC	<mode=0>
AT+CGREG	<n=1>
AT%CGREG	<n=1>
AT+CREG	<n=1>
AT%CREG	<n=1>

Reference:

- v.25

3.2.4 Manufacturer Information about TA: ATI

Table 3-10 ATI action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATI	HUAWEI GTM900 OK	TA returns ME issues product information.

Reference:

- v.25

3.2.5 TA Manufacturer ID: AT+GMI

Table 3-11 AT+GMI action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+GMI	HUAWEI OK	TA returns the information of manufacturer.
Test command	AT+GMI=?	OK	--

Reference:

- v.25
- 2.2.1 Request Manufacturer Identification: AT+CGMI

3.2.6 TA Model Identification: AT+GMM

Table 3-12 AT+GMM action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+GMM	GTM900 OK	TA returns model identification.
Test command	AT+GMM=?	OK	--

Reference:

- v.25
- 2.2.2 Request Model Identification: AT+CGMM

3.2.7 TA Revision Number: AT+GMR

Table 3-13 AT+GMR action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+GMR	HW REVISION: X SW REVISION: XX.YYY OK	TA returns product firmware version identification text. XX.YYY --variant of software release
Test command	AT+GMR=?	OK	--

Reference:

- v.25
- 2.2.3 Request Revision Identification: AT+CGMR

3.2.8 Request TA serial Number: AT+GSN

Table 3-14 AT+GSN action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+GSN	<sn> OK	TA returns one or more lines of information text to identify the individual device.
Test command	AT+GSN=?	OK	--

Table 3-15 Parameter description

Parameter	Description
<sn>	International Mobile station Equipment Identity of the telephone

Reference:

- v.25

3.2.9 Request Overall Capabilities for TA: AT+GCAP

Table 3-16 AT+GCAP action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+GCAP	+GCAP: <name> OK	TA returns a list of additional capabilities.
Test command	AT+GCAP=?	OK	--

Table 3-17 Parameter description

Parameter	Description
<name>	For example: ” +FCLASS,+DS” or: “+FCLASS”

3.2.10 Command Line Termination Character: ATS3

This command sets the character recognized by TA to terminate an incoming command line.

Table 3-18 ATS3 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS3=<n>	OK	--
Read command	ATS3?	<n> OK	--
Test command	ATS3=?	S3: (list of supported<n>s) OK	--

Table 3-19 Parameter description

Parameter	Value	Description
<n>	0-127	Default: 13 (the ASCII character: carriage return)

Reference:

- v.25

3.2.11 Responds Formatting Character: ATS4

This command sets the character generated by TA for result code and information text.

Table 3-20 ATS4 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS4=<n>	OK	--
Read command	ATS4?	<n> OK	--
Test command	ATS4=?	S4: (list of supported<n>s) OK	--

Table 3-21 Parameter description

Parameter	Value	Description
<n>	0~127	Default: 10 (the ASCII character: line feed)

Reference:

- v.25

3.2.12 Editing Character: ATS5

This command sets the character recognized by TA as a request to delete the immediately preceding character from the command line.

Table 3-22 ATS5 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS5=<n>	OK	--
Read command	ATS5?	OK	--
Test command	ATS5=?	S5: (list of supported<n>s) OK	--

Table 3-23 Parameter description

Parameter	Value	Description
<n>	0~127	Default: 8 (the ASCII character: backspace)

Reference:

- v.25

3.2.13 Command Echo Mode: ATE

This command sets whether or not the TA echoes characters received from TE during command state.

Table 3-24 ATE action command syntax

Type	Command	Possible response(s)	Description
Set command	ATE<value>	OK	--

Table 3-25 Parameter description

Parameter	Value	Description
<value>	[1]	Echo mode on
	0	Echo mode off

Reference:

- v.25

3.2.14 Result Code Suppression: ATQ

This command sets whether or not the TA transmits result code to TE.

Table 3-26 ATQ action command syntax

Type	Command	Possible response(s)	Description
Set command	ATQ<value>	OK	If (value = 0)
		(none)	If (value = 1)

Table 3-27 Parameter description

Parameter	Value	Description
<value>	[0]	Transmit result code to TE
	1	Result code are suppressed and not transmitted

Reference:

- v.25

3.2.15 Response Format: ATV

This command determines whether result codes are transmitted in a numeric form or an alphabetic form. It also determines the contents of the header and trailer transmitted with result codes and information responses.

Table 3-28 ATV action command syntax

Type	Command	Possible response(s)	Description
Set command	ATV<value>	0	If (value = 0)
		OK	If (value = 1)

Table 3-29 Parameter description

Parameter	Value	Description
<value>	[0]	Information response: <text><CR><LF> Short result code format: <numeric code><CR>
	1	Information response: <CR><LF><text><CR><LF> Long result code format: <CR><LF><verbose code><CR><LF>

Reference:

- v.25

3.2.16 CONNECT Result: ATX

This command determines whether or not the TA transmits particular result code to TE.

Table 3-30 ATX action command syntax

Type	Command	Possible response(s)	Description
Set command	ATX<value>	OK	--

Table 3-31 Parameter description

Parameter	Value	Description
<value>	[0]	CONNECT result code is given upon entering online data state. Dial tone and busy detection are disabled

Parameter	Value	Description
	1	CONNECT <text> result code is given upon entering online data state. Dial tone and busy detection are disabled
	2	CONNECT <text> result code is given upon entering online data state. Dial tone detection is enabled, and busy detection is disabled
	3	CONNECT <text> result code is given upon entering online data state. Dial tone detection is disabled, and busy detection is enabled
	4	CONNECT <text> result code is given upon entering online data state. Dial tone and busy detection are both enabled

Reference:

- v.25

3.2.17 DCD-usage: AT&C

This command determines how the state of circuit 109 relates to the detection of received line signal from the distant end.

Table 3-32 AT&C action command syntax

Type	Command	Possible response(s)	Description
Set command	AT&C<value>	OK	--
		ERROR	If DCD is not supported by driver

Table 3-33 Parameter description

Parameter	Value	Description
<value>	[0]	DCD line is always ON
	1	DCD line is ON in the presence of data carrier only.

Reference:

- v.25

3.2.18 DTR-usage: AT&D

This command determines how the TA responses when circuit 108/2(DTR) is changed from ON to OFF during data state.

Table 3-34 AT&D action command syntax

Type	Command	Possible response(s)	Description
Set command	AT&D<value>	OK	--
		ERROR	If DTR is not supported by driver

Table 3-35 Parameter description

Parameter	Value	Description
<value>	[0]	TA ignores status on DTR.
	1	Change to command mode while retaining the connected call.
	2	Disconnect data call, change to command mode. During state DTR = OFF is auto-answer off.

Reference:

- v.25

3.2.19 Fixed TE-TA Data Rate: AT+IPR

This command sets the DTE-DCE bit rate. If you set a fix rate, you must ensure that both TE and TA are configured to the same rate.

Table 3-36 AT+IPR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+IPR=<rate>	OK	--
		ERROR/ +CME ERROR <err>	If error is relate to ME
Read command	AT+IPR?	+IPR: <rate> OK	--

Type	Command	Possible response(s)	Description
Test command	AT+IPR=?	+IPR: (list of supported <rate>s) OK	--

Table 3-37 Parameter description

Parameter	Value	Description
<rate>	300 600 1200 2400 4800 7200 [9600] 14400 19200 28800 33900 38400 57600 115200	--

Reference:

- v.25

3.2.20 TE-TA Character Framing: AT+ICF

This command determines the local serial port start-stop (asynchronous) character framing that DCE shall use while accepting DTE commands and while transmitting information text and result code.

Table 3-38 AT+ICF action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+ICF=[<form	OK	--

Type	Command	Possible response(s)	Description
	at>[,<parity>]]	ERROR/ +CME ERROR <err>	If error is relate to ME
Read command	AT+ICF?	+ICF:<format>[,<parity>] OK	--
Test command	AT+ICF=?	+ICF:(list of supported <format>s),(list of supported <parity>s) OK	--

Table 3-39 Parameter description

Parameter	Value	Description
<format>	1	8 Data; 2 Stop
	2	8 Data; 1 Parity; 1 Stop
	[3]	8 Data; 1 Stop
	4	7 Data; 2 Stop
	5	7 Data; 1 Parity; 1 Stop
	6	7 Data; 1 Stop
<parity>	0	Odd
	1	Even
	2	Mark
	[3]	Space

Reference:

- v.25

3.2.21 TE-TA Local Flow Control: AT+IFC

This command controls the operation of local flow control between DTE and DCE during the data state when V.42 error control is being used.

Table 3-40 AT+IFC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+IFC=[<DCE_by_DTE>[,<DTE_by_DCE>]]	OK	--
		ERROR/ +CME ERROR <err>	If error is relate to ME
Read command	AT+IFC?	+IFC:<DCE_by_DTE>,<DTE_by_DCE> OK	--
Test command	AT+IFC=?	+IFC:(list of supported <DCE_by_DTE>s),(list of supported <DTE_by_DCE>s) OK	--

Table 3-41 Parameter description

Parameter	Value	Description
<DCE_by_DTE>	0	--
	1	DC1/DC3 on circuit 103; do not pass DC1/DC3 characters to the remote DCE
	[2]	Circuit 133 (Ready for Receiving)
<DTE_by_DCE>	0	--
	1	DC1/DC3 on circuit 104
	[2]	Circuit 106 (Clear to Send/Ready for Sending)

Reference:

- v.25

Note:

The values of <DCE_by_DTE> and <DTE_by_DCE> must be equal.

3.2.22 TE-TA Local Rate Reporting: AT+ILRR

This command controls whether or not the intermediate result code (+ILRR:<rate>) shall transmitted from the DCE to the DTE.

If enabled, the intermediate result code is transmitted after any modulation, error control or data compression reports are transmitted and before any final result code (e.g., CONNECT) is transmitted.

Table 3-42 AT+ILRR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+ILRR=<value>	OK	--
		ERROR/ +CME ERROR <err>	If error is relate to ME
Read command	AT+ILRR?	+ILRR: <value> OK	--
Test command	AT+ILRR=?	+ILRR (list of supported <value>s) OK	--

Table 3-43 Parameter description

Parameter	Value	Description
<value>	[0]	Disables reporting of local port rate.
	1	Enables reporting of local port rate.

Reference:

- v.25

3.3 Call Control Commands

3.3.1 Tone Dialling: ATT

Table 3-44 ATT action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATT	OK	Set to DTMF dialing tone.

Reference:

- v.25

3.3.2 Pulse Dialling: ATP

Table 3-45 ATP action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATP	OK	Set to pulse dialing.

Reference:

- v.25

3.3.3 Answer a Call: ATA

This command set the DCE immediately connect to the line and start the answer sequence as specified for the underlying DCE.

Note:

Any additional commands that appear after A on the same command line are ignored. This command may be aborted by receiving a character during execution. It can not be aborted in some connection setup states, such as handshaking, etc.

Table 3-46 ATA action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATA	CONNECT	If response a data call and connect established successful
		CONNECT <text>	If response a data call and connect established successful, <text> may be the speed, error control, etc.
		OK	If response a voice call and connect established successful

Type	Command	Possible response(s)	Description
		NO CARRIER	If the connect can not be established, or a character was received from TE
		ERROR	If issued while in online command state

Reference:

- v.25

3.3.4 Hook Control: ATH

This command is used to terminate any call in progress.

Table 3-47 ATH action command syntax

Type	Command	Possible response(s)	Description
Execution command	ATH[<n>]	OK	--
		ERROR	If <n> is not recognized or supported

Table 3-48 Parameter description

Parameter	Value	Description
<n>	0	Terminate call

Reference:

- v.25

3.3.5 Return to Data State: ATO

This command causes the DCE to return to online data /PPP state and issue a CONNECT or CONNECT<text> result code.

Table 3-49 ATO action command syntax

Type	Command	Possible response(s)	Description
Set command	ATO[<value>]	CONNECT/CONNECT <text>	If connect successful (<text> may be the speed, error control , etc.)
		NO CARRIER	If connect failed
		ERROR	If <value> is not recognized or supported

Table 3-50 Parameter description

Parameter	Value	Description
<value>	0	Switch command mode to data state

Reference:

- v.25

3.3.6 Ring before Automatic Answer: ATS0

This command disables/enables the DCE automatic answering the incoming call. If <n> was set to non-zero value, the DCE shall case the DCE to answer when the incoming call indication has occurred the number of times indicated by the value.

Table 3-51 ATS0 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS0=<n>	OK	If successful
		OK/ERROR	The second OK/ERROR will return if GPRS attached successfully or failed.
Read command	ATS0?	<n> OK	--
Test command	ATS0=?	S0: (list of supported <n>s) OK	--

Table 3-52 Parameter description

Parameter	Value	Description
<n>	[0]	Disable automatic answering
	1~255	Enable automatic answering after the specified numbers of ring

Reference:

- v.25

3.3.7 Pause before Blind Dialling: ATS6

Table 3-53 ATS6 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS6=<n>	OK	--
Read command	ATS6?	<n> OK	--
Test command	ATS6=?	S6: (list of supported <n>s) OK	--

Table 3-54 Parameter description

Parameter	Value	Description
<n>	2~10	--

Reference:

- v.25

3.3.8 Wait for Completion: ATS7

This command sets the numbers of seconds that TA will wait for the completion of the call setup when answering or originating a data call.

Table 3-55 ATS7 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS7=<n>	OK	--

Type	Command	Possible response(s)	Description
Read command	ATS7?	<n> OK	--
Test command	ATS7=?	S7: (list of supported <n>s) OK	--

Table 3-56 Parameter description

Parameter	Value	Description
<n>	1~255	Number of seconds in which connection must be established or call will be disconnected.

Reference:

- v.25

3.3.9 Dial Pause: ATS8

This command sets the numbers of seconds that TA shall pause, during signaling of call addressing information to network (dialing), when a "," dial modifier is encountered in a dial string.

Table 3-57 ATS8 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS8=<n>	OK	--
Read command	ATS8?	<n> OK	--
Test command	ATS8=?	S8: (list of supported <n>s) OK	--

Table 3-58 Parameter description

Parameter	Value	Description
<n>	2	Default
	0	Disable the DCE to pause when "," encountered in dial string

Parameter	Value	Description
	1~255	Number of seconds to pause

Reference:

- v.25

3.3.10 Hang up Delay: ATS10

This command specifies the amount time that the DCE remain connected to the line after the DCE has indicated the absence of received line signal.

Table 3-59 ATS10 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATS10=<n>	OK	--
Read command	ATS10?	<n> OK	--
Test command	ATS10=?	S10: (list of supported <n>s) OK	--

Table 3-60 Parameter description

Parameter	Value	Description
<n>	1~254	Number of tenths of a seconds of delay

Reference:

- v.25

3.4 Data Compression Commands

3.4.1 V.42bits Data Compression: AT+DS

This command determines whether or not the V.42 bits data compression function will be provided in the DCE.

Table 3-61 AT+DS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+DS=[<direction>[,<compression_negotiation>[,<max_dict>[,<max_string>]]]]	OK	--
		ERROR	If the parameters is not supported
Read command	AT+DS?	+DS:<direction>,<compression_negotiation>,<max_dict>, <max_string> OK	--
Test command	AT+DS=?	+DS: (list of supported <direction>s),(list of supported <compression_negotiation>s),(list of supported <max_dict>s),(list of supported <max_string>s) OK	--

Table 3-62 Parameter description

Parameter	Value	Description
<direction>	[0]	Negotiated; no compression (V.42 bis P0 = 0)
	1	Transmit only
	2	Receive only
	3	Both directions, accept any direction (V.42 bis P0 = 11)
<compression_negotiation>	[0]	Do not disconnect if ITU-T Rec. V.42 bis is not negotiated by the remote DCE as specified in direction
	1	Disconnect if ITU-T Rec. V.42 bis is not negotiated by the remote DCE as specified in direction
<max_dict>	512~65535	--
<max_string>	[6]~250	--

Reference:

- v.25

3.4.2 V.42 Data Compress Reporting: AT+DR

This command determines whether or not the intermediate result code (+DR: <type>) shall be transmitted from TA to TE. If enabled, the intermediate result code is transmitted at the point after error control negotiation (handshaking) at which the TA has determined which data compression technique will be used and direction of operation.

Note:

Data compression reporting intermediate result codes

- +DR: NONE //Data compression is not in use
- +DR: V42B //ITU-T Rec. V.42 bis is in use in both directions
- +DR: V42B RD //ITU-T Rec. V.42 bis is in use in receive direction only
- +DR: V42B TD //ITU-T Rec. V.42 bis is in use in transmit direction only
- +DR: V44 //ITU-T Rec. V.44 is in use in both directions
- +DR: V44 RD //ITU-T Rec. V.44 is in use in receive direction only
- +DR: V44 TD //ITU-T Rec. V.44 is in use in transmit direction only

---

Table 3-63 AT+DR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+DR=<value>	OK	--
		ERROR	If set failed
Read command	AT+DR?	+DR: <value> OK	--
Test command	AT+DR=?	+DR: (list of supported <value>s) OK	--

Table 3-64 Parameter description

Parameter	Value	Description
<value>	[0]	Data compression reporting disabled
	1	Data compression reporting enabled

Reference:

- V.25

Chapter 4 Standardized GPRS AT Commands

4.1 About This Chapter

This chapter describes the standardized GPRS AT commands, including:

- Commands Specified by GSM Rec. 07.07

4.2 Commands Specified by GSM Rec. 07.07

4.2.1 Define PDP Context: AT+CGDCONT

Set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>. A special form of the set command, +CGDCONT= <cid> causes the values for context number <cid> to become undefined.

Table 4-1 AT+CGDCONT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]]	OK	-
		ERROR	If set failed
Read command	AT+CGDCONT?	+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>[<CR><LF>+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>] OK	-
Test command	AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s) OK	-

Table 4-2 Parameter description

Parameter	Value	Description
<cid>	(1-2)	A numeric parameter which specifies a particular PDP context definition The parameter is local to the TE-MT interface and is used in other PDP context-related commands.
<PDP_type>	-	(Packet Data Protocol type) A string parameter which specifies the type of packet data protocol Only “IP” is supported. IP Internet Protocol (IETF STD 5)
<APN>	-	The Access Point Name is a string parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<PDP_address>	-	A string parameter that identifies the MT in the address space applicable to the PDP If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read form of the command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command.
<d_comp> a numeric parameter that controls PDP data compression	0	Off (default if value is omitted)
<h_comp> a numeric parameter that controls PDP header compression	0	Off (default if value is omitted)
	1	On

Reference:

- GSM 07.07

4.2.2 Quality of Service Profile (Requested): AT+CGQREQ

This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

Set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. A special form of the set command, +CGQREQ= <cid> causes the requested profile for context number <cid> to become undefined.

Table 4-3 AT+CGQREQ action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability.>[,<peak>[,<mean>]]]]]]	OK	-
		ERROR	If set failed
Read command	AT+CGQREQ?	+CGQREQ: <cid>, <precedence >, <delay>,<reliability>, <peak>, <mean>[<CR><LF>+CGQREQ: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean>[…]] OK	-
Test command	AT+CGQREQ=?	+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK	-

Table 4-4 Parameter description

Parameter	Value	Description
<cid>	0	Default. When PDP is activated, if no QoS is designated to the corresponding cid, this parameter is used. When cid=0, the query command is not supported.
	(1-2)	Value type parameter. It is used to specify the context definitions of specific PDPs. For the TE-MT interface, this parameter is a local parameter and can be used in the commands of other PDP contexts.
<precedence> a numeric parameter which specifies the precedence class	0	Customized parameters for the network
	1	High Priority Service commitments shall be maintained ahead of precedence classes 2 and 3
	2	Normal priority Service commitments shall be maintained ahead of precedence class 3
	3	Low priority Service commitments shall be maintained
<delay> a numeric parameter which specifies the delay class	0	Customized parameters for the network
	1	-
	2	-
	3	-
	4	-
<reliability> a numeric parameter which specifies the reliability class cope with infrequent data loss	0	Customized parameters for the network
	1	Non real-time traffic, error-sensitive application that cannot cope with data loss
	2	Non real-time traffic, error-sensitive application that can cope with data loss
	3	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
	4	Real-time traffic, error-sensitive application that can cope with data loss
	5	Real-time traffic, error non-sensitive application that can cope with data loss
<peak> a numeric parameter which specifies the	0	Customized parameters for the network
	1	Up to 1 000 (8 kbit/s)
	2	Up to 2 000 (16 kbit/s)

Parameter	Value	Description
peak throughput class	3	Up to 4 000 (32 kbit/s)
	4	Up to 8 000 (64 kbit/s)
	5	Up to 16 000 (128 kbit/s)
	6	Up to 32 000 (256 kbit/s)
	7	Up to 64 000 (512 kbit/s)
	8	Up to 128 000 (1 024 kbit/s)
	9	Up to 256 000 (2 048 kbit/s)
<PDP_type> String parameter of Packet Data Protocol type	"IP"	-
<mean> a numeric parameter which specifies the mean throughput class	0	Customized parameters for the network
	1	100 (~0.22 bit/s)
	2	200 (~0.44 bit/s)
	3	500 (~1.11 bit/s)
	4	1 000 (~2.2 bit/s)
	5	2 000 (~4.4 bit/s)
	6	5 000 (~11.1 bit/s)
	7	10 000 (~22 bit/s)
	8	20 000 (~44 bit/s)
	9	50 000 (~111 bit/s)
	10	100 000 (~0.22 kbit/s)
	11	200 000 (~0.44 kbit/s)
	12	500 000 (~1.11 kbit/s)
	13	1 000 000 (~2.2 kbit/s)
	14	2 000 000 (~4.4 kbit/s)
	15	5 000 000 (~11.1 kbit/s)
	16	10 000 000 (~22 kbit/s)
	17	20 000 000 (~44 kbit/s)
	18	50 000 000 (~111 kbit/s)
	31	Best effort

Caution:

- AT+CGQREQ=<cid> can be used to cancel the settings. cid is 1 or 2.
- All QoS options are set to 0. For example: AT+CGQREQ=1,0,0,0,0,0 cancels the default parameters but not the parameters of the corresponding cid.

Reference:

- GSM 07.07

4.2.3 Quality of Service Profile (Minimum acceptable): AT+CGQMIN

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.

Set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. A special form of the set command, +CGQMIN= <cid> causes the minimum acceptable profile for context number <cid> to become undefined.

Table 4-5 AT+CGQMIN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGQMIN=[<cid> [,<precedence> [,<delay>[,<reliability.> [,<peak> [,<mean>]]]]]]	OK	-
		ERROR	If set failed
Read command	AT+ CGQMIN?	+CGQMIN: <cid>, <precedence >, <delay>,<reliability>, <peak>, <mean>[<CR><LF>+ CGQMIN: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean>[…]] OK	-
Test command	AT+ CGQMIN=?	+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK	-

Parameter: See AT+CGQREQ

Reference:

- GSM 07.07

4.2.4 GPRS Attach and Detach: AT+CGATT

Set command is used to attach the MT to, or detach the MT from, the GPRS service. The MT remains in V.25ter command state after the command has completed. If the MT is already in the requested state, this command is ignored and the OK response is returned.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

Table 4-6 AT+CGATT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGATT=[<state>]	OK	-
		ERROR	If set failed
Read command	AT+CGATT?	+CGATT: <state> OK	-
Test command	AT+CGATT=?	+CGATT: (list of supported <state>s) OK	-

Table 4-7 Parameter description

Parameter	Value	Description
<state> indicates the state of GPRS attachment	[0]	Detached
	1	Attached

Reference:

- GSM 07.07

Note:

If parameter <state>is omitted the GPRS attach state will be changed.

4.2.5 PDP Context Activate or Deactivate: AT+CGACT

Set command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in V.25ter command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the MT is not GPRS attached when the activation form of the command is executed, the MT first performs a GPRS attach and them attempts to activate the specified contexts.

Table 4-8 AT+CGACT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGACT=<state>[,<cid>[,<cid>[,…]]]	OK	-
		ERROR	If set failed
Read command	AT+CGACT?	+CGACT: <cid>, <state>[<CR><LF>+CGACT: <cid>, <state>[...]] OK	-
Test command	AT+CGACT=?	+CGACT: (list of supported <state>s) OK	-

Table 4-9 Parameter description

Parameter	Value	Description
<state> indicates the state of PDP context activation	[0]	Deactivated
	1	Activated
<cid>	-	See AT+CGDCONT

Reference:

- GSM 07.07

4.2.6 Enter Data State: AT+CGDATA

Set command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more GPRS PDP types. This may include performing a GPRS attach and one or more PDP context activations.

Commands following +CGDATA command in the AT command line shall not be processed by the MT.

Table 4-10 AT+CGDATA action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGDATA=[<L2P> ,[<cid> [,<cid> [,…]]]]	CONNECT	If establish successful, the MT issues the intermediate result code CONNECT and enter V.25ter online data state.
		OK	When data transfer is completed, and the layer 2 protocol termination procedure has completed successfully, the V.25ter command state is re-entered and the MT returns the final result code OK.
		ERROR	If set failed
Test command	AT+CGDATA=?	+CGDATA: (list of supported <L2P>s) OK	-

Table 4-11 Parameter description

Parameter	Value	Description
<L2P>	“PPP”	A string parameter that indicates the layer 2 protocol to be used between the TE and MT
<cid>	-	Refer to AT+CGDCONT

Reference:

- GSM 07.07

4.2.7 Show PDP Address: AT+CGPADDR

Set command returns a list of PDP addresses for the specified context identifiers.

Table 4-12 AT+CGPADDR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGPADDR =[<cid> [,<cid>[,…]]]	+CGPADDR: <cid>,<PDP_addr>[<CR><LF>+CGPADDR: <cid>,<PDP_addr>[...]] OK	-
		ERROR	If list failed
Test command	AT+CGPADDR =?	+CGPADDR: (list of defined <cid>s) OK	-

Table 4-13 Parameter description

Parameter	Value	Description
<cid>	-	A numeric parameter which specifies a particular PDP context definition (see AT+CGDCONT). If <cid> is omitted, the addresses for all defined contexts are returned.
<PDP_address>	-	A string that identifies the MT in the address space applicable to the PDP. The address maybe static or dynamic. For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted when none is available.

Reference:

- GSM 07.07

4.2.8 Automatic Response to a Network Request for PDP Context Activation: AT+CGAUTO

Set command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network.

Table 4-14 AT+CGAUTO action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGAUTO=[<n>]	OK	-
		ERROR	If set failed
Read command	AT+CGAUTO?	+CGAUTO: <n> OK	-
Test command	AT+CGAUTO=?	+CGAUTO: (list of supported <n>s) OK	-

Table 4-15 Parameter description

Parameter	Value	Description
<n>	0	Turn off automatic response for GPRS only
	1	Turn on automatic response for GPRS only
	2	Modem compatibility mode, GPRS only
	[3]	Modem compatibility mode, GPRS and circuit switched calls (default)

Reference:

- GSM 07.07

Note:

If parameter <n> is omitted it is assumed to be 3.

4.2.9 Manual Response to a Network Request for PDP Context Activation: AT+CGANS

Set command requests the MT to respond to a network request for GPRS PDP context activation which has been signalled to the TE by the RING or +CRING: unsolicited result code. The <response> parameter allows the TE to accept or reject the request.

Table 4-16 AT+CGANS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGANS=[<response>,[<L2P> ,[<cid>]]]	OK	-
		ERROR	If set failed
Test command	AT+CGANS=?	+CGANS: (list of supported <response>s), (list of supported <L2P>s) OK	-

Table 4-17 Parameter description

Parameter	Value	Description
<response>	[0]	Reject the request
	1	Accept and request that the PDP context be activated
<L2P>	“PPP”	-
<cid>	-	See AT+CGDCONT

Reference:

- GSM 07.07

4.2.10 GPRS Mobile Station Class: AT+CGCLASS

Set command is used to set the MT to operate according to the specified GPRS mobile class.

Table 4-18 AT+CGCLASS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGCLASS =<class>	OK	-
		ERROR	If the <class> is not supported
Read command	AT+CGCLASS ?	+CGCLASS: <class> OK	-
Test command	AT+CGCLASS =?	+CGCLASS: (list of supported <class>s) OK	-

Table 4-19 Parameter description

Parameter	Value	Description
<class> a string parameter which indicates the GPRS mobile class (in descending order of functionality)	"B"	ClassB
	"CG"	Class C in GPRS only mode
	"CC"	Class C in circuit switched only mode (lowest)

Reference:

- GSM 07.07

4.2.11 GPRS Event Reporting: AT+CGEREP

Set command enables or disables sending of unsolicited result codes, *+CGEV: XXX* from MT to TE in the case of certain events occurring in the GPRS MT or the network.

Table 4-20 AT+CGEREP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGEREP=[<mode>[,<bfr>]]	OK	-
		ERROR	If set failed
Read command	AT+CGEREP?	+CGEREP: <mode>,<bfr> OK	-

Type	Command	Possible response(s)	Description
Test command	AT+CGEREP=?	+CGEREP: (list of supported <mode>s),(list of supported <bfr>s) OK	-

Table 4-21 Parameter description

Parameter	Value	Description
<mode>	[0]	Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
	1	Discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE.
	2	Buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE.
<bfr>	[0]	MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered.
	1	MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes).

Reference:

- GSM 07.07

Note:

- If parameter <mode> is omitted it is assumed to be the value of the last command execution or the default value (0).
- If parameter <bfr> is omitted it is assumed to be the value of the last command execution or the default value (0).

4.2.12 GPRS Network Registration Status: AT+CGREG

Set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the MT's GPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell.

Table 4-22 AT+CGREG action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGREG=[<n>]	OK	-
		ERROR	If set failed
Read command	AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>] OK	-
Test command	AT+CGREG=?	+CGREG: (list of supported <n>s) OK	-

Table 4-23 Parameter description

Parameter	Value	Description
<n>	[0]	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code +CGREG: <stat>
	2	Enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>]
<stat>	0	Not registered, ME is not currently searching a new operator to register to
	1	Registered, home network
	2	Not registered, but ME is currently searching a new operator to register to
	3	Registration denied
	4	Unknown
	5	Registered, roaming
<lac>	-	String type; Two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

Parameter	Value	Description
<ci>	-	String type; Two byte cell ID in hexadecimal format

Reference:

- GSM 07.07

Note:

If parameter <n> is omitted the command do nothing.

4.2.13 Select Service for MO SMS Messages: AT+CGSMS

Set command is used to specify the service or service preference that the MT will use to send MO SMS messages.

Table 4-24 AT+CGSMS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CGSMS=<service>	OK	-
		ERROR	If set failed
Read command	AT+CGSMS?	+CGSMS: <service> OK	-
Test command	AT+CGSMS=?	+CGSMS: (list of currently available <service>s) OK	-

Table 4-25 Parameter description

Parameter	Value	Description
<service> indicates the service or service preference to be used	0	GPRS
	1	Circuit switched
	2	GPRS preferred (use circuit switched if GPRS not available)
	3	Circuit switched preferred (use GPRS if circuit switched not available)

Reference:

- GSM 07.07

4.2.14 Request GPRS Server: ATD*99

Set command causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

The V.25ter 'D' (Dial) command causes the MT to enter the V.25ter online data state and, with the TE, to start the specified layer 2 protocol. No further commands may follow on the AT command line. The detailed behavior after the online data state has been entered is dependent on the PDP type. GPRS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the AT+CGATT and AT+CGACT commands.

Table 4-26 ATD*99 action command syntax

Type	Command	Possible response(s)	Description
Set command	ATD*99[*[<called_address>][*[<L2P>][*[<cid>]]]]#	CONNECT	Connect successful
		NO CARRIER	If the layer 2 protocol has terminated, either as a result of an orderly shut down of the PDP or an error, the MT enters V.25ter command state and returns.
		ERROR/ +CME ERROR: <err>	If error is related to ME

Table 4-27 Parameter description

Parameter	Value	Description
<called_address>	-	It shall be ignored
<L2P>	“PPP”	-
<cid>	-	See :AT+CGDCONT

Reference:

- GSM 07.07

4.2.15 Manual Acceptance of a Network Request for PDP Context Activation: ATA

This command may be used to accept a network request for a PDP context activation announced by the unsolicited result code RING.

Table 4-28 ATA action command syntax

Type	Command	Possible response(s)	Description
Set command	ATA	CONNECT	-

Reference:

- GSM 07.07

4.2.16 Manual Rejection of a Network Request for PDP Context Activation: ATH

Set command may be used to reject a network request for PDP context activation announced by the unsolicited result code RING.

Table 4-29 ATH action command syntax

Type	Command	Possible response(s)
Set command	ATH	OK

Reference:

- GSM 07.07

Chapter 5 Commands Specified by GSM Rec.07.05

5.1 About This Chapter

This chapter describes the AT commands specified by GSM Rec.07.05, including:

- General Configuration Commands
- Message Configuration Commands
- Message Receiving and Reading Command
- Message Sending and Writing Commands

5.2 General Configuration Commands

5.2.1 Select Message Service: AT+CSMS

Table 5-1 AT+CSMS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSMS=<service>	+CSMS: <mt>,<mo>,<bm> OK	TA returns the type of messages supported by ME.
		+CMS ERROR: <err>	If chosen service is not supported by ME, TA will be return.
Read command	AT+CSMS?	+CSMS: <service>,<mt>,<mo>,<bm> OK	--
Test command	AT+CSMS=?	+CSMS: (list of supported <service>s) OK	--

Table 5-2 Parameter description

Parameter	Value	Description
<service>	[0]	GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0; Phase 2+ features which do not require new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes))
	1	GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2+ version; The requirement of <service> setting 1 is mentioned under corresponding command descriptions)
<mt> mobile terminated messages	0	Type not supported
	1	Type supported
<mo> mobile originated messages	0	Type not supported
	1	Type supported
<bm> broadcast type messages	0	Type not supported
	1	Type supported

Reference:

- GSM 07.05

5.2.2 Preferred Message Storage: AT+CPMS

Set command selects memory storages <mem1>, <mem2>and <mem3> to be used for reading, writing, etc.

Table 5-3 AT+CPMS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK	--
		+CMS ERROR: <err>	If chosen storage is not appropriate for ME

Type	Command	Possible response(s)	Description
Read command	AT+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK	--
		+CMS ERROR: <err>	If error is related to ME functionality
Test command	AT+CPMS=?	+CPMS: (list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s) OK	--

Table 5-4 Parameter description

Parameter	Value	Description
<mem1> memory to be used when reading and deleting messages	"SM"	SIM message storage
	"ME"	ME message storage
<mem2> memory to be used when writing and sending messages	"SM"	SIM message storage
	"ME"	ME message storage
<mem3> received messages will be placed to this storage if routing to TE is not set	"SM"	SIM message storage
	"ME"	ME message storage
<usedx>	--	Number of messages currently in <memx>
<totalx>	--	Number of messages storable in <memx>

Reference:

- GSM 07.05

5.2.3 SMS Format: AT+CMGF

Set command specifies the input and output format of the short messages.

Table 5-5 AT+CMGF action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMGF=[<mode>]	OK	--
Read command	AT+CMGF?	+CMGF: <mode> OK	--
Test command	AT+CMGF=?	+CMGF: (list of supported <mode>s) OK	--

Table 5-6 Parameter description

Parameter	Value	Description
<mode>	[0]	PDU mode
	1	TEXT mode

Reference:

- GSM 07.05

5.2.4 Message Service Failure Result Code: +CMS ERROR

Table 5-7 +CMS ERROR action command syntax

Type	Command	Possible response(s)	Description
--	--	+CMS ERROR <err>	--

Table 5-8 Parameter description

Parameter	Value	Description
<err>	0~127	GSM 04.11 Annex E-2 values
	128~255	GSM 03.40 subclause 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
	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 acknowledgement expected
	500	Unknown error
	511	Other values in range 25~511 are reserved
	512	Manufacturer specific

5.3 Message Configuration Commands

5.3.1 Service Centre Address: AT+CSCA

Set command updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, setting is used by send and set commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into <pdu> parameter equals zero.

Table 5-9 AT+CSCA action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSCA=<sca>[,<tosca>]	OK	--
Read command	AT+CSCA?	+CSCA: <sca>,<tosca> OK	--
Test command	AT+CSCA=?	OK	--

Table 5-10 Parameter description

Parameter	Value	Description
<sca>	--	GSM 04.11 RP SC address Address value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by <tosca>
<tosca>	--	Service centre address format GSM 04.11 RP SC address Type-of-Address octet in integer format (default refer <toda>)

Reference:

- GSM 07.05

Note:

The SMS service centre address should be entered as specified by the service provider.

5.3.2 Set Text Mode Parameters: AT+CSMP

Set command is used to select values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0~255) or define the absolute time of the validity period termination (<vp> is a string). The format of <vp> is given by <fo>. If TA supports the enhanced validity period format ($(EVPF)$, see GSM 03.40), it shall be given as a hexadecimal coded string (refer e.g. <pdu>) with double quotes.

Table 5-11 AT+CSMP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK	--
Read command	AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs> OK	--
Test command	AT+CSMP=?	OK	--

Table 5-12 Parameter description

Parameter	Value	Description
<fo>	--	Depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), or SMS-COMMAND (default 2) in integer format.
<vp>	--	Depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167), in time-string format (refer <dt>), or if $(EVPF)$ is supported, in enhanced format (hexadecimal coded string with double quotes)
<pid>	--	Refer GSM 03.40, TP-Protocol-Identifier in integer format (default 0)
<dcs>	--	Depending on the command or result code: GSM 03.38, SMS Data Coding Scheme, or Cell Broadcast Data Coding Scheme in integer format

Reference:

- GSM 07.05

Note:

- When storing a SMS-DELIVER from the TE to the preferred memory storage in text mode (refer command Write Message to Memory +CMGW), <vp> field can be used for <scts>.
- The default values of <dcs> depend on SIM card and coding scheme for sending messages in text mode. If the value of <dcs> is 8, the UCS2 coding scheme is used. If the value of <dcs> is 0, the ASCII coding scheme is used.

5.3.3 Show Text Mode Parameters: AT+CSDH

Set command controls whether detailed header information is shown in text mode result codes.

Table 5-13 AT+CSDH action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSDH=[<show>]	OK	--
Read command	AT+CSDH?	+CSDH: (list of supported <show>s) OK	--
Test command	AT+CSDH=?	+CSDH: <show> OK	--

Table 5-14 Parameter description

Parameter	Value	Description
<show>	0	Do not show header values defined in commands +CMT and +CMGL, or +CMGR (<sca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CSCA, +CSMP result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; For SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>
	[1]	Show the values in result codes

Reference:

- GSM 07.05

5.3.4 Select Cell Broadcast Message Type: AT+CSCB

Set commands selects which type of CBMs are to be received by the ME.

Table 5-15 AT+CSCB action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CSCB=[<mode>[,<mids>[,<dcss>]]]	OK	--
Read command	AT+CSCB?	+CSCB: <mode>,<mids>,<dcss> OK	--
Test command	AT+CSCB=?	+CSCB: (list of supported <mode>s) OK	--

Table 5-16 Parameter description

Parameter	Value	Description
<mode>	[0]	Message types specified in <mids> and <dcss> are accepted
	1	Message types specified in <mids> and <dcss> are not accepted
<mids>	--	String type(e.g. "0,1,5,320-478,922"); All different possible combinations of CBM message identifiers (refer <mid>);
<dcss>	--	String type(e.g. "0-3,5"); All different possible combinations of CBM data coding schemes (refer <dcs>) (default is empty string);

Reference:

- GSM 07.05

Note:

Supported values for parameter <mids> and <dcss>: maximum of 20 ranges could be declared for each parameter.

5.3.5 Saving Setting: AT+CSAS

Set command saves active message service settings to a non-volatile memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB (if implemented) are saved.

Table 5-17 AT+CSAS action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CSAS[=<profile>]	OK	--
		+CMS ERROR: <err>	If the setting is not be supported(e.g. SIM SMS parameters)
Test command	AT+CSAS=?	+CSAS: (list of supported <profile>s) OK	--

Table 5-18 Parameter description

Parameter	Value	Description
<profile>	[0]~255	Manufacturer specific profile number where settings are to be stored

Reference:

- GSM 07.05

5.3.6 Restore Settings: AT+CRES

Set command restores message service settings from non-volatile memory to active memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB (if implemented) are restored.

Table 5-19 AT+CRES action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CRES[=<profile>]	OK	--
		+CMS ERROR: <err>	If the setting is not be supported(e.g. SIM SMS parameters)
Test command	AT+CRES=?	+CRES: (list of supported <profile>s) OK	--

Table 5-20 Parameter description

Parameter	Value	Description
<profile>	[0]~255	Manufacturer specific profile number where settings are to be stored

Reference:

- GSM 07.05

5.4 Message Receiving and Reading Command

5.4.1 New Message Indications to TE: AT+CNMI

Set command selects the procedure, how receiving of new messages from the network is indicated to the TE when TE is active, (e.g. DTR signal is ON.) If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in GSM 03.38.

If DTR signal is not available or the state of the signal is ignored (V.25ter command &D0), reliable message transfer can be assured by using +CNMA acknowledgement procedure.

Command Select Message Service +CSMS should be used to detect ME support of mobile terminated SMs and CBMs, and to define whether a message routed directly to TE should be acknowledged or not (refer command +CNMA).

Table 5-21 AT+CNMI action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK	--
		+CMS ERROR <err>	If failed
Read command	AT+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK	--
Test command	AT+CNMI=?	+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s) OK	--

Table 5-22 Parameter description

Parameter	Value	Description
<mode> control the processing of unsolicited result codes specified	[0]	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
	1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
	2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

Parameter	Value	Description
<mt> the rules for storing received SMs depend on its data coding scheme (refer GSM 03.38 [2]), preferred memory storage (+CPMS) setting and this value	[0]	No SMS-DELIVER indications are routed to the TE.
	1	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index>
	2	SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code: +CMT([<alpha>],<length><CR><LF><pdu> (PDU mode enabled)) or +CMT(<oa>, [<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled)); NOTE: If AT command interface is acting as the only display device, the ME must support storing of class 0 messages and messages in the message waiting indication group (discard message)
	3	Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.
<bm> the rules for storing received CBMs depend on its data coding scheme (refer GSM 03.38 [2]), the setting of Select CBM Types (+CSCB) and this value;)	[0]	No CBM indications are routed to the TE.
	2	New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode enabled) or +CBM:<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)

Parameter	Value	Description
<ds>	[0]	No SMS-STATUS-REPORTs are routed to the TE.
	1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled) or +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)
<bfr>	[0]	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1~3 is entered (OK response shall be given before flushing the codes).
	1	TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1~3 is entered.

Reference:

- GSM 07.05

5.4.2 List Messages: AT+CMGL

List messages with status value <stat> from preferred message storage <mem1> to the TE. If the status of the message is 'received unread', change to 'received read'.

Table 5-23 AT+CMGL action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CMGL[=<stat>]	+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF>+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu>[...]] OK	If PDU mode (+CMGF=0) and command successful

Type	Command	Possible response(s)	Description
		+CMGL:<index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF>+CMGL:<index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]] OK	If text mode (+CMGF=1) and command successful for SMS-SUBMITs and/or SMS-DELIVERs
		+CMGL:<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF>+CMGL:<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...]] OK	SMS-STATUS-REPORTs
		+CMGL:<index>,<stat>,<fo>,<ct>[<CR><LF>+CMGL:<index>,<stat>,<fo>,<ct>[...]] OK	SMS-COMMANDs
		+CMS ERROR: <err>	If list failed
		+CMGL: (list of supported <stat>s) OK	--
Test command	AT+CMGL=?	+CMGL: (list of supported <stat>s) OK	--

Table 5-24 Parameter description

Parameter	Value	Description
<stat>	"REC UNREAD"	If text mode (+CMGF=1) received unread message
	"REC READ"	If text mode (+CMGF=1) received read message
	"STO UNSENT"	If text mode (+CMGF=1) stored unsent message

Parameter	Value	Description
	"STO SENT"	If text mode (+CMGF=1) stored sent message
	"ALL"	If text mode (+CMGF=1) all messages
	0	If PDU mode (+CMGF=0) received unread message
	1	If PDU mode (+CMGF=0) received read message
	2	If PDU mode (+CMGF=0) stored unsent message
	3	If PDU mode (+CMGF=0) stored sent message
	4	If PDU mode (+CMGF=0) all messages
<alpha>	--	String type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; Implementation of this feature is manufacturer specific; Used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in TS 07.07)
<dt>	--	GSM 03.40 TP-Discharge-Time in time-string format: “yy/MM/dd,hh:mm:ss±zz”, where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1995, 22:10:00 GMT+2 hours equals to “95/05/06,22:10:00+08”
<fo>	--	Depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format
<length>	--	Integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; Or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e.the RP layer SMSC address octets are not counted in the length)
<ct>	--	GSM 03.40 TP-Command-Type in integer format (default 0)

Parameter	Value	Description
<da>	--	GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); Type of address given by <toda>
<index>	--	Integer type; Value in the range of location numbers supported by the associated memory
<mr>	--	GSM 03.40 TP-Message-Reference in integer format
<oa>	--	GSM 03.40 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; Type of address given by <tooa>
<pdu>	--	In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format.
<ra>	--	GSM 03.40 TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; Type of address given by <tora>
<scts>	--	GSM 03.40 TP- Service-Centre-Time-Stamp in time-string format (refer <dt>)
<st>	--	GSM 03.40 TP-Status in integer format
<toda>	--	GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145,otherwise default is 129)
<tooa>	--	GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer<toda>)
<tora>	--	GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer<toda>)

Reference:

- GSM 07.05

5.4.3 Read Message: AT+CMGR

TA returns message with location value <index> from message storage <mem1> to the TE. If status of the message is 'received unread', change to “received read”.

Table 5-25 AT+CMGR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMGR=<index>	+CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> OK	If PDU mode (+CMGF=0) and command successful
		+CMGR:<stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> OK	If text mode (+CMGF=1) and command successful for SMS-DELIVER
		+CMGR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> OK	If text mode (+CMGF=1) and command successful for SMS-SUBMIT
		+CMGR:<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> OK	If text mode (+CMGF=1) and command successful for SMS-STATUS-REPORT
		+CMGR:<stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>] OK	If text mode (+CMGF=1) and command successful for SMS-COMMAND
		+CMS ERROR: <err>	If read failed
		OK	--
Test command	AT+CMGR=?	OK	--

Table 5-26 Parameter description

Parameter	Value	Description
<dcs>	--	Depending on the command or result code: GSM 03.38 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format
<cdata>	--	GSM 03.40 TP-Command-Data in text mode responses; ME/TA converts each 8-bit octet into two IRA character long hexadecimal numbers (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
<pid>	--	GSM 03.40 TP-Protocol-Identifier in integer format (default 0)
<sca>	--	GSM 04.11 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCSin TS 07.07); Type of address given by <tosca>
<tosca>	--	GSM 04.11 RP SC address Type-of-Address octet in integer format (default refer <toda>)
<vp>	--	Depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format(default 167), in time-string format (refer <dt>), or if $(EVPF)$ is supported, in enhanced format (hexadecimal coded string with double quotes)

Reference:

- GSM 07.05

5.4.4 New Message Acknowledge: AT+CNMA

Set command confirms correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE.

Table 5-27 AT+CNMA action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CNMA	OK	--
	AT+CNMA[=<n>[,<length>[<CR>PDU is given <ctrl-Z/ESC>]]]	+CMS ERROR <err>	If PDU mode (+CMGF=0) and command failed

Type	Command	Possible response(s)	Description
Test command	AT+CNMA=?	OK	--
		+CNMA: (list of supported <n>s)	If PDU mode

Table 5-28 Parameter description

Parameter	Value	Description
<n>	0	Command operates similarly as defined for the text mode
	1	Send RP-ACK (or buffered result code received correctly)
	2	Send RP-ERROR (if PDU is not given, ME/TA shall send SMS-DELIVER-REPORT with GSM 03.40 TP-FCS value set to 'FF' (unspecified error cause))

Reference:

- GSM 07.05

5.5 Message Sending and Writing Commands

5.5.1 Send Message: AT+CMGS

Set command serves to transmit SMS from TE to network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code.

Table 5-29 AT+CMGS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMGS=<da>[,<toda>]<CR>text to send <ctrl-Z/ESC>	+CMGS: <mr>[,<scts>] OK	If text mode(+CMGF=1) and command successful
		+CMS ERROR: <err>	If text mode (+CMGF=1) and command failed

Type	Command	Possible response(s)	Description
	AT+CMGS=<length><CR> PDU to send<ctrl-Z/ESC>	+CMGS: <mr>[,<ackpdu>] OK	If PDU mode(+CMGF=0) and command successful
		+CMS ERROR: <err>	If PDU mode (+CMGF=0) and command failed
Test command	AT+CMGS=?	OK	--

Table 5-30 Parameter description

Parameter	Value	Description
<da>	--	GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); Type of address given by <toda>
<pdu>	--	In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format.
<length>	--	Integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; Or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<mr>	--	GSM 03.40 TP-Message-Reference in integer format
<scts>	--	GSM 03.40 TP- Service-Centre-Time-Stamp in time-string format (refer <dt>)
<dt>	--	GSM 03.40 TP-Discharge-Time in time-string format: “yy/MM/dd,hh:mm:ss±zz”, where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1995, 22:10:00 GMT+2 hours equals to “95/05/06,22:10:00+08”

Parameter	Value	Description
<ackpdu>	--	GSM 03.40 RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without GSM 04.11 SC address field and parameter shall be enclosed in double quote characters like a normal string type parameter.
<toda>	--	GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145,otherwise default is 129)

Reference:

- GSM 07.05

5.5.2 Send Message from Storage: AT+CMSS

Set command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code.

Table 5-31 AT+CMSS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr>[,<scts>]	If text mode (+CMGF=1) and command successful
		+CMS ERROR: <err>	If text mode (+CMGF=1) and command failed
		+CMSS: <mr>[,<ackpdu>]	If PDU mode (+CMGF=0) and command successful
		+CMS ERROR: <err>	If PDU mode (+CMGF=0) and command failed
Test command	AT+CMSS=?	OK	--

Table 5-32 Parameter description

Parameter	Value	Description
<ackpdu>	--	GSM 03.40 RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without GSM 04.11 SC address field and parameter shall be enclosed in double quote characters like a normal string type parameter
<index>	--	Integer type; Value in the range of location numbers supported by the associated memory
<da>	--	GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); Type of address given by <toda>
<toda>	--	GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145,otherwise default is 129)
<mr>	--	GSM 03.40 TP-Message-Reference in integer format
<scts>	--	GSM 03.40 TP- Service-Centre-Time-Stamp in time-string format (refer <dt>)

Reference:

- GSM 07.05

5.5.3 Write Message to Memory: AT+CMGW

Set command serves to transmit SMS (either SMSDELIVER or SMS-SUBMIT) from TE to memory storage <mem2>. Memory location <index> of the stored message is returned. Message status will be set to stored unsent unless otherwise given in parameter <stat>.

Table 5-33 AT+CMGW action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT+CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR> text is entered<ctrl-Z/ESC>	+CMGW: <index> OK	If text mode (+CMGF=1) and command successful
		+CMS ERROR: <err>	If text mode (+CMGF=1) and command failed
	AT+CMGW=<length>[,<stat>]<CR> PDU is given <ctrl-Z/ESC>	+CMGW: <index> OK	If PDU mode (+CMGF=0) and command successful
		+CMS ERROR: <err>	If PDU mode (+CMGF=0) and command failed
Test command	AT+CMGW=?	OK	--

Table 5-34 Parameter description

Parameter	Value	Description
<da>	--	GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); Type of address given by <toda>
<oa>	--	GSM 03.40 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; Type of address given by <tooa>
<toda>	--	GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145,otherwise default is 129)
<tooa>	--	GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer<toda>)

Parameter	Value	Description
<stat>	"REC UNREAD"	Received unread message(+CMGF=1)
	“REC READ"	Received read message(+CMGF=1)
	"STO UNSENT"	Stored unsent message(+CMGF=1)
	"STO SENT"	Stored sent message(+CMGF=1)
	0	Received unread message(+CMGF=0)
	1	Received read message(+CMGF=0)
	2	Stored unsent message(+CMGF=0)
	3	Stored sent message(+CMGF=0)

Reference:

- GSM 07.05

5.5.4 Delete Message: AT+CMGD

Set command deletes message from preferred message storage <mem1> location <index>.

Table 5-35 AT+CMGD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMGD=<index>[,<delflag>]	OK	If delete successful
		+CMS ERROR: <err>	If failed
Test command	AT+CMGD=?	OK	-

Table 5-36 Parameter description

Parameter	Value	Description
<index>	-	Integer type; Value in the range of location numbers supported by the associated memory
<delflag>	-	Delete messages specified by <index>.
	0	Delete messages specified by <index>.
	1	Delete all read messages.
	2	Delete all read and sent messages.
	3	Delete all read messages,all sent messages and drafts.
	4	Delete all messages.

Reference:

- GSM 07.05

5.5.5 Send Command: AT+CMGC

Table 5-37 AT+CMGC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR> text is entered <ctrl-Z/ESC>	+CMGC: <mr>[,<scts>]	If text mode (+CMGF=1) and command successful
		+CMS ERROR: <err>	If text mode (+CMGF=1) and command failed
	AT+CMGC=<length><CR> PDU is given<ctrl-Z/ESC>	+CMGC: <mr>[,<ackpdu>]	If PDU mode (+CMGF=0) and command successful
		+CMS ERROR: <err>	If PDU mode (+CMGF=0) and command failed
Test command	AT+CMGC=?	OK	--

Table 5-38 Parameter description

Parameter	Value	Description
<length>	--	Integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; Or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e.the RP layer SMSC address octets are not counted in the length)
<toda>	--	GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43)default is 145, otherwise default is 129)
<pdu>	--	In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format.

Parameter	Value	Description
<mr>	--	GSM 03.40 TP-Message-Reference in integer format
<fo>	--	Depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS -COMMAND (default 2) in integer format
<ct>	--	GSM 03.40 TP-Command-Type in integer format (default 0)
<pid>	--	GSM 03.40 TP-Protocol-Identifier in integer format (default0)
<da>	--	GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <toda>
<scts>	--	GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer to <dt>)

Reference:

- GSM 07.05

Chapter 6 Enhanced AT Commands

6.1 About This Chapter

This chapter describes the Enhanced AT command, including:

- HUAWEI Specific AT Commands
- AT Commands for Audio Setting

6.2 HUAWEI Specific AT Commands

6.2.1 Network registration and service selection: AT%NRG

Execute this command to force an attempt to select and register the GSM network operator.

<regMode> is used to select whether the selection is done automatically by the ME or is forced by this command to operator <opr> (it shall be given in format <oprFrmt>). If the selected operator is not available, no other operator is selected (except <regMode>=4). The selected operator name format shall apply to further read commands (AT%NRG?) too.

<srvMode> is used to specify the different stages of service to register to. <srvMode>=3 can be used to change the behavior of registration in case of a loss of coverage. If connection to the operator is lost and <regMode> was set to automatic, ME tries to register to the previous operator automatically. In case <regMode> was set to manual, ME stays unregistered and waits for a manual registration attempt. Refer subclause 9.2 of [GSM 07.07] for possible <err> values. This command is abortable when registration attempt is made.

Read command returns the current registration mode, service mode, service status and the currently selected operator. If no operator is selected, <oprFrmt> and <opr> are omitted.

Test command returns facility values supported by the TA as a compound value.

Note:

The command AT%NRG is an expansion of the AT+COPS command. The new command allows specifying the service state of the registration. For a list of current available network operators please use the test command of AT+COPS.

Table 6-1 AT%NRG action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NRG=[<regMode>[,<srvMode>[,<oprFrmt>[,<opr>]]]]	OK	-
		ERROR	-
Read command	AT%NRG?	%NRG: <regMode>,<srvMode>,[<oprFrmt>],<srvStat>,[<opr>] OK	-
Test command	AT%NRG=?	%NRG: (list of supported <regMode>s), (list of supported <srvMode>s), (list of supported <oprFrmt>s) OK	-

Table 6-2 Parameter description

Parameter	Value	Description
<regMode>	0	Automatic registration (<opr> field is ignored)
	1	Manual registration (<opr> field shall be present on registration attempt)
	4	Manual/automatic (<opr> field shall be present); if manual selection fails, automatic mode (<regMode>=0) is entered
<srvMode>	0	Full service
	1	Limited service
	2	No service
	3	Set registration mode only
<oprFrmt>	0	Long format alphanumeric <opr>
	1	Short format alphanumeric <opr>
	2	Numeric <oprr>
< srvStat >	0	Full service
	1	Limited service
	2	No service
	3	Set registration mode only

Parameter	Value	Description
<opr>	--	String type; <oprFrmt> Indicates if the format is alphanumeric or numeric; Long alphanumeric format can be up to 16 characters long and short format up to 8 characters; numeric format is the GSM Location Area Identification number (refer GSM 04.08 subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A, plus a two BCD digit network code, which is administration specific; returned <opr> shall not be in BCD format, but in IRA characters converted from BCD; hence the number has structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 2)(network code digit 1)

6.2.2 Query accumulated call meter using PUCT: AT%CACM

Execute this command to return the current value of the accumulated call meter, calculated with the values given by the price per unit and currency table stored in SIM. Refer subclause 9.2 of [GSM 07.07] for possible <err> values.

Table 6-3 AT%CACM action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%CACM	%CACM: <cur>,<price> OK	OK
		ERROR	If failed
Test command	AT%CACM=?	OK	-

Table 6-4 Parameter description

Parameter	Description
<cur>	String type; Three-character currency code (e.g. "GBP", "DEM"); character set as specified by command Select TE Character Set +CSCS
<price>	String type; Calculated price value of accumulated call meter; Dot is used as a decimal separator (e.g."2.66")

6.2.3 Query current call meter using PUCT: AT%CAOC

Execute this command to return the current value of the current call meter, calculated with the values given by the price per unit and currency table stored in SIM. Refer subclause 9.2 of [GSM 07.07] for possible <err> values.

Table 6-5 AT%CAOC action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%CAOC	%CAOC: <cur>,<price> OK	OK
		ERROR	If failed
Test command	AT%CAOC=?	OK	--

Table 6-6 Parameter description

Parameter	Description
<cur>	String type; Three-character currency code (e.g. "GBP", "DEM"); character set as specified by command Select TE Character Set +CSCS
<price>	String type; Calculated price value of accumulated call meter; Dot is used as a decimal separator (e.g."2.66")

6.2.4 Call timer value: AT%CTV

Execute this command to return the current value of the last call duration in seconds. Refer subclause 9.2 of [GSM 07.07] for possible <err> values.

Table 6-7 AT%CTV action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%CTV	%CTV: <dur> OK	OK
		ERROR	If failed
Test command	AT%CTV=?	OK	--

Table 6-8 Parameter description

Parameter	Description
<dur>	Integer type; Represents the duration of the last call in unit of seconds.

Note:

This value does not necessary refer to the actual call duration only. It may include the call setup time. For details about how to get accurate time, refer to commands "AT%LCD" and AT%TCD".

6.2.5 Call progress information: AT%CPI

This command refers to call progress information, which is indicated by the network during call establishment. The set command enables/disables the presentation of unsolicited notification result codes from TA to TE.

When <n>=1 and a call progress information is received during a call establishment, intermediate result code %CPI: <cId>,<msgType>,<ibt>,<tch> is sent to TE.

<cId> identifies the call in the call table.

The value of <msgType> describes the layer 3 message type that was used to transfer the call progress information.

The state of TCH assignment and the use of in-band tones for that call can be monitored by the values of <ibt> and <tch>.

Execute this command to return values supported by the TA as compound value.

Table 6-9 AT%CPI action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%CPI=<n>	OK	-
		ERROR	-
Read command	AT%CPI?	%CPI: <n> OK	-
Test command	AT%CPI=?	%CPI: (list of supported <n>s) OK	-

Table 6-10 Parameter description

Parameter	Value	Description
<n> parameter sets/shows the result code presentation status in the TA	0	Disable
	1	Enable
	2	Enable with call number information
	3	Enable with call number information, GSM cause information and ALS line information
<cId>	-	Integer type; Call identification number as described in GSM 02.30 subclause 4.5.5.1
<msgType> layer 3 message type	0	Setup message
	1	Disconnect message
	2	Alert message
	3	Call proceed message
	4	Synchronization message
<ibt> status of the usage of in-band tones	0	No in-band tones
	1	In-band tones
<tch> TCH assignment	0	TCH not assigned
	1	TCH assigned

6.2.6 Configuration for SIM application toolkit: AT%SATC

This command refers to the SIM application toolkit download mechanism, which is used to indicate to the SIM the features that the ME is capable of. The different features that are possible for a proactive SIM card are summarized by a table called a profile, refer to GSM 11.14 for more details. HUAWEI's ACI, SMS and SIM modules already implement some of these features. Therefore the profile that is indicated by <satPrfl> will be combined with the existing one. The current profile setting could be displayed using the read command. <n> is used to enable/disable the presentation of unsolicited notification result codes from TA to TE.

When <n>=1 and one of the following conditions have occurred, the respective unsolicited result is sent to TE.

- A command received from the SIM that is not handled by ME is indicated to TE by %SATI: <satCmd>.

- The result to an envelope command, which was sent by TE, is indicated using the result %SATE: <satRsp>. For more information regarding the sending of envelope commands to SIM, please refer to the %SATE command description.
- If SIM application toolkit tries to set up a call using the Set Up Call feature described in GSM 11.14, and the conditions for the call are checked by ME successfully, the call is indicated to TE using the result %SATA:[<rdl>]. Using the accept command A, ME tries to establish the call, otherwise the hook-on command H rejects the pending SAT call and sends the respective response to SIM.
- In general, commands or responses sent by ME to SIM or commands handled by ME are indicated to TE using the result %SATN: <satNtfy>. With these notifications, TE shall be able to indicate appropriate messages to a user.

Table 6-11 AT%SATC action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SATC=<n>,<satPrfl>	OK	-
		ERROR	-
Read command	AT%SATC?	%SATC: <n>,<satPrfl> OK	-
Test command	AT%SATC=?	%SATC: (list of supported <n>s),(<prflLen>) OK	-

Table 6-12 Parameter description

Parameter	Value	Description
<n>	0	Unsolicited SAT output disabled
	1	Unsolicited SAT output enabled
	2	Class E unsolicited SAT output enabled
<satPrfl>	-	String type; SIM application toolkit profile (hexadecimal format; refer +CSCS) starting with first byte of the profile
<satCmd>	-	String type; SIM application toolkit command (hexadecimal format; refer +CSCS) starting with command tag
<satRsp>	-	String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte of response data
<satNtfy>	-	String type; Commands or responses sent by ME to SIM or commands handled by ME (hexadecimal format; refer +CSCS) starting with first byte of response data or command tag

Parameter	Value	Description
<rdl>	-	Integer type; If a pending SIM application toolkit command is alerted to TE using result %SATA:, The value of <rdl> indicates the redial timeout for the call in unit of milliseconds

6.2.7 Send SAT envelope command: AT%SATE

This command provides the possibility to send a command to the SIM, using the envelope mechanism of SIM application toolkit as described in GSM 11.14. If <satCmd> is present, the contents is converted and send directly to SIM. The coding of the SIM command is the task of TE, no checking is done by ME. As soon as a response from the SIM is received, the contents is send to ME using the result %SATE: <satRsp>.

Table 6-13 AT%SATE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SATE=<satCmd>	%SATE: <satRsp> OK	-
		ERROR	-
Test command	AT%SATE=?	OK	-

Table 6-14 Parameter description

Parameter	Description
<satCmd>	String type; SIM application toolkit command (hexadecimal format; refer +CSCS) starting with command tag
<satRsp>	String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte of response data

6.2.8 Send SAT command response: AT%SATR

This command provides the possibility to send a response to previous received SAT command. If a SIM application toolkit command was indicated to TE using the result %SATI: <satCmd>, the TE should send an appropriate response using the AT%SATR command. If <satRsp> is present, the contents is converted and send directly to SIM. The coding of the SIM response is the task of TE, no checking is done by ME.

Table 6-15 AT%SATR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SATR=<satRsp>	OK	-
		ERROR	-
Test command	AT%SATR=?	OK	-

Table 6-16 Parameter description

Parameter	Description
<satRsp>	String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte of response data

6.2.9 Terminate SAT command or session: AT%SATT

Execute this command to terminate a SIM application toolkit command or session. If <cs> is present, the value is coded and send to the SIM to terminate the command or session. For example, if a SAT Call Set up was indicated with the result %SATA: 60, and the redialing time is exceeded, TE shall send the cause 'end of redialing reached' to ME.

Table 6-17 AT%SATT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SATT=<cs>	OK	-
		ERROR	-
Test command	AT%SATT=?	OK	-

Table 6-18 Parameter description

Parameter	Value	Description
<cs> cause of command or session termination	0	User stopped redialing
	1	End of redialing reached
	2	User ends session

6.2.10 GPRS Byte counter: AT%SNCNT

Execute this command to return or reset the byte counts of every current connection.

Table 6-19 AT%SNCNT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SNCNT=<rst>	OK	-
		ERROR	-
Read command	AT%SNCNT?	%SNCNT: <nsapi1>, <upo>, <dno>, <upp>, <dnp><CR><LF> %SNCNT: <nsapi2>, <upo>, <dno>, <upp>, <dnp><CR><LF> ... OK	-
Test command	AT%SNCNT=?	%SNCNT: (0) OK	-

Table 6-20 Parameter description

Parameter	Description
<rst>	Resets the counters if rst = 0
<nsapi>	Connection id
<upo>	Uplink octets count
<dno>	Downlink octets count
<upp>	Uplink packets count
<dnp>	Downlink packets count

6.2.11 Automatic attach mode: AT%CGAATT

Execute this command to chose the behavior of the attach procedure.

Table 6-21 AT%CGAATT action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%CGAATT=<att_m>,<det_m>	OK	-
		ERROR	-

Read command	AT%CGAATT?	%CGAATT: <att_m>,<det_m> OK	-
Test command	AT%CGAATT=?	%CGAATT(list of supported <att_m>s), (list of supported <det_m>s) OK	-

Table 6-22 Parameter description

Parameter	Value	Description
<att_m> automatic attach mode	0	Automatic attach
	1	Manuel attach
<det_m> automatic detach mode	0	Automatic detach after last context deactivation
	1	Manuel detach

6.2.12 Ciphering indication: AT%CPRI

Execute this command to enable or disable ciphering indications.

If enabled, ciphering indications are routed to the TE using unsolicited result code: %CPRI: <network_state>,<network_state>. The first parameter is for GSM, the second parameter is for GPRS.

If ciphering indications are disabled on the SIM, the command AT%CPRI=<mode> returns +CME ERROR: <err>.

Table 6-23 AT%CPRI action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%CPRI=<mode>	OK	-
		ERROR	-
Read command	AT%CPRI?	%CPRI: <state> OK	-
Test command	AT%CPRI=?	%CPRI: (list of supported <mode>s) OK	-

Table 6-24 Parameter description

Parameter	Value	Description
<mode> enable or disable ciphering indications	0	Don't show ciphering indications
	[1]	Show ciphering indications
<network_state>	0	Ciphering disabled
	1	Ciphering enabled
	2	Ciphering state not applicable (ciphering state not changed)
<state>	0	Don't show ciphering indications (ciphering indications are enabled on the SIM or SIM is removed)
	1	Show ciphering indications (ciphering indications are enabled on the SIM or SIM is removed)
	2	Ciphering indications are disabled on the SIM

6.2.13 GPRS extended registration state: AT%CGREG

Execute this command to report extended information about GPRS registration state.

AT%CGREG behaves exactly as AT+CGREG does. In addition AT%CGREG supports three states AT+CGREG does not support.

Table 6-25 AT%CGREG action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%CGREG=<mode>	OK	-
		ERROR	-
Read command	AT%CGREG?	%CGREG: <mode>,<stat>,[<lac>],[<ci>],[<state>] OK	-
Test command	AT%CGREG=?	%CGREG: (list of supported <mode>s) OK	-

Table 6-26 Parameter description

Parameter	Value	Description
<mode> enable or disable extended GPRS registration state reporting	0	Registration state reported
	1	Registration state not reported
	2	Registration state and location information reported
	3	Registration state and location information during PDP activation or deactivation reported

Parameter	Value	Description
<state>	0	Not registered
	1	Registered to home network
	2	Not yet registered, but searching for network to register to
	3	Registration denied
	4	Unknown state
	5	Registered to foreign network (roaming)
	6	Limited service (cell might be overloaded)
	7	GSM call active
	8	No cell available
	9	Next attempt to update MS
<lac>	-	Location area code
<ci>	-	Cell ID
<state>	0	No PDP context activated
	1	One or more PDP contexts activated

6.2.14 SIM card insert indication: AT%TSIM

Table 6-27 AT%TSIM action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%TSIM	%TSIM <n> OK	-

Table 6-28 Parameter description

Parameter	Value	Description
<n>	0	SIM card not inserted
	1	SIM card inserted

6.2.15 Last call duration: AT%LCD

TA return the last call duration.

Table 6-29 AT%LCD action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%LCD	%LCD <time> OK	-

Table 6-30 Parameter description

Parameter	Value	Description
<time>	hh:mm:ss	String type, The max value is 23:59:59, where the character indicate hour, minute and second. It won't be lost by power off.

6.2.16 Total call duration: AT%TCD

TA returns the last call duration.

Table 6-31 AT%TCD action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%TCD	%TCD <time> OK	-

Table 6-32 Parameter description

Parameter	Value	Description
<time>	hhhhh:mm:ss	String type, The max value is 19999:59:59, where the characters indicate hour ,minute and second. It won't be lost by power off.

6.2.17 GTM900 power off: AT%MSO

Table 6-33 AT%MSO action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%MSO	无返回值	-

6.2.18 List Messages: AT%MGL

Execute this command to list messages with status value <stat> from preferred message storage <mem1> to the TE. But the state of messages is unchanged. If status of the message is 'received unread', status in the storage is still “received unread”.

Table 6-34 AT%MGL action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%MGL[=<stat>]	%MGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF>%MGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu>[...]] OK	If PDU mode (+CMGF=0) and command successful
		%MGL:<index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF>%MGL:<index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]] OK	If text mode (+CMGF=1), command successful SMS-SUBMITs and/or SMS-DELIVERs
		%MGL:<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF>%MGL:<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...]] OK	SMS-STATUS-REPORTs

Type	Command	Possible response(s)	Description
		%MGL:<index>,<stat>,<fo>,<ct>[<CR><LF>%MGL:<index>,<stat>,<fo>,<ct>[...]] OK	SMS-COMMANDs
		ERROR	If list failed
Test command	AT%MGL=?	%MGL: (list of supported <stat>s) OK	

For parameter description, refer to the AT+CMGL command.

6.2.19 Read Message: AT%MGR

TA returns message with location value <index> from message storage <mem1> to the TE. But the state of messages is unchanged. If status of the message is 'received unread', status in the storage is still “received unread”.

Table 6-35 AT%MGR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%MGR=<index>	%MGR: <stat>,[<alpha>],<length><CR><LF><pdu> OK	If PDU mode (+CMGF=0) and command successful
		%MGR:<stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> OK	Text mode (+CMGF=1), command successful SMS-DELIVER
		%MGR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> OK	Text mode (+CMGF=1), command successful SMS-SUBMIT
		%MGR:<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> OK	Text mode (+CMGF=1), command successful SMS-STATUS-REPORT

Type	Command	Possible response(s)	Description
		%MGR:<stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>] OK	Text mode (+CMGF=1), command successful SMS-COMMAND
		ERROR	Read failed
Test command	AT%MGR=?	OK	-

For parameter description, refer to the AT+CMGR command.

6.2.20 Sleep Control: AT%SLEEP

Execute this command to enable or disable the sleep function of GTM900.

Table 6-36 AT%SLEEP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SLEEP=<mode>	OK	-
		ERROR [<error number>]	Failure
Read command	AT%SLEEP?	%SLEEP:<mode> OK	-

Table 6-37 Parameter description

Parameter	Value	Description
<mode>	[0]	Sleep function disabled by default
	1	Sleep function enable

Caution:

If the sleep function is enabled, there might be no response from the serial port when no operation is done on the GTM900 and the AT command is entered. This case is normal. You may re-enter the command or type in the carriage return to activate the GTM900 before entering the AT command.

6.3 AT Commands for Audio Setting

6.3.1 Set audio input (MIC path) parameters: AT%NFI

Execute this command to set MIC path parameters in terms of path, gain, outbais, and extra gain.

<path> is used to set the path of MIC.

<gain>, a common parameter for all MIC paths, is used to set the gain of MIC path.

<outbais>, a common parameter for all MIC paths, is used to set MIC outbais.

<extra_gain>, a parameter that is valid only when <path>=1(audio input path 2), is used to set MIC path extra gain.

Table 6-38 AT%NFI action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NFI=<path>,<gain>,<outbais>,<extra_gain>	OK	-
		ERROR	If failed
Read command	AT%NFI?	%NFI: <path>,<gain>,<outbais> OK	<path>=0, 2
		%NFI: <path>,<gain>,<outbais>, <extra_gain> OK	<path>=1
Test command	AT%NFI=?	%NFI: (list of supported <path>s),(list of supported <gain>s), (list of supported <outbais>s), (list of supported <etra_gain>s) OK	-

Table 6-39 Parameter description

Parameter	Value	Description
<path>	[0]	Audio input path 1 (MIC+, MIC-); For more details, see Product Description.
	1	Audio input path 2 (AUXI+, AUXI-); For more details, see Product Description.

	2	Audio input path 3 (hardware supportive)
<gain>	Value range [-12, 13]	-
	-12	Min. gain
	+12	Max. gain
	13	Mute
	[0]	Default value
<outbais>	0	2.0V
	[1]	2.5V
<extra_gain>	[0]	28.2dB
	1	4.6dB

Example 1:

AT%NFI=0,0,1

OK

Path of MIC set to audio input path 1 with the gain of 0dB and outbais of 2.5 V.

Returned result:

AT%NFI?

%NFI: 0,0,1

OK

Example 2:

AT%NFI=1,3,1,0

OK

Path of MIC set to audio input path 2 with the gain of 3dB, outbais of 2.5 V, and extra gain of 28.2 dB.

Returned result:

AT%NFI?

%NFI: 1,3,1,0

OK

6.3.2 Set audio output (speaker path) parameters: AT%NFO

Execute this command to set speaker path parameters in terms of path, gain, and filter switch.

<path> is used to set the path of speaker.

<gain>, a common parameter for all speaker paths, is used to set the gain of speaker path.

<filter_switch> is used to enable/disable the filter of speaker path.

Table 6-40 AT%NFO action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NFO=<path>,<gain>,<filter_switch>	OK	-
		ERROR	If failed
Read command	AT%NFO?	%NFO: <path>,<gain>,<filter_switch> OK	-
Test command	AT%NFO=?	%NFO: (list of supported <path>s), (list of supported <gain>s), (list of supported <filter_switch>s) OK	-

Table 6-41 Parameter description

Parameter	Value	Description
<path>	[0]	Audio output path 1 (EAR+, EAR-); For more details, see Product Description.
	1	Audio output path 2 (AUXO+, AUXO-); For more details, see Product Description.
	2	Audio output path 3 (hardware supportive)
	4	Audio output path 1; Audio output path 2
<gain>	Value range: [-6, +6]	--
	[3]	Default value
<filter_switch>	[0]	Enable the filter
	1	Disable the filter

Example:

AT%NFO=0,3,0

OK

Path of speaker set to audio output path 1 with the gain of 3dB and with the filter enabled.

Returned result:

AT%NFO?

%NFO: 0,3,0

OK

6.3.3 Set speaker volume: AT%NFV

<vol>, a common parameter for all speaker paths used to set volume of speaker, is automatically saved to non-volatile storage after the set command is carried out. And the volume will be automatically set to this value in next call.

Table 6-42 AT%NFV action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NFV=<vol>	OK	-
		ERROR	If failed
Read command	AT%NFV?	%NFV: <vol> OK	-
Test command	AT%NFV=?	AT%NFV: (list of supported <vol>s) OK	-

Table 6-43 Parameter description

Parameter	Value	Description
<vol>	0	Mute
	1	-24dB
	2	-18dB
	3	-12dB
	[4]	-6dB
	5	0dB

Example:

AT%NFV=4

OK

Volume of the speaker set to -6 dB

Returned result:

AT%NFV?

%NFV: 4

OK

6.3.4 Save audio mode configuration parameters: AT%NFW

Execute this command to save current audio mode configuration parameters.

A subscriber can define 5 groups of audio mode configuration parameter and save them to non-volatile store. The subscriber can use any of the five groups of audio parameter through AT%NFS.

An audio mode is a fixed setting of audio features embedded in the module. For example, handsfree mode is a particular audio mode. The audio mode configuration parameters include:

AT%NFI=<path>,<gain>,<outbais>,<extra_gain>

AT%NFO=<path>,<gain>,<filter_switch>

AT%STN=<vol>

AT%VLB=<enable>

Table 6-44 AT%NFW action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NFW=<mode>	OK	-
		ERROR	If failed
Read command	AT%NFW?	OK	-
Test command	AT%NFW=?	%NFW: (list of supported <mode>s) OK	-

Table 6-45 Parameter description

Parameter	Value	Description
<mode>	1	Subscriber defined audio mode configuration parameters, handheld mode for example.
	2	Subscriber defined audio mode configuration parameters, handsfree mode for example.
	3	Subscriber defined audio mode configuration parameters, headset mode for example.
	4	Subscriber defined audio mode configuration parameters.
	5	Subscriber defined audio mode configuration parameters.

Example:

AT%NFI=0,0,1

OK

AT%NFO=0,3,0

OK

AT%STN=-26

OK

AT%VLB=0

OK

Save the parameters as follows:

AT%NFW=1

OK

6.3.5 Select audio mode configuration parameters: AT%NFS

Execute this command to read the saved audio mode configuration parameters and then configure them.

Table 6-46 AT%NFS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%NFS=<mode>	OK	-
		ERROR	If failed
Read command	AT%NFS?	OK	-
Test command	AT%NFS=?	AT%NFS: (list of supported <mode>s) OK	-

Table 6-47 Parameter description

Parameter	Value	Description
<mode>	0	Default audio mode configuration parameters of the manufacturer
	1	Subscriber defined audio mode configuration parameters
	2	Subscriber defined audio mode configuration parameters
	3	Subscriber defined audio mode configuration parameters
	4	Subscriber defined audio mode configuration parameters
	5	Subscriber defined audio mode configuration parameters

Example:

(If you have completed the steps described in Example of the AT%NFW command, you may read this group of parameters through AT%NFS.)

AT%NFS=1

OK

After reading and configuring the audio mode parameters saved by the subscriber, the returned result is as follows:

AT%NFI?

%NFI: 0,0,1

OK

AT%NFO?

%NFO: 0,3,0

OK

AT%STN?

%STN: -26

OK

AT%VLB?

%VLB: 0

OK

6.3.6 Set sidetone volume: AT%STN

Table 6-48 AT%STN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%STN=<vol>	OK	-

		ERROR	If failed
Read command	AT%STN?	%STN: <vol> OK	-
Test command	AT%STN=?	%STN: (list of supported <vol>s) OK	-

Table 6-49 Parameter description

Parameter	Value	Description
<vol>	(-23,-20,-17,-14,-11,-8, -5, -2, 1)	Unit: dB
	[-26]	mute

Example:

AT%STN=-26

OK

Volume of the sidetone set to mute

Returned result:

AT%STN?

%STN: -26

OK

6.3.7 Acoustic-Echo Cancellation: AT%VLB

Execute this command to enable/disable Acoustic-Echo Cancellation (AEC).

Table 6-50 AT%VLB action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%VLB=<enable>	OK	-
		ERROR	If failed
Read command	AT%VLB?	%VLB : <enable> OK	-
Test command	AT%VLB=?	%VLB: (list of supported <enable>s) OK	-

Table 6-51 Parameter description

Parameter	Value	Description
<enable>	[0]	AEC disabled
	1	AEC enabled

Example:

AT%VLB=1

OK

AEC enabled

Returned result:

AT%VLB?

%VLB: 1

OK

Caution:

AEC is valid only when AT%VLB=1 is sent out before each active call.

6.3.8 Select audio paths: AT%SNFS

Execute this command to select the paths of audio input(MIC) and audio output(speaker).

Table 6-52 AT%SNFS action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%SNFS=<path>	OK	-
		ERROR	If failed
Test command	AT%SNFS=?	%SNFS: (list of supported <path>s) OK	-

Table 6-53 Parameter description

Parameter	Value	Description
<path>	[0]	Audio path 1 (MIC+, MIC-, EAR+, EAR-); For more details, see Product Description.
	1	Audio path 2 (AUXI+, AUXI-, AUXO+, AUXO-); For more details, see Product Description.
	2	Audio path 3 (hardware supportive)

Example:

AT%NFI?

%NFI: 0,0,1

OK

AT%NFO?

%NFO: 0,3,0

OK

AT%SNFS=1

OK

Change to audio path 2, the returned result is as follows:

AT%NFI?

%NFI: 1,0,1,0

OK

AT%NFO?

%NFO: 1,3,0

OK

6.3.9 Play DTMF Audio: AT%DTMF

Execute this command to play DTMF audio.

Table 6-54 AT%DTMF action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%DTMF=<isEnable>,[,<dtmf>,<duration>]	OK	-
		ERROR	
Test command	AT%DTMF=?	%DTMF: (<isEnable > value list), (<dtmf > value list), (<duration > value list) OK	-

Table 6-55 Parameter description

Parameter	Value	Description
< isEnable >	[0]	Disable
	1	Enable
< dtmf >	-	[0]-9,A-D,*,#
< duration >	[0]	Cycle play, unit: 55ms
	1-50	Multiples of 55ms

Caution:

- Before executing AT+VTS and AT%DTMF at the same time, execute AT+CMUT=1 to mute.
- After executing AT+VTS and AT%DTMF, execute AT+CMUT=0 to unmute to avoid sound from space coupling from speaker to mic.

6.3.10 Play alert tone: AT%CTONE

Execute this command to play the alert tone.

Table 6-56 AT%CTONE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%CTONE=<type>	OK	-
		ERROR	
Test command	AT%CTONE=?	%CTONE: (<type> value list) OK	-

Table 6-57 Parameter description

Parameter	Value	Description
<type>	[0]	Disable
	1	BUSY CALL TONE (cycle play)
	2	ALERT CALL TONE (cycle play)
	3	RADIO ACK CALL TONE (cycle play)
	4	AUTHENTICATION CALL TONE (cycle play)
	5	CALL DROP CALL TONE (cycle play)
	6	CONGESTED CALL TONE (cycle play)
	7	WAITING CALL TONE (last 15s)

Caution:

When AT%CTONE=7 and it lasts for no more than 15s, it cannot be set to other modes directly. To change the settings, you should first disable this mode by running AT%CTONE=0.

6.3.11 Switch incoming call ringtone on or off: AT%RING

Execute this command to switch on or switch off the incoming call ringtone.

Table 6-58 AT%RING action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%RING=<mode>	OK	-
		ERROR	

Enquiry command	AT%RING?	%RING: <mode> OK	-
Test command	AT%RING=?	%RING: (<mode> value list) OK	-

Table 6-59 Parameter description

Parameter	Value	Description
<mode >	[0]	Disable
	1	Enable

Caution:

When the incoming call ringtone plays, do not execute AT%RING to configure.

6.4 STK Extended Commands

6.4.1 AT%STKR

You can execute AT command to do STK operations, such as menu selecting, menu returning and inputting text.

Table 6-60 lists action command syntax.

Table 6-61 lists parameter description.

Table 6-60 AT%STKR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%STKR=<cmd_type>,[<status>],[<item_id>],[<input_string>]	OK %STKR:cmd_type	-
		ERROR	-
Inquiry command	AT%STKR?	%STKR: cmd_type OK	-
		ERROR	

Table 6-61 Parameter description

Parameter	Value	Description
cmd_type	Integer of eight bits	Command type
status	Integer of eight bits	Command status
item_id	Integer of eight bits	Item identification
input_string	Characters	Input string

Note:

For details, see *STK User Manual.*

6.4.2 AT%STKD

Execute this command to display the status of the command.

Table 6-62 lists the action command syntax.

Table 6-63 lists parameter description.

Table 6-62 AT%STKD action command syntax

Type	Command	Possible response(s)	Remarks
Set command	AT%STKD=<cmd_type>	%STKD: Information list 1 %STKD: Information list 2 …… %STKD: Information list n OK	-
		ERROR	-

Table 6-63 Parameter description

Parameter	Value	Remarks
cmd_type	Integer of eight bits	Command type

Note:

For details, see *STK User Manual*.

Chapter 7 TCPIP AT Commands

7.1 Initialization: AT%ETCPIP

Execute this command to activate PDP and initialize TCPIP. Table 7-1 lists the action command syntax, and Table 7-2lists the description of the parameters.

Table 7-1 AT%ETCPIP action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%ETCPIP=[<user_ name>], [<password>],[<cid>]	OK	-
		ERROR[: <error number>]	-
Read command	AT%ETCPIP?	%ETCPIP: <state>[,[<local_ip>],[<gate >],[<DNS1>],[<DNS2>]] OK	-
Test command	AT%ETCPIP=?	%ETCPIP: (list of <stat>) OK	-

Table 7-2 Parameter description

Parameter	Value	Description
<user_name>	String of no more than 31 characters	• User name, for example, GPRS • Can be omitted
<password>	String of no more than 31 characters	• User password, for example, GPRS • Can be omitted
<cid>	1	• Same as the setting of +CGDCONT • The value must be set to 1. • Can be omitted
<local_ip>	-	Local IP address
<gate>	-	Gateway
<DNS1>	-	Preferable domain name resolution server
<DNS2>	-	Standby domain name resolution server
<state>	0	TCPIP not initialized
	1	TCPIP initialized
<error number>	-	See 7.10 .

Note:

- Before executing the command, carry out the +CGDCONT command, for example, AT+CGDCONT=1,"IP","CMNET".
- Execute this command 20 or 30 seconds later when the terminal equipment has been started and initialized.

7.2 Opening TCP/UDP Link

Execute the commands below to open one TCP or UDP link or to open one or more TCP/UDP links.

7.2.1 Opening One TCP/UDP Link: AT%IPOPEN

Execute this command to open one TCP or UDP link. Table 7-3 lists the action command syntax. Table 7-4 lists the description of the parameters.

Table 7-3 AT%IPOPEN action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPOPEN=<type>,<dest_ip>,<dest_port>,[[<udp_dest_send_port> , [local_port>]]	CONNECT	-
		ERROR[: <error number>]	-
Read command	AT%IPOPEN?	%IPOPEN:[<type>,<dest_ip>,<dest_port>] OK	-
Test command	AT%IPOPEN=?	%IPOPEN: (list of <type>) OK	-

Table 7-4 Parameter description

Parameter	Value	Description
<dest_ip>	Character string	IP address to be connected
<dest_port>	16-bit integer type	Port of the IP address to be connected
<udp_dest_send_port>	16-bit integer type	• Tx port of the remote UDP server • If not specified, the data of all ports is by default reported to the terminal equipment user.

Parameter	Value	Description
<local_port>	16-bit integer type	Binding the local port is not supported for the moment.
<type>	"TCP"	The link type is set to TCP.
	"UDP"	The link type is set to UDP.
<error number>	-	See 7.10 .

7.2.2 Opening One or More TCP/UDP Links: AT%IPOPENX

Execute this command to open one or more TCP/UDP link. Table 7-5 lists the action command syntax. Table 7-6lists the description of the parameters.

Table 7-5 AT%IPOPENX action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPOPENX=<link_num>,<type>,<dest_ip>,<dest_port>,[[<udp_dest_send_port>,[local_port>]]	CONNECT	-
		ERROR[: <error number>]	-
Read command	AT%IPOPENX?	%IPOPENX: <link_num1>,[<type>,<dest_ip>,<dest_port>], <cd><cr> <link_num2>,[<type>,<dest_ip>,<dest_port>], <cd><cr> <link_num3>,[<type>,<dest_ip>,<dest_port>], <cd><cr> OK	-
Test command	AT%IPOPENX=?	%IPOPENX: (list of <link_num>), (list of <type>) OK	-

Table 7-6 Parameter description

Parameter	Value	Description
<link_numx>	1 to 3	The number of an opened link
<dest_ip>	Character string	• IP address to be connected; • The parameter consisting of characters only must be enclosed in quotation marks.

Parameter	Value	Description
<dest_port>	16-bit integer type	Port of the IP address to be connected
<udp_dest_send_port>	16-bit integer type	• Tx port of the remote UDP server • If not specified, the data of all ports is by default reported to the terminal equipment user.
<local_port>	16-bit integer type	Binding the local port is not supported for the moment.
<type>	"TCP"	The link type is set to TCP.
	"UDP"	The link type is set to UDP.
<error number>	-	See 7.10 .

7.3 Setting Data Conversion Mode: AT%IOMODE

Execute this command to determine HEX-ASCII data conversion. Table 7-7 lists the action command syntax. Table 7-8lists the description of the parameters.

Table 7-7 AT%IOMODE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IOMODE=[<n>],[<link_flag>],[<buffer_flag>]	OK	-
		ERROR[: <error number>]	-
Read command	AT%IOMODE?	%IOMODE:<n>,<link_flag>,<buffer_flag> OK	-
Test command	AT%IOMODE=?	%IOMODE:(list of <n>),(list of <link_flag>),(list of <buffer_flag>) OK	-

Table 7-8 Parameter description

Parameter	Value	Description
<n>	0	No input or output data is converted.
	[1]	• Input or output data conversion is made by the module. • Input or output data conversion must be converted by the terminal equipment at the same time.

Parameter	Value	Description
<link_flag>	[1]	The AT command is executed in single link mode.
	2	The AT command is executed in multi-link mode.
<buffer_flag>	0	Receive buffer is used.
	[1]	No receive buffer is used.
<error_num>	-	See 7.10 .

When <n> is set to 0, the input data does not require coding. However, the terminal equipment user must ensure that the input data only contains printable characters. No ";" or """ is allowed.

The recommended value of <n> is 1. See *TCPIP AT Command User Guide* for related API functions of coding and decoding.

When <n> is set to 1, the data requires conversion. To send 0x1A to the terminal equipment at the peer end, the local terminal equipment must convert 0x1A to 0x31, 0x41, respectively corresponding to printable characters of "1" and "A". During transmission, the character string takes the form of "1A", that is, AT%IPSEND=”1A”. Upon receipt of this type of input data, the receiving terminal equipment converts the data back to 0x1A.

When <n> is set to 1, the receiving terminal equipment converts the data from the TCP/UDP party, for example, 0x1A, to the character string of "1A".

When the value is set to 1, execute AT%IPOPEN and AT%IPSEND. When the value is set to 2, execute AT%IPOPENX and AT%IPSENDX.

When <buffer_flag> is set to 0, the receiver buffer is by default used. The buffer supports 30 packets at most with each packet of up to 512 bytes. If the buffer is used, execute the related commands of %IPDR, %IPDQ, %IPDD and %IPDDMODE.

Caution:

- The value of <link_flag>, that is, 1 or 2, takes effect only when there is no active link.
- For details about API functions (C codes) of input and output data, see *TCPIP AT Command User Guide*.
- The data saved to the receive buffer is lost during system outage.

7.4 Sending Data

Data can be sent in two modes:

- Single-link
- Multi-link

7.4.1 Sending Data in Single-Link Mode: AT%IPSEND

Execute this command to send the data in single-link mode to an open TCP/UDP link. Table 7-9 lists the action command syntax. Table 7-10lists the description of the parameters.

Table 7-9 AT%IPSEND action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPSEND=<data>	[%IPSEND: <tx_window>] OK	-
		ERROR[: <error number>]	-
Read command	AT%IPSEND?	[%IPSEND:<tx_window>] OK	-

Table 7-10 Parameter description

Parameter	Description
<data>	All transmitted data must be put within quotation marks "".
<tx_window>	The size of the data transmitting window, which is applicable to TCP, indicates the number of data packets to be sent by the user.
<error number>	See 7.10 .

🕮 **Note:**

- The maximum value of the <tx_window> is 16, which indicates that up to 16 data packets can be continuously sent to the module. One packet can contain up to 512 bytes.
- The value of <tx_window> descends by 1 after each packet is sent out. The size of the <tx_window> is restored only when the data is received by the peer end in TCP connection.
- When the value of <tx_window>is 0, ERROR 20 is returned. In this case, the data must be stopped from transmitting.

Caution:

When transmitting data,

- The data put within the quotation marks must not exceed 1024 bytes or 512 bytes when the %IOMODE is set to 1 or 0. Otherwise, an error message might be returned.
- The user must convert the input data when %IOMODE is set to 1. Otherwise, an error message might be returned. For example, to send 0x1A, the user must convert it into 0x31,0x41.

7.4.2 Sending Data in Multi-Link Mode: AT%IPSENDX

Execute this command to send the data in multi-link mode to an open TCP/UDP link. Table 7-11 lists the action command syntax. Table 7-12lists the description of the parameters.

Table 7-11 AT%IPSEND action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPSENDX=<link_num>,<data>	[%IPSENDX: <link_num>,<tx_window>] OK	-
		ERROR[: <error number>]	-

Table 7-12 Parameter description

Parameter	Value	Description
<link_numx>	1-3	The number of an open link
<data>	-	All transmitted data must be put within quotation marks "".
<tx_window>	-	The size of the data transmitting window, which is applicable to TCP, indicates the number of data packets to be sent by the user.
<error number>	-	See 7.10 .

Note:

- The maximum value of the <tx_window> is 16, which indicates that up to 16 data packets can be continuously sent to the module. One packet can contain up to 512 bytes.
- The value of <tx_window> descends by 1 after each packet is sent out. The size of the <tx_window> is restored only when the data is received by the peer end in TCP connection.
- When the value of <tx_window>is 0, ERROR 20 is returned. In this case, the data must be stopped from transmitting.

Caution:

When transmitting data,

- The data put within the quotation marks must not exceed 1024 bytes or 512 bytes when the %IOMODE is set to 1 or 0. Otherwise, an error message might be returned.
- The user must convert the input data when %IOMODE is set to 1. Otherwise, an error message might be returned. For example, to send 0x1A, the user must convert it into 0x31,0x41.

7.5 Closing Link: AT%IPCLOSE

Execute this command to close a link. Table 7-13 lists the action command syntax. Table 7-14lists the description of the parameters.

Table 7-13 AT%IPCLOSE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPCLOSE = [<link_num>]	%IPCLOSE:<link_num> OK	-
		ERROR[: <error number>]	
Read command	AT%IPCLOSE?	%IPCLOSE: <link1_state>,<link2_state>,<link3_state> OK	-
Test command	AT%IPCLOSE =?	%IPCLOSE:(list of <link1_state>),(list of <link2_state>),(list of <link3_state>) OK	-

Table 7-14 Parameter description

Parameter	Value	Description
<link_numx>	[1]-3	• The number of a link; • There can be up to three links.
	5	The TCPIP function is deactivated. The module is unsubscribed from the GPRS network.
<linkx_state>	0	Link closed
	1	Link opened
<error number>	-	See 7.10 .

Note:

- If all parameters use default values, link 1 is closed, that is, AT%IPCLOSE is set to 1.
- To close one TCP link, you must wait for at least 15 seconds to receive the returned OK message.

7.6 Querying ACK of TCP: AT%TXSTATE

Execute this command to query or clear the statistic data of active packets in TCP connection mode. Table 7-15 lists the action command syntax. Table 7-16 lists the description of the parameters.

Table 7-15 AT%TXSTATE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%TXSTATE= [<link_num>]	OK ERROR[: <error number>]	-
Read command	AT%TXSTATE?	% TXSTATE: <link1>,<send_sum>,<ack_sum> <link2>,<send_sum>,<ack_sum> <link3>,<send_sum>,<ack_sum> OK	-
Test command	AT%TXSTATE=?	%TXSTATE:(list of <link_num>) OK	-

Table 7-16 Parameter description

Parameter	Value	Description
<link_numx>	0	• Available to the set command to clear all statistic data over TCP
	[1]-3	• The number of a link; • There can be up to three links. • Available to the set command to clear statistic data over a link.
<send_sum>	-	Total number of data packets sent in TCP connection mode
<ack_sum>	-	Total number of data packets acknowledged in TCP connection mode
ERROR[: <error number>]	-	See 7.10 .

Note:

- To check that the TCP data packets are acknowledged by the peer end, compare the original data with the queried data.
- If AT%TXSTATE is set to 0, all statistic data over the three links is cleared.

7.7 Operating Data

Data operation commands covers:

- Command to query data
- Command to read data
- Command to delete data
- Command to set data deletion mode

7.7.1 Querying Data Packet: AT%IPDQ

Execute this command to query the number of data packets in the cache at the receiving end. Table 7-17 lists the action command syntax. Table 7-18lists the description of the parameters.

Table 7-17 AT%IPDQ action command syntax

Type	Command	Possible response(s)	Description
Execution command	AT%IPDQ	%IPDQ:<unread_sum>,<packet_sum> OK	-
		ERROR[: <error number>]	

Table 7-18 Parameter description

Parameter	Description
<unread_sum >	The total number of unread data packets
<packet_sum>	The total number of data packets, read and unread
ERROR[: <error number>]	See 7.10 .

7.7.2 Reading Data Packet: AT%IPDR

Execute this command to read the number of data packets in the cache at the receiving end. The first data packet in the cache is by default read. Table 7-19 lists the action command syntax. Table 7-20lists the description of the parameters.

Table 7-19 AT%IPDR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT% IPDR=[<index >]	%IPDR:<link_num>,<data_index >,<data_len>,<data> OK	-
		ERROR[: <error number>]	

Table 7-20 Parameter description

Parameter	Value	Description
<index>	1-30	The serial number of a data packet to be read
< link_num >	[1]-3	• The number of a link; • There can be up to three links.
<data_index>	-	The serial number of a data packet
<data_len>	-	The length of a data packet
<data>	-	The content of a data packet
<error number>	-	See 7.10 .

Note:

- If all parameters use default values, unread data in the first packet is read, that is, AT%IPDR is set to 1.
- If %IPDDMODE is set to 0, the data packet is automatically deleted after being read.
- The receiving cache can be used only when the AT%IOMODE is set to 0.
- Read all new data packets by executing AT%IPDR for as many times as necessary.

7.7.3 Deleting Data Packet: AT%IPDD

Execute this command to delete the data packets in the receiving cache. Table 7-21 lists the action command syntax. Table 7-22lists the description of the parameters.

Table 7-21 AT%IPDD action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPDD=[<index >],[<type>]	%IPDQ: <del_num> OK	-
		ERROR[: <error number>]	

Table 7-22 Parameter description

Parameter	Value	Description
<index>	0-30	The serial number of a data packet to be read
<type>	0	Deleting read data packets
	1	Deleting unread data packets
	2	Deleting all data packets
< del_num >	-	The number of data packets to be deleted
<error number>	-	See 7.10 .

Note:

If all parameters use default values, the first read data packet is deleted.

Caution:

- <index> set to 0 indicates a special application. For example, when AT+IPDD is set to 0 or 2, this indicates that all data packets will be deleted.
- The <type> parameter is valid only when <index> is set to 0.

7.7.4 Data Packet Deletion Mode: AT%IPDDMODE

Execute this command to set the data packet deletion mode. Table 7-23 lists the action command syntax. Table 7-24 lists the description of the parameters.

Table 7-23 AT%IPDDMODE action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%IPDDMODE =<mode>	%IPDDMODE:<mode> OK	-
		ERROR[: <error number>]	
Read command	AT%IPDDMODE?	%IPDDMODE:<mode> OK	-
Test command	AT%IPDDMODE =?	%IPDDMODE:(list of <mode>) OK	-

Table 7-24 Parameter description

Parameter	Value	Description
<type>	[0]	Data packet is automatically deleted.
	1	Data packet is manually deleted.
ERROR[: <error number>]	-	See 7.10 .

7.8 Unsolicited Result Codes

The description of unsolicited result codes covers both % IPDATA and %IPCLOSE:<n>.

7.8.1 %IPDATA

I. Failure in Opening Default Cache

- Single-link mode

%IPDATA:<len>,<data>

Table 7-25lists the parameter description of this command.

Table 7-25 Parameter description

Parameter	Description
<len>	The actual rather than converted length of the data packet
<data>	The character string type of data packet is valid for the user. The data packet is placed within the quotation marks.

- Multi-link Mode

%IPDATA:<link_num>,<len>,<data>

Table 7-26 lists the parameter description of the command.

Table 7-26 Parameter description

Parameter	Description
<link_num>	The number of the link numbered from 1 to 3
<len>	The actual rather than converted length of the data packet
<data>	The character string type of data packet is valid for the user. The data packet is placed within the quotation marks.

II. Current Receiving Cache Opened

%IPDATA:<link_num>,<data_index>,< len>

Execute this command to notify the user network of the arrival of valid data. Table 7-27 lists the parameter description of the command.

Caution:

- If %IOMODE is set to 0, the user can receive the data through the serial port.
- If %IOMODE is set to 1, the user must convert the data before using the data. For example, if the data received at the serial port is 0x31,0x41,0x30,0x37, this indicates that the original data from the network is 0x1A,0x07.

Table 7-27 Parameter description

Parameter	Value	Description
<link_num>	1-3	The number of the link
<len>	-	The actual rather than converted length of the data packet
<data_index>	-	• The location of user data in the cache • The location might change whenhte data is read.

7.8.2 %IPCLOSE:<n>

The network notifies the user to close the TCP connection. The link number is "n". Table 7-28 lists the parameter description of the command.

Table 7-28 Parameter description

Parameter	Value	Description
<n>	1-3	The default value 1 indicates the number of the link to be closed.
	5	The TCPIP function is deactivated. The module is unsubscribed from the GPRS network.

7.9 Domain Name Resolution: AT%DNSR

Execute this command to resolve the IP address related to the domain name.

1. AT% DNSR action command syntax

Type	Command	Possible response(s)	Description
Set command	AT%DNSR= <host_name>	%DNSR:<ip> OK	Resolution succeeds.
		ERROR [: <error_number>]	Resolution fails.

2. Parameter description

Parameter	Value	Description
<host_name>	String type	The domain name to be resolved must not be longer then 128 bytes.
<ip>	--	Resolved IP address
<error number>	-	See 7.10 .

Note:

- Activate the PDP context through AT%ETCPIP before executing this command.
- The response is made within 12 minutes after the command is executed.
- If the domain name corresponds to multiple IP addresses, the first IP address returned by the domain name server is reported.

7.10 Error Codes

Code	Description
0	User name or password subscription rejected by the network APN error Owing-fee SIM card GPRS services not supported by SIM card
1	Not logged in to the network
2	There is already an active link.
3	Invalid input parameters

Code	Description
4	TCP connection rejected by the peer end
5	TCP connection times out due to incorrect IP address or port.
6	Several multi-link commands started
7	Single-link command started
8	There is an active link but link_flag (for IOMODE) cannot be modified.
9	There is no active TCP or UDP link (for IPSEND).
11	The receiving cache is full.
12	The receiving cache has no data.
13	The valid input data exceeds 512 bytes.
14	The bytes must be even-numbered in the user mode.
15	Invalid characters occur when data is input in user mode.
16	The serial number does not exist.
17	Invalid deletion type
18	Other errors
20	The cache for transmitting TCP data is full.
21	No PDP activation is done.
22	The current %ETCPIP is being activated. The command cannot be executed.
23	Domain Name is not exsit.
24	Resolution is time out.
25	There is unknown error during Resolution.