

SM5100B-D AT Command

SENDTRUE
CONFIDENTIAL

Revision history

Version	Date	Author	Review	Update description
1.0.0	20081225	Buddy	Steven	Create

IMPORTANT NOTICE

COPYRIGHT NOTICE

Copyright©2008, Shanghai Sendtrue Technology Co.,Ltd. All rights reserved.

TRADEMARKS

Shanghai Sendtrue Technology Co.,Ltd and Shanghai Sendtrue Technology Co.,Ltd's products are exclusively owned by Shanghai Sendtrue Technology Co.,Ltd. References to other companies and their products use trademarks owned by the respective companies and are for reference purpose only.

WARRANTY DISCLAIMER

Shanghai Sendtrue Technology Co.,Ltd makes no representations or warranties,either express or implied, by or with respect to anything in this document,and shall not be liable for any implied warranties of merchantability or fitness for a particular purpose or for any indirect,special or consequential damages.

CONFIDENTIALITY

The information contained here (including any attachments) is confidential. The recipient here acknowledges the confidentiality of this document, and except for the specific purpose, this document shall not be disclosed to any third party.

NO GUARANTEE

Our company will not take any responsibility for any damage caused by the customer's abnormal operation. Please refer to specification and designing reference guide.Our company have right to modify the document according to technical requirement with no announcement to the customer.

Contents

1. Introduction.....	9
1.1 Scope of this document.....	9
1.2 Correlative documents.....	9
1.3 Correlative standards.....	9
1.4 Command format.....	10
1.4.1 The AT command format obeys the following principle.....	10
1.4.2 AT commands syntax.....	10
1.5 Information response and result codes.....	11
1.5.1 AT command result codes.....	11
1.6 Definitions and Abbreviations.....	11
2. Overview of AT commands.....	13
2.1 Overview of general control commands.....	13
2.2 Overview of networking service commands.....	14
2.3 Overview of call control commands.....	14
2.4 Overview of supplementary service commands.....	14
2.5 Overview of security commands.....	15
2.6 Overview of SMS commands.....	15
2.7 Overview of phonebook commands.....	16
2.8 Overview of STK commands.....	16
2.9 Overview of GPRS commands.....	16
2.10 Overview of TCP/IP commands.....	17
2.11 Overview of AUDIO commands.....	17
2.12 Overview of special commands.....	18
3. General control commands.....	19
3.1 Overview of general control commands.....	19
3.2 Detailed description of general control commands.....	20
3.2.1 AT.....	20
3.2.2 ATZ.....	20
3.2.3 ATE.....	20
3.2.4 ATSO.....	21
3.2.5 ATQ.....	21
3.2.6 ATV.....	22
3.2.7 AT&W.....	22
3.2.8 AT+CMEE.....	23
3.2.9 AT+CFUN.....	23
3.2.10 AT+CCLK.....	24
3.2.11 AT+IPR.....	24
3.2.12 AT+CGSN.....	25

3.2.13 AT+CGMM	25
3.2.14 AT+CGMR	25
3.2.15 AT+CGMI	26
3.2.16 AT+CPAS	26
3.2.17 AT+CCID	27
3.2.18 AT+CIMI	27
3.2.19 AT+CBC	27
3.2.20 AT+CPOF	28
3.2.21 AT+CSCS	28
3.2.22 AT+SAC	29
3.2.23 AT+SBCM	29
3.2.24 +SBCI	30
3.2.25 AT+IFC	30
3.2.26 AT+CFGRI	31
3.2.27 AT+ARMSLEEP	31
3.2.28 AT+ASSERTMODE	32
3.2.29 AT+AUTOPOWERON	32
3.2.30 AT+ADCM	32
3.3.31 AT+SLOG	33
3.2.32 AT+ISC	33
3.2.33 AT+SSIMT	33
4. Networking service commands	35
4.1 Overview of networking service commands	35
4.2 Detailed description of networking service commands	35
4.2.1 AT+COPS	35
4.2.2 AT+CSQ	36
4.2.3 AT+CCED	37
4.2.4 AT+CREG	39
5. Call control commands	40
5.1 Overview of call control commands	40
5.2 Detailed description of call control commands	40
5.2.1 ATD	40
5.2.2 ATA	41
5.2.3 ATH	41
5.2.4 AT+VTD	41
5.2.5 AT+VTS	42
5.2.6 AT+CICB	42
5.2.7 AT+CIND	43
6. Supplementary service commands	44
6.1 Overview of supplementary service commands	44
6.2 Detailed description of supplementary service commands	44
6.2.1 AT+CCFC	44
6.2.2 AT+CCWA	45
6.2.3 AT+CHLD	46

6.2.4 AT+CLIP	46
6.2.5 AT+CLIR.....	47
6.2.6 AT+COLP.....	48
6.2.7 AT+COLR.....	48
6.2.8 AT+CLCK.....	49
6.2.9 AT+CPWD.....	49
6.2.10 AT+CACM.....	49
6.2.11 AT+CAMM.....	49
6.2.12 AT+CPUC.....	50
6.2.13 AT+CLCC.....	50
6.2.14 AT+CURD.....	51
6.2.15 AT+CSSN.....	52
7. Security commands.....	54
7.1 Overview of security commands.....	54
7.2 Detailed description of security commands.....	54
7.2.1 AT+CPIN.....	54
7.2.2 AT+CPWD.....	55
7.2.3 AT+CLCK.....	56
7.2.4 AT+XX.....	57
8. SMS commands.....	58
8.1 Overview of SMS commands.....	58
8.2 Detailed description of SMS commands.....	58
8.2.1 AT+CSMS.....	58
8.2.2 AT+CSAS.....	59
8.2.3 AT+CRES.....	60
8.2.4 AT+CSDH.....	60
8.2.5 AT+CPMS.....	60
8.2.6 AT+CSCA.....	61
8.2.7 AT+CMGF.....	62
8.2.8 AT+CMGL.....	62
8.2.9 AT+CMGR.....	64
8.2.10 AT+CMGS.....	65
8.2.11 AT+CSMP.....	66
8.2.12 AT+CMGW.....	68
8.2.13 AT+CMSS.....	69
8.2.14 AT+CMGD.....	69
8.2.15 AT+CSCB.....	70
8.2.16 AT+CNMI.....	70
8.2.17 +CMTI.....	71
8.2.18 +CMT.....	72
8.2.19 +CBM.....	72
8.2.20 AT+SMSC.....	73
8.2.21 AT+SUSS.....	73
9. Phonebook commands.....	74

9.1 Overview of phonebook commands.....	74
9.2 Detailed description of phonebook commands	74
9.2.1 AT+CPBS	74
9.2.2 AT+CPBR.....	75
9.2.3 AT+CPBF	75
9.2.4 AT+CPBW	76
9.2.5 AT+CPBP	76
9.2.6 AT+CPBN	77
9.2.7 AT+CNUM.....	79
9.2.8 AT+SDCP.....	79
9.2.9 AT+CSVM	79
10. STK commands.....	81
10.1 Preface.....	81
10.2 The exchange procedure between STK user and STK.....	81
10.3 Overview of STK commands.....	82
10.4 Detailed description of STK commands	83
10.4.1 AT+STSF.....	83
10.4.2 AT+STIN.....	83
10.4.3 AT+STGI.....	84
10.4.4 AT+STGR.....	86
11. GPRS commands	89
11.1 Overview of GPRS commands	89
11.2 Detailed description of GPRS commands.....	90
11.2.1 AT+CGDCONT.....	90
11.2.2 AT+CGQREQ	91
11.2.3 AT+CGQMIN.....	93
11.2.4 AT+CGPCO.....	95
11.2.5 AT+CGATT	95
11.2.6 AT+CGACT	96
11.2.7 AT+CGPADDR.....	96
11.2.8 AT+CGDATA	97
11.2.9 AT+CGAUTO	97
11.2.10 AT+CGANS	98
11.2.11 AT+CGCLASS	99
11.2.12 AT+CGEREP.....	99
11.2.13 AT+CGREG	100
11.2.14 AT+CGSMS	101
11.2.15 AT+CRC.....	101
11.2.16 AT+CR.....	102
11.2.17 AT+CEER.....	102
11.2.18 Extension of ATD	103
11.2.19 AT+SSST	103
11.2.20 AT+SATT	104
11.2.21 AT+SAUTOATT	104

11.2.22 AT+SGPRSDATA	105
11.2.23 ATO	105
11.2.24 +++	106
12. TCP/IP commands	107
12.1 Overview of special commands	107
12.2 Detailed description of TCP/IP commands	107
12.2.1 AT+SDATACONF	107
12.2.2 AT+SDATASTART	108
12.2.3 AT+SDATATSEND	109
12.2.4 AT+SDATATREAD	109
12.2.5 AT+SDATASEND	110
12.2.6 AT+SSTRSEND	110
12.2.7 AT+SDATAREAD	111
12.2.8 AT+SDATARXMD	111
12.2.9 AT+SDATASTATUS	112
12.2.10 AT+TRT	113
13. AUDIO commands	114
13.1 Overview of AUDIO commands	114
13.2 Detailed description of AUDIO commands	114
13.2.1 AT+SSAM	114
13.2.2 AT+SPEAKER	115
13.2.3 AT+SDMUT	115
13.2.4 AT+CMUT	116
13.2.5 AT+CRMP	116
13.2.6 AT+STONE	117
13.2.7 AT+VGR	117
13.2.8 AT+SDTMF	118
13.2.9 AT+SCDM	118
13.2.10 AT+ECHO	119
13.2.11 AT+SSAP	120
13.2.12 AT+STMF	120
13.2.13 AT+SEQT	121
13.2.14 AT+SSEA	122
14. Special commands	124
14.1 Overview of special commands	124
14.2 Detailed description of GPRS commands	124
14.2.1 AT+SMUX	124
14.2.2 AT+S32K	125
14.2.3 AT+SIND	125
14.2.4 AT+SBAND	126
14.2.5 AT+SMGF	127
14.2.6 AT+SMGD	128
14.2.7 AT+SSMP	129
14.2.8 AT+SSGF	130

14.2.9 AT+SSGS	130
14.2.10 AT+SNVM	131
15. MSC illustration.....	133
15.1 MO call	133
15.2 MT call.....	133
15.3 SMS.....	134
15.4 GPRS connect	134
15.5 Send GPRS data manually	135
16. Appendix.....	136
16.1 Multiplexing protocol	136
16.1.1 Introduction.....	136
16.1.2 AT commands packets.....	136
16.1.3 Data packets	136
16.2 Result code.....	137


CONFIDENTIAL

1. Introduction

1.1 Scope of this document

This document presents the AT Command Set for Sendtrue[®] cellular engine SM5100B-D.

1.2 Correlative documents

- (1) SM5100B-D Datasheet
- (2) SM5100B-D HW Spec
- (3) SM5100B-D-EVB User's Guide

1.3 Correlative standards

This interface of this document refers to these document criterions below:

[1] ETSI GSM 07.05:

Digital cellular telecommunications system (Phase 2+);
Use of Data Terminal Equipment - Data Circuit terminating
Equipment (DTE - DCE) interface for Short Message Service (SMS) and
Cell Broadcast Service (CBS)
(GSM 07.05 version 7.0.1 Release 1998)

[2] ETSI GSM 07.07:

Digital cellular telecommunications system (Phase 2+);
AT command set for GSM Mobile Equipment (ME)
(GSM 07.07 version 7.5.0 Release 1998)

[3] ITU-T Recommendation V.25 ter:

Serial asynchronous automatic dialing and control

[4] ETSI GSM 03.40:

Digital cellular telecommunications system (Phase 2+);
Technical realization of the Short Message Service (SMS);
(GSM 03.40 version 7.4.0 Release 1998)

[5] ETSI GSM 03.38:

Digital cellular telecommunications system (Phase 2+);
Alphabets and language-specific information
(GSM 03.38 version 7.2.0 Release 1998)

[6] ETSI GSM 04.80:

Digital cellular telecommunications system (Phase 2+);
Mobile radio interface layer 3 supplementary services specification;
Formats and coding

1.4 Command format

1.4.1 The AT command format obeys the following principle

- 1) Every AT command starts with the character AT and ends with <CR>. (Note: Quite few commands start with "+")
- 2) The command line may have several AT commands, which are separated by semicolon as command delimiter.
- 3) Standard basic commands are referred to V.25ter.
- 4) GSM commands use syntax rules of the extended commands
- 5) Every extended command has a test command (trailing=?) to check the existence of the command and offer the type and range of its parameters.
- 6) The commands with parameters also have a read command to read the current values of parameters.
- 7) As write commands do not have parameters, therefore they do not have a read command.
- 8) Write commands (trailing=<para>) are used to set parameters and accomplish corresponding functions.

See figure below for the structure of AT command line:

$$\text{AT } \text{①} \text{ } \text{②} \text{ } \text{③} \text{ } \text{④} \text{ } \text{⑤} \text{ } \text{⑥} \text{ } \text{⑦} \text{ } \text{⑧} \text{ } \text{⑨}$$

Figure 1 : structure of AT command line

- ①: Command line prefix
- ②: Basic command(no prefix)
- ③: Subparameter
- ④: Extended command(prefixed with +)
- ⑤: Extended commands are delimited with semicolon
- ⑥: Subparameters may be omitted
- ⑦: Read command for checking current subparameter values
- ⑧: Test command for checking possible subparameter values
- ⑨: Command line termination character

1.4.2 AT commands syntax

The AT command set implemented by SSM5100B-D is a combination of GSM07.05, GSM07.07, ITU-T V.25ter and the AT commands developed by Sendtrue. All these AT commands can be split into two categories syntactically: "basic" and "extended".

1) Basic syntax

These AT commands have the format of "AT<x><CR>", where "<x>" is the

command, and <CR> is the end character.

Example: ATZ<CR>

2) Extended syntax

These commands can operate in several modes, as shown in the following table:

category	syntax	example
Test Command	AT+<x>=?	AT+CMEE=?
Read Command	AT+<x>?	AT+CMEE?
Write Command(with parameter)	AT+<x>=<...>	AT+CMEE=0
Write Command(without parameter)	AT+<x>	AT+CGSN

1.5 Information response and result codes

1.5.1 AT command result codes

- 1) The response of every executed command starts and ends with <CR><LF> and the ATQ1 commands (result code suppression). Except for the ATV0 DCE response format.
- 2) If command syntax is incorrect, an “ERROR” string will be returned.
- 3) If AT command syntax is correct but transmitted with wrong parameters, the +CME ERROR:<err> or +CMS ERROR:<err> strings will be returned.(SMS Command).
- 4) If an AT command has been executed successfully, an “OK” string will be returned.
- 5) When receiving SMS, definite characters will be sent to terminal, referred to the following AT command introduction.
- 6) You can set different result codes by AT+CMEE=<...> when error message returns. Referred to the AT command introduction

Note: Related error code referred to appendix[14].

1.6 Definitions and Abbreviations

ACM	Accumulated call meter
APN	Access Point Name
BM	ME short message storage
DCE	Data Communication Equipment
DSP	Digital Signal Processing
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
MO	Mobile Originated
MT	Mobile Terminated

MS	Mobile Station
MSISDN	Mobile Station International ISDN Number
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PS	Protocol Stack

 **SENDTRUE**
CONFIDENTIAL

2. Overview of AT commands

2.1 Overview of general control commands

number	command	description
1	<u>AT</u>	Check the module communication state
2	<u>ATZ</u>	Set all current parameters to user defined profile
3	<u>ATE</u>	Set command ECHO mode
4	<u>ATSO</u>	Set number or rings before automatically answering the call
5	<u>ATQ</u>	Set result code presentation code
6	<u>ATV</u>	Set result code format code
7	<u>AT&W</u>	Store current parameter to used defined profile
8	<u>AT+CMEE</u>	Report mobile equipment error
9	<u>AT+CFUN</u>	Set phone functionality
10	<u>AT+CCLK</u>	clock
11	<u>AT+IPR</u>	Set TE-TA fixed local rate
12	<u>AT+CGSN</u>	Request product serial number identification
13	<u>AT+CGMM</u>	Request model identification
14	<u>AT+CGMR</u>	Request TA revision identification of software release
15	<u>AT+CGMI</u>	Request manufacturer identification
16	<u>AT+CPAS</u>	Mobile equipment activity status
17	<u>AT+CCID</u>	Show ICCID
18	<u>AT+CIMI</u>	Request the IMST
19	<u>AT+CBC</u>	Battery charge
20	<u>AT+CPOF</u>	Stop the machine
21	<u>AT+CSCS</u>	Select TE character set
22	<u>AT+SAC</u>	Stop network searching and supplementary services
23	<u>AT+SBCM</u>	Manage the process of battery charge and set the parameters of battery charge
24	<u>+SBCI</u>	Indicate the current status and voltage of the battery
25	<u>AT+IFC</u>	Set TE-TA local data flow control
26	<u>AT+CFGRI</u>	Indicate RI when using URC
27	<u>AT+ARMSLEEP</u>	Set ARM sleep or not
28	<u>AT+ASSERTMODE</u>	Set assert mode
29	<u>AT+AUTOPOWERON</u>	Set auto-poweron enable or not
30	<u>AT+ADCM</u>	Read the voltage of ADC1
31	<u>AT+SLOG</u>	Set output log enable or not
32	<u>AT+ISC</u>	Configure the interval for checking SIM card

2.2 Overview of networking service commands

number	command	description
1	<u>AT+COPS</u>	Operator selection
2	<u>AT+CSQ</u>	Signal quality
3	<u>AT+CCED</u>	Get the status of current service cell and nearby ones or report the RSSI of current cell automatically
4	<u>AT+CREG</u>	Network registration

2.3 Overview of call control commands

number	command	description
1	<u>ATD</u>	Mobile originated call to specified number
2	<u>ATA</u>	Answer a call
3	<u>ATH</u>	Disconnect existing connection
4	<u>AT+VTD</u>	Tone duration
5	<u>AT+VTS</u>	DTMF and tone generation
6	<u>AT+ECHO</u>	Configure the ECHO CANCELLATION function for voice calls
7	<u>AT+CICB</u>	Set the type of incoming calls, which is data, fax or speech.
8	<u>AT+CIND</u>	Indicator control

2.4 Overview of supplementary service commands

number	command	description
1	<u>AT+CCFC</u>	Call forwarding number and conditions control
2	<u>AT+CCWA</u>	Call waiting
3	<u>AT+CHLD</u>	Call hold and multiparty
4	<u>AT+CLIP</u>	Calling line identification presentation
5	<u>AT+CLIR</u>	Calling line identification restriction
6	<u>AT+COLP</u>	Connected line identification presentation
7	<u>AT+COLR</u>	Get the status of connected line identification restriction
8	<u>AT+CLCK</u>	Refers to segment 7.2.3
9	<u>AT+CPWD</u>	Refers to segment 7.2.2
10	<u>AT+CACM</u>	Accumulated call meter(ACM) reset or query
11	<u>AT+CAMM</u>	Accumulated all meter maximum set(ACMmax) or query
12	<u>AT+CPUC</u>	Price per unit and currency table
13	<u>AT+CLCC</u>	Give a list of all calls
14	<u>AT+CUSD</u>	Supplementary service notifications

15 [AT+CSSN](#) Supplementary service notifications

2.5 [Overview of security commands](#)

number	command	description
1	AT+CPIN	PIN authentication
2	AT+CPWD	Change password
3	AT+CLCK	Facility lock
4	AT+XX	Get the remaining times of valid attempts for PIN and PUK

2.6 [Overview of SMS commands](#)

number	command	description
1	AT+CSMS	Select message service
2	AT+CSAS	Store settings of +CSAS and +CSMP to EEPROM or SIM card
3	AT+CRES	Restore the settings specified by AT+CSCA and AT+CSMP commands to EEPROM
4	AT+CSDH	Show SMS text mode parameters
5	AT+CPMS	Preferred SMS message storage
6	AT+CSCA	SMS service center address
7	AT+CMGF	Select SMS message format
8	AT+CMGL	List SMS message from preferred store
9	AT+CMGR	Read SMS message
10	AT+CMGS	Send short message
11	AT+CSMP	Set SMS text mode parameters
12	AT+CMGW	Write short message to memory
13	AT+CMSS	Send short message from storage
14	AT+CMGD	Delete short message
15	AT+CSCB	Select Cell Broadcast Message Indication
16	AT+CNMI	New short message indication
17	+CMTI	Indicate the MEM index location of received message(Enabled by AT+CNMI)
18	+CMT	Indicate the short message was sent to DTE directly after received
19	+CBM	Indicate that the cell broadcast message was sent to DTE device after received
20	AT+SMSC	Change the status of message stored in SIM card
21	AT+SUS	Set REC UNREAD status of these messages which remain unchanged

2.7 Overview of phonebook commands

number	command	description
1	<u>AT+CPBS</u>	Select phonebook memory storage
2	<u>AT+CPBR</u>	Read from phonebook
3	<u>AT+CPBF</u>	Search phonebook with a name string
4	<u>AT+CPBW</u>	Write into phonebook
5	<u>AT+CPBP</u>	Search the phonebook for an item with the same phone number
6	<u>AT+CPBN</u>	Make a forward or backward move in the phonebook
7	<u>AT+CNUM</u>	Read own numbers
8	<u>AT+SDCP</u>	Delete all the calls
9	<u>AT+CSVM</u>	Set/get and enable/disable the voice mail number

2.8 Overview of STK commands

number	command	description
1	<u>AT+STSF</u>	Allow STK facilities to be activated, deactivated or configured
2	<u>AT+STIN</u>	Allow the user to identify the commands sent via SIM card
3	<u>AT+STGI</u>	Get the information of a command sent from the SIM
4	<u>AT+STGR</u>	Allow the application to select an item in the main menu or to answer command

2.9 Overview of GPRS commands

number	command	description
1	<u>AT+CGDCONT</u>	Define PDP context
2	<u>AT+CGQREQ</u>	Quality of service profile(requested)
3	<u>AT+CGQMIN</u>	Quality of service profile(minimum acceptable)
4	<u>AT+CGPCO</u>	Configure the PDP context parameters of PCO
5	<u>AT+CGATT</u>	Attach or detach GPRS services
6	<u>AT+CGACT</u>	PDP context activate or deactivate
7	<u>AT+CGPADDR</u>	Show PDP address
8	<u>AT+CGDATA</u>	Enter data state
9	<u>AT+CGAUTO</u>	Automatic response to a network for PDP context activation
10	<u>AT+CGANS</u>	Manual response to a network for PDP context activation

11	<u>AT+CGCLASS</u>	Set the GPRS type of MT
12	<u>AT+CGEREP</u>	GPRS event reporting
13	<u>AT+CGREG</u>	GPRS network registration status
14	<u>AT+CGSMS</u>	Select service for MO SMS messages
15	<u>AT+CRC</u>	Decide whether shows the supplementary information of incoming calls
16	<u>AT+CR</u>	Decide whether to present that this CONNECT is GPRS
17	<u>AT+CEER</u>	Extend the error report
18	<u>Extension of ATD</u>	Built the connections between terminal devices and networks
19	<u>AT+SSST</u>	Set the MS service type
20	<u>AT+SATT</u>	Attach or detach GPRS service
21	<u>AT+SAUTOATT</u>	Allow MT to perform auto attach operation
22	<u>AT+SGPRSDATA</u>	Specify the data length of GPRS data sent by MT
23	<u>ATO</u>	Switch from command mode to data mode
24	<u>+++</u>	Switch from data mode or PPP online mode to command mode

2.10 [Overview of TCP/IP commands](#)

number	command	description
1	<u>AT+SDATACONF</u>	Config the configure parameters of data sent by AT commands based on GPRS
2	<u>AT+SDATASTART</u>	Enable GPRS service
3	<u>AT+SDATASEND</u>	Send the data specified by user in transparent mode.
4	<u>AT+SDATATREAD</u>	Read the received data and display in transparent mode.
5	<u>AT+SDATASEND</u>	Send the character string data specified by user
6	<u>AT+SSTRSEND</u>	Send the character strings specified by customer
7	<u>AT+SDATAREAD</u>	Read the received data from the buffer.
8	<u>AT+SDATARXMD</u>	Configure the display format and the mode when received data.
9	<u>AT+SDATASTATUS</u>	Require socket status
10	<u>AT+TRT</u>	Set network data resend times after failing to send data

2.11 [Overview of AUDIO commands](#)

number	command	description
1	<u>AT+SSAM</u>	Configure the sound mode
2	<u>AT+SPEAKER</u>	Config MIC and SPEAKER channels

3	<u>AT+SDMUT</u>	Mute the downlink voice
4	<u>AT+CMUT</u>	Mute control
5	<u>AT+CRMP</u>	Test ring of incoming calls
6	<u>AT+STONE</u>	Play sound in a certain frequency
7	<u>AT+VGR</u>	Tune the sound level of the speaker
8	<u>AT+SDTMF</u>	Play a DTMF tone on the current speaker
9	<u>AT+SCDM</u>	Select the specific ring melody
10	<u>AT+ECHO</u>	Configure the ECHO CANCELLATION function for voice calls
11	<u>AT+SSAP</u>	Config the parameter of audio gain
12	<u>AT+STMF</u>	Store and delete the file in MIDI format
13	<u>AT+SEQT</u>	Set the speaker equalizer type
14	<u>AT+SSEA</u>	Configure the sound parameters in project mode

2.12 Overview of special commands

number	command	description
1	<u>AT+SMUX</u>	Configure the multiplexing mode
2	<u>AT+S32K</u>	Allow or forbid entering of sleep mode
3	<u>AT+SIND</u>	Set some status of a system
4	<u>AT+SBAND</u>	Select the frequency of module
5	<u>AT+SMGF</u>	Manage files
6	<u>AT+SMGD</u>	Manage directory
7	<u>AT+SSMP</u>	Require ME be sent in maximum power
8	<u>AT+SSGF</u>	Configure GPIO direction
9	<u>AT+SSGS</u>	Set and query GPIO level
10	<u>AT+SNVM</u>	Manage the NVITEM data through NVITEM id

3. General control commands

The General Control Commands are to accomplish some communication control. These commands are designed according to the ITUT-T (International Telecommunication Union, Telecommunication sector) V2.5ter document.

3.1 Overview of general control commands

number	command	description
1	<u>AT</u>	Check the module communication state
2	<u>ATZ</u>	Set all current parameters to user defined profile
3	<u>ATE</u>	Set command ECHO mode
4	<u>ATSO</u>	Set number of rings before automatically answering the call
5	<u>ATQ</u>	Set result code presentation code
6	<u>ATV</u>	Set result code format code
7	<u>AT&W</u>	Store current parameter to used defined profile
8	<u>AT+CMEE</u>	Report mobile equipment error
9	<u>AT+CFUN</u>	Set phone functionality
10	<u>AT+CCLK</u>	clock
11	<u>AT+IPR</u>	Set TE-TA fixed local rate
12	<u>AT+CGSN</u>	Request product serial number identification
13	<u>AT+CGMM</u>	Request model identification
14	<u>AT+CGMR</u>	Request TA revision identification of software release
15	<u>AT+CGMI</u>	Request manufacturer identification
16	<u>AT+CPAS</u>	Mobile equipment activity status
17	<u>AT+CCID</u>	Show ICCID
18	<u>AT+CIMI</u>	Request the IMST
19	<u>AT+CBC</u>	Battery charge
20	<u>AT+CPOF</u>	Stop the machine
21	<u>AT+CSCS</u>	Select TE character set
22	<u>AT+SAC</u>	Stop network searching and supplementary services
23	<u>AT+SBCM</u>	Manage the process of battery charge and set the parameters of battery charge
24	<u>+SBCI</u>	Indicate the current status and voltage of the battery
25	<u>AT+IFC</u>	Set TE-TA local data flow control

26	AT+CFGRI	Indicate RI when using URC
27	AT+ARMSLEEP	Set ARM sleep or not
28	AT+ASSERTMODE	Set assert mode
29	AT+AUTOPOWERON	Set auto-poweron enable or not
30	AT+ADCM	Read the voltage of ADC1
31	AT+SLOG	Set output log enable or not
32	AT+ISC	Configure the interval for checking SIM card
33	AT+SSIMT	Query the SIM card type

3.2 Detailed description of general control commands

3.2.1 AT

AT: check the communication between the module/chip and any accessory	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT
Return	OK
Reference	This command is used to check the communication between the module/chip and any accessory.
Example	

3.2.2 ATZ

ATZ: restore the configuration profile	
Test Command	None
Return	
Read Command	None
Return	
Write Command	ATZ
Return	OK
Reference	This command is used to restore the configuration profile. Any call is released.
Example	

3.2.3 ATE

ATE: determine whether or not the DCE echoes characters received from the

DTE		
Test Command	None	
Return		
Read Command	None	
Return		
Write Command	ATE<value>	
Return	OK	
Reference	<value>	description
	0	DCE returns no character to DTE(Default Settings)
	1	DCE returns characters to DTE
Example	ATE1	
	OK	

3.2.4 ATSO

ATSO: set the automatic answering feature of the DCE		
Test Command	ATSO=?	
Return	S0: (0-255) OK	
Read Command	ATSO?	
Return	<value> OK	
Write Command	ATSO=<value>	
Return	OK	
Reference	<value>	description
	0	Automatic answering is disabled
	1~255	Enable automatic answering on the ring number specifier.
Example	ATSO=3	
	OK	

3.2.5 ATQ

ATQ: determine whether the mobile equipment sends result codes or not		
Test Command	None	
Return		
Read Command	None	
Return		
Write Command	ATQ<value>	
Return	OK / No String	
Reference	<value>	description
	0	DCE transmits result codes to DTE

	1	Result codes are not transmitted to DTE
Example	ATQ0	OK

3.2.6 ATV

ATV: set the DCE response format							
Test Command	ATV=?						
Return	V(0,1) OK						
Read Command	ATV?						
Return	1 OK or: 0 0						
Write Command	ATV<value>						
Return	OK / none						
Reference	<table border="0"> <thead> <tr> <th><value></th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Without head characters <CR><LF> and without the use of numeric result codes</td> </tr> <tr> <td>1</td> <td>With head characters<CR><LF> and with the use of numeric result codes</td> </tr> </tbody> </table>	<value>	description	0	Without head characters <CR><LF> and without the use of numeric result codes	1	With head characters<CR><LF> and with the use of numeric result codes
<value>	description						
0	Without head characters <CR><LF> and without the use of numeric result codes						
1	With head characters<CR><LF> and with the use of numeric result codes						
Example	ATV1 OK						

3.2.7 AT&W

AT&W: write the active configuration to non-volatile memory section																			
Test Command	None																		
Return																			
Read Command	None																		
Return																			
Write Command	AT&W																		
Return	OK																		
Reference	<table border="0"> <thead> <tr> <th colspan="2">The list of parameters stored to non-volatile memory section by AT&W</th> <th>AT Command</th> </tr> <tr> <th>NUM</th> <th>Content</th> <th>(modify respective values)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Flag of CLIP</td> <td>AT+CLIP</td> </tr> <tr> <td>2</td> <td>Flag of COLP</td> <td>AT+COLP</td> </tr> <tr> <td>3</td> <td>mode of SMS</td> <td>AT+CMGF</td> </tr> <tr> <td>4</td> <td>Flag of mixed modes</td> <td>AT+SMUX</td> </tr> </tbody> </table>	The list of parameters stored to non-volatile memory section by AT&W		AT Command	NUM	Content	(modify respective values)	1	Flag of CLIP	AT+CLIP	2	Flag of COLP	AT+COLP	3	mode of SMS	AT+CMGF	4	Flag of mixed modes	AT+SMUX
The list of parameters stored to non-volatile memory section by AT&W		AT Command																	
NUM	Content	(modify respective values)																	
1	Flag of CLIP	AT+CLIP																	
2	Flag of COLP	AT+COLP																	
3	mode of SMS	AT+CMGF																	
4	Flag of mixed modes	AT+SMUX																	

5	Flag of charge states	AT+SBCM
6	Flag of echo character	ATE
7	Mode of CREG	AT+CREG
8	Flag of SIDE TONE	AT+SIDET
9	Sequence num of incoming music	AT+SCDM
10	Format of returned error	AT+CMEE
Example		

3.2.8 AT+CMEE

AT+CMEE: disable or enable the use of result code +CME ERROR		
Test Command	AT+CMEE=?	
Return	+CMEE: (0-2) OK	
Read Command	AT+CMEE?	
Return	+CMEE: <value> OK	
Write Command	AT+CMEE=<value>	
Return	OK	
Reference	<value>	description
	0	Deactivate +CME ERROR Returning code
	1	Activate +CME ERROR Returning code and use numeric error values
	2	Activate +CME ERROR Returning code and use verbose error description
Example		

3.2.9 AT+CFUN

AT+CFUN: activate or deactivate PS, or reboot module		
Test Command	AT+CFUN=?	
Return	+CFUN: (0-1),(0-1) OK	
Read Command	AT+CFUN?	
Return	+CFUN: <value1> OK	
Write Command	AT+CFUN=<value1>,[<value2>]	
Return	OK	
Reference	Value1	description
	0	Deactivate PS
	1	Activate PS

	Value2	description
	0	Do not reboot module
	1	Reboot module
	Notes: when reboot module,value1 will be ignored.	
Example	Reboot module: AT+CFUN=1, 1 OK Activate PS: AT+CFUN=1 OK	

3.2.10 AT+CCLK

AT+CCLK: set or get the current date and time	
Test Command	None
Return	
Read Command	AT+CCLK?
Return	+CCLK: <current date and time> OK
Write Command	AT+CCLK=<date and time string>
Return	OK / +CME ERROR<err>
Reference	<date and time string>: “yy/mm/dd, hh:mm:ss”, total length is 17,users must input data according to this format,or it will return ERROR.
Example	Set current time: AT+CCLK="07/01/29,13:27:10" OK

3.2.11 AT+IPR

AT+IPR: set or get the baudrate of DCE	
Test Command	AT+IPR=?
Return	+IPR: {1200,2400,4800,9600,19200,38400,57600,115200,230400,460800} OK
Read Command	AT+IPR?
Return	+IPR: <current BaudRate> OK
Write Command	AT+IPR=<baudrate>
Return	OK / ERROR
Reference	After setting the baudrate, respective tools, such as hyperterminal, must be modified according to it, or normal communication could not be performed. Default baud rate is 115200

Example

3.2.12 AT+CGSN

AT+CGSN: get the IMEI of DCE	
Test Command	AT+CGSN=?
Return	+CGSN: OK
Read Command	None
Return	
Write Command	AT+CGSN
Return	<sn> OK
Reference	
Example	AT+CGSN 332190700972650 OK

3.2.13 AT+CGMM

AT+CGMM: get the identification of DCE module	
Test Command	AT+CGMM=?
Return	+CGMM: OK
Read Command	None
Return	
Write Command	AT+CGMM
Return	<Module Identification> OK
Reference	
Example	AT+CGMM V1.0.1-B7 OK

3.2.14 AT+CGMR

AT+CGMR: get DCE software version	
Test Command	AT+CGMR=?
Return	+CGMR: OK

Read Command	None
Return	
Write Command	AT+CGMR
Return	<Version Number> OK
Reference	
Example	AT+CGMR SW version:RIYUE_R1.8.7001.BL0005.BUILD0017 OK

3.2.15 AT+CGMI

AT+CGMI: get the identification of DCE manufacturer	
Test Command	AT+CGMI=?
Return	+CGMI: OK
Read Command	None
Return	
Write Command	AT+CGMI
Return	<manufacturer> OK
Reference	
Example	AT+CGMI Sendtrue Technology Co.,Ltd OK

3.2.16 AT+CPAS

AT+CPAS: get the status of DCE									
Test Command	AT+CPAS=?								
Return	+CPAS: <list supported value> OK								
Read Command	None								
Return									
Write Command	AT+CPAS								
Return	+CPAS: <code> OK								
Reference	<table border="1"> <thead> <tr> <th>code</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>READY</td> </tr> <tr> <td>3</td> <td>RINGING</td> </tr> <tr> <td>4</td> <td>Call in progress</td> </tr> </tbody> </table>	code	description	0	READY	3	RINGING	4	Call in progress
code	description								
0	READY								
3	RINGING								
4	Call in progress								

Example

3.2.17 AT+CCID

AT+CCID: read the EF-ICCID file on the SIM card	
Test Command	AT+CCID=?
Return	+CCID: OK
Read Command	AT+CCID?
Return	+CCID: "SIM number" OK
Write Command	AT+CCID
Return	+CCID: "SIM number"
Reference	
Example	AT+CCID? +CCID: "89860106120217281047" OK

3.2.18 AT+CIMI

AT+CIMI: get IMSI	
Test Command	AT+CIMI=?
Return	+CIMI: OK
Read Command	None
Return	
Write Command	AT+CIMI
Return	+CIMI: <IMSI string> OK
Reference	
Example	AT+CIMI +CIMI: "460012222952704" OK

3.2.19 AT+CBC

AT+CBC: indicate the battery connection status and the battery voltage	
Test Command	AT+CBC=?
Return	+CBC: (0-2),(0-4200) OK

Read Command	None	
Return		
Write Command	AT+CBC	
Return	+CBC: <bcs> ,<bcl> OK	
Reference	bcs	description
	0	ME powered by battery(no charger connected)
	1	ME has a battery connected, but it is powered by the charger
	2	ME does not have a battery connected(not support in current)
	<bcl>:current battery voltage.	
Example		

3.2.20 AT+CPOF

AT+CPOF: stop the machine		
Test Command	AT+CPOF=?	
Return	+CPOF: OK	
Read Command	None	
Return		
Write Command	AT+CPOF	
Return	OK	
Reference		
Example		

3.2.21 AT+CSCS

AT+CSCS: tell DCE the set of characters which will be used next		
Test Command	AT+CSCS=?	
Return	+CSCS: (“GSM”,”IRA”) OK	
Read Command	AT+CSCS?	
Return	+CSCS: <chest> OK	
Write Command	AT+CSCS=<chest>	
Return	OK	
Reference	chset	description
	“GSM”	GSM default character set
	“IRA”	International Reference Character set(ITU-T T.50)
	Note: At present, this function is not supported, the default value is “GSM”.	
Example		

3.2.22 AT+SAC

AT+SAC: stop the network searching and supplementary services	
Test Command	AT+SAC=?
Return	OK
Read Command	AT+SAC?
Return	OK (system is not searching the network or doing additional services) or ERROR (system is searching the network or doing additional services)
Write Command	AT+SAC
Return	OK
Reference	Query command can find whether to search the network and do the supplementary services
Example	

3.2.23 AT+SBCM

AT+SBCM: manage the process of battery charge and set the parameters of battery charge																			
Test Command	AT+SBCM=?																		
Return	+SBCM: (0-3),(0-1),(4000-5000),(2800-3800),(10-10000),(10-10000),(0-255) OK																		
Read Command	None																		
Return																			
Write Command	AT+SBCM=<mode>[[,<chargeInd>]][,<BattLevelMax>],[<BattLevelMin>] ,<TPulseIncharge>],[<TPulseOutCharge>],[<BattIntRes>]]]																		
Return	OK / ERROR																		
Reference	<table border="0"> <thead> <tr> <th>mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Stop battery charging</td> </tr> <tr> <td>1</td> <td>Start battery charging</td> </tr> <tr> <td>2</td> <td>Get the current battery voltage</td> </tr> <tr> <td>3</td> <td>Set battery charge parameters</td> </tr> </tbody> </table> <p>Note: when <mode> equals 0 or 1, only parameter <ChargeInd> is valid, when <mode> equals 2, other parameters are invalid.</p> <table border="0"> <thead> <tr> <th>ChargeInd</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Cancel +SBCM hint code</td> </tr> <tr> <td>1</td> <td>Activate +SBCM code</td> </tr> </tbody> </table> <table border="0"> <tr> <td>BattLevelMax</td> <td>The maximum level of battery voltage. When reached, battery will stop charging. The allowed range is (4000-5000),default 4200mV.</td> </tr> </table>	mode	description	0	Stop battery charging	1	Start battery charging	2	Get the current battery voltage	3	Set battery charge parameters	ChargeInd	description	0	Cancel +SBCM hint code	1	Activate +SBCM code	BattLevelMax	The maximum level of battery voltage. When reached, battery will stop charging. The allowed range is (4000-5000),default 4200mV.
mode	description																		
0	Stop battery charging																		
1	Start battery charging																		
2	Get the current battery voltage																		
3	Set battery charge parameters																		
ChargeInd	description																		
0	Cancel +SBCM hint code																		
1	Activate +SBCM code																		
BattLevelMax	The maximum level of battery voltage. When reached, battery will stop charging. The allowed range is (4000-5000),default 4200mV.																		

BattLevelMin	The minimum level of battery voltage. When reached, DCE will be shut off. The allowed range is (2800-3800), default 3300mV
TPulseInCharge	Time space between pluses in charge: range(100-10000), default value: 100ms
TPulseOutCharge	Send +SBCM time space: allowed value range (100-10000), default value:(5000ms)
BattIntRes	Battery Interior Resistance: allowed value range (0-255mΩ), default value: 0 mΩ
Example	

3.2.24 +SBCI

+SBCI: indicate the current status and voltage of the battery	
Test Command	None
Return	
Read Command	None
Return	
Write Command	None
Return	
Reference	+SBCI: <status>[,<level>] status description 0 Battery Voltage reached minimum 1 Battery Voltage reached maximum 2 Battery in charging 3 Battery out of charging Level: current voltage of battery
Example	

3.2.25 AT+IFC

AT+IFC: Set TE-TA local data flow control	
Test Command	AT+ IFC =?
Return	+IFC: (0-2),(0-2) OK
Read Command	AT+IFC?
Return	+IFC:<dce_by_dte>,<dte_by_dce> OK
write Command	AT+IFC=<dce_by_dte>[,<dte_by_dce>]
Return	OK / ERROR
Reference	<dce_by_dte>:integer;specifies the method will be used by TE at receive of data from TA

<p><dte_by_dce>:integer;specifies the method will be used by TA at receive of data form TE</p> <p><dce_by_dte>/<dte_by_dce> description</p> <p>0 None</p> <p>1 Software flow control</p> <p>2 Hardware flow control(CTS/RTS)</p> <p>Note:</p> <p>Equality between <dce_by_dte> and <dte_by_dce> is supported currently.</p>
Example

3.2.26 AT+CFGRI

AT+CFGRI: Indicate RI when using URC		
Read	AT+ CFGRI?	
Command		
	+CFGRI:<status>	
Return	OK	
Write	AT+CFGRI=<status>	
Command		
	OK / ERROR	
Return		
Reference	<status>	description
	0	Off
	1	On
Example		

3.2.27 AT+ARMSLEEP

AT+ ARMSLEEP: Set ARM sleep or not		
Test Command	AT+ ARMSLEEP =?	
Return	+ ARMSLEEP:(0-1)	
	OK	
Read Command	AT+ ARMSLEEP?	
Return	+ ARMSLEEP:<status>	
	OK	
write Command	AT+ ARMSLEEP =<status>	
Return	OK / ERROR	
Reference	<status>	description
	0	Off
	1	On
Example		

3.2.28 AT+ASSERTMODE

AT+ ASSERTMODE: Set assert mode		
Test Command	AT+ ASSERTMODE=?	
Return	+ ASSERTMODE:(0-1) OK	
Read Command	AT+ ASSERTMODE?	
Return	+ ASSERTMODE:<status> OK	
write Command	AT+ ASSERTMODE =<status>	
Return	OK / ERROR	
Reference	<status>	description
	0	Off
	1	On
Example		

3.2.29 AT+AUTOPOWERON

AT+ AUTOPOWERON: Set auto-poweron enable or not		
Test Command	AT+ AUTOPOWERON=?	
Return	+ AUTOPOWERON:(0-1) OK	
Read Command	AT+ AUTOPOWERON?	
Return	+ AUTOPOWERON:<status> OK	
write Command	AT+ AUTOPOWERON =<status>	
Return	OK / ERROR	
Reference	<status>	description
	0	Off
	1	On
Example		

3.2.30 AT+ADCM

AT+ ADCM: Read the voltage of ADC1	
Execution Command	AT+ ADCM
Return	+ ADCM:<ADC1_Voltage> OK
Reference	<ADC1_Voltage>:the voltage of ADC1 with the range 0-5000

Example

3.3.31 AT+SLOG

AT+ SLOG: Set output log enable or not		
Test Command	AT+ SLOG=?	
Return	+ SLOG:(0-1) OK	
Read Command	AT+ SLOG?	
Return	+ SLOG:<status> OK	
write Command	AT+ SLOG =<status>	
Return	OK / ERROR	
Reference	<status>	description
	0	Off
	1	On
Example		

3.2.32 AT+ISC

AT+ISC: Configure the interval for checking SIM card		
Test Command	AT+ ISC=?	
Return	+ SLOG:(0,5-60) OK	
Read Command	AT+ ISC?	
Return	+ ISC:<interval> OK	
write Command	AT+ ISC =<interval>	
Return	OK / ERROR	
Reference	<interval>	description
	0	Disable checking SIM card
	5-60(s)	The range of interval
Example		

3.2.33 AT+SSIMT

AT+SSIMT: Query the type of SIM card	
Test Command	AT+ SSIMT =?
Return	+ SSIMT:”””

	OK																				
Execution	AT+ SSIMT																				
Command																					
Return	+ SSIMT:<cause>,<card_type>																				
	OK																				
Reference	<cause>:current card status. <table border="1"> <thead> <tr> <th><cause></th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Success</td> </tr> <tr> <td>1</td> <td>Not ready</td> </tr> <tr> <td>2</td> <td>No SIM card</td> </tr> <tr> <td>3</td> <td>Failed</td> </tr> </tbody> </table> <card_type>:current card type. <table border="1"> <thead> <tr> <th>< card_type ></th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>SIM card</td> </tr> <tr> <td>1</td> <td>UM card</td> </tr> <tr> <td>2</td> <td>Double model card</td> </tr> <tr> <td>3</td> <td>Invalid card</td> </tr> </tbody> </table>	<cause>	description	0	Success	1	Not ready	2	No SIM card	3	Failed	< card_type >	description	0	SIM card	1	UM card	2	Double model card	3	Invalid card
<cause>	description																				
0	Success																				
1	Not ready																				
2	No SIM card																				
3	Failed																				
< card_type >	description																				
0	SIM card																				
1	UM card																				
2	Double model card																				
3	Invalid card																				
Example																					

SENDTRUE
CONFIDENTIAL

4. Networking service commands

Networking service commands are related to various network services, such as registering mobile communication, getting the information about the network and so on.

4.1 Overview of networking service commands

number	command	description
1	AT+COPS	Operator selection
2	AT+CSQ	Signal quality
3	AT+CCED	Get the status of current service cell and nearby ones or report the RSSI of current cell automatically
4	AT+CREG	Network registration

4.2 Detailed description of networking service commands

4.2.1 AT+COPS

AT+COPS: select and register mobile communication network		
Test Command	AT+COPS=?	
Return	+COPS:[list of supported(<stat>,long alphanumeric<oper>,short alphanumeric<oper>s, numeric<oper>) s] OK	
Read Command	AT+COPS?	
Return	+COPS: <mode>[,<format>,<current oper>] OK	
Write Command	AT+COPS=<mode>[,<format>[,<oper>]]	
Return	OK / +CME ERROR: <err>	
Reference	mode	description
	0	Select automatically(oper is ignore)
	1	Select manually(oper should be present)
	2	Deregister the network
	3	Only used in setting mode
	4	Manually/automatically(if manual selection fails, select automatically)
	format	description
	0	Short format alphanumeric<oper>
	2	Num <oper>

stat	description
0	Unknown
1	Available
2	Currently used
3	Forbidden

<oper>: operands(MCC/MNC numeric codes which is used in network selection, such as 46000 is China Mobile Communication, 46001 is China Unicom communication) .

Notes: while commands are being set, if mode=3, in setting mode, this option is not available, because only digital mode is supported. And when mode=2, deregisters network. This function is not supported, for AT+CFUN command can do. If these above options are executed, ERROR will be returned.

Example

```

AT+COPS=?
+COPS: (1,"CMCC",,"46000"),(3,"CUCC",,"46001"),(0-4),(0,2)

OK

AT+COPS?
+COPS:1,2,46000
OK

Select network automatically:
AT+COPS=0
OK

Search network manually:
AT+COPS=1,2,46000
OK
    
```

4.2.2 AT+CSQ

AT+CSQ: get the signal strength indication of current service cell	
Test Command	AT+CSQ=?
Return	+CSQ: (0-31),(0-7,99) OK
Read Command	None
Return	
Write Command	AT+CSQ
Return	+CSQ: <rss>,<ber> OK

Reference	rsqi	description
	0	-110db
	1-30	..
	31	-48db
	ber	description
	0-7	RXQUAL Value (GSM)
	99	ineffective
Example	AT+CSQ +CSQ: 23,99 OK	

4.2.3 AT+CCED

AT+CCED: get the status of current service cell and nearby ones or report the RSSI of current cell automatically		
Test Command	AT+CCED=?	
Return	+CCED: (0-2),(1,2,4,8) OK	
Read Command	None	
Return		
Write Command	AT+CCED=<mode>[,<requested dump>]	
Return	(1) get the status from the current cell and nearby ones: +CCED: <mcc>,<mnc>,<lac>,<Cellid>,<Bsic>,<Arfcn>,<Rxlev>,<Rxqual> OK (2) get the status of current service cell but no network is available +CCED: OK (3) get the timing advance +CCED: <timing advance > OK (4) get the RSSI of current cell: +CSQ: <rsqi>,<Rxqual> OK	
Reference	mode	description
	0	One shot requested
	1	Automatical shots requested
	2	Stop automatic shots
	Requested dump	description
	1	Current service cell
	2	Nearby cell
	4	Timing advance

8 RSSI value of current cell

Note:

When get the status of current service cell and nearby ones, requested dump value is 1,2,4

When report the RSSI of current cell, requested dump value is 8

Mcc	Mobile Country Code
Mnc	Mobile Network Code
Lac	Location Area Code
Cell id	Id of cell
Bsic	Flag of main cell
Arfcn	Channel of BCCH
Rxlev	Strength indication of receiving signal(0-63)
Rxqual	Quality of receiving signal(0-7, 99 is an invalid value)

Example

Get the status of current service cell:

```
AT+CCED=0,1
+CCED: 460,01,4184,50861,27,109,31,99
OK
```

Get the status of nearby cells:

```
AT+CCED=0,2
+CCED:460,01,4184,33132,20,727,21,460,01,4198,36183,25,723,21,460,01,41
84,56671,24,120,17,460,01,4184,50862,29,124,22,460,01,4184,33131,18,722,1
9
OK
```

Get the timing advance:

```
AT+CCED=0, 4
+CCED: 0
OK
```

Get the RSSI value of current service cell:

```
AT+CCED=0, 8
+CCED: 30, 99
OK
```

Report the RSSI value automatically:

```
AT+CCED=1, 8
OK
+CSQ: 30, 99
+CSQ: 30, 99
.....
+CSQ: 30, 99
```

Stop report automatically:

AT+CCED=0, 8
OK

4.2.4 AT+CREG

AT+CREG: set the state of automatic network report																							
Test Command	AT+CREG=?																						
Return	+CREG: (0,1,2) OK																						
Read Command	AT+CREG?																						
Return	+CREG: <mode>,<state> OK																						
Write Command	AT+CREG=<mode>																						
Return	OK / ERROR																						
Reference	<table border="0"> <thead> <tr> <th style="text-align: left;">mode</th> <th style="text-align: left;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Deactivate the report of network registration report(default value)</td> </tr> <tr> <td>1</td> <td>Activate network registration report and return +CREG: <state></td> </tr> <tr> <td>2</td> <td>Activate network registration report and location status report ,return +CREG: <state>,<lac>,<ci></td> </tr> </tbody> </table> <table border="0"> <thead> <tr> <th style="text-align: left;">mode</th> <th style="text-align: left;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No registered network, ME does not search new network</td> </tr> <tr> <td>1</td> <td>Register local network successfully</td> </tr> <tr> <td>2</td> <td>No registered network, ME is searching new network</td> </tr> <tr> <td>3</td> <td>Network registration is denied</td> </tr> <tr> <td>4</td> <td>unknown</td> </tr> <tr> <td>5</td> <td>Register roam network successfully</td> </tr> </tbody> </table> <p> <lac>: location id of cell <ci>: cell id </p>	mode	description	0	Deactivate the report of network registration report(default value)	1	Activate network registration report and return +CREG: <state>	2	Activate network registration report and location status report ,return +CREG: <state>,<lac>,<ci>	mode	description	0	No registered network, ME does not search new network	1	Register local network successfully	2	No registered network, ME is searching new network	3	Network registration is denied	4	unknown	5	Register roam network successfully
mode	description																						
0	Deactivate the report of network registration report(default value)																						
1	Activate network registration report and return +CREG: <state>																						
2	Activate network registration report and location status report ,return +CREG: <state>,<lac>,<ci>																						
mode	description																						
0	No registered network, ME does not search new network																						
1	Register local network successfully																						
2	No registered network, ME is searching new network																						
3	Network registration is denied																						
4	unknown																						
5	Register roam network successfully																						
Example	<pre> AT+CREG=1 OK +CREG: 5 AT+CREG=2 OK +CREG: 5, 0x1830, 0x3091 AT+CREG=0 OK </pre>																						

5. Call control commands

Call control commands are related to Mobile Originated (MO) calls and Mobile Terminated (MT) calls, such as calling, answering, volume setting and so on.

5.1 Overview of call control commands

number	command	description
1	ATD	Mobile originated call to specified number
2	ATA	Answer a call
3	ATH	Disconnect existing connection
4	AT+VTD	Tone duration
5	AT+VTS	DTMF and tone generation
6	AT+CICB	Set the type of incoming calls, which is data, fax or speech.
7	AT+CIND	Indicator control

5.2 Detailed description of call control commands

5.2.1 ATD

ATD: call remote user	
Test Command	None
Return	
Read Command	None
Return	
Write Command	ATD<dialing string>
Return	OK(call connection succeeded) NO CARRIER(call connection failed or released by remote user) ERROR (error occur)
Reference	<dialing string>: {0-9,*,#,+,a,b,c}, the maximum length is 40,if dialing string end with “#”,then the call number will be treat as a emergency call number. If the AT+SIND is used to set bits related to calling, when ATD <dialing string> is used, ME reports respective messages. Note: At present, call from phonebook is not supported.
Example	Call 10086: ATD10086 +SIND: 5,1 +SIND:2 +SIND:9

<p>OK</p> <p>Supplementary service: ATD**61*00431234*11*5# OK</p> <p>Emergency call: ATD911,# +SIND:5,1 +SIND:2 +SIND:9 OK</p>
--

5.2.2 ATA

ATA: answer calls from remote users	
Test Command	None
Return	
Read Command	None
Return	
Write Command	ATA
Return	OK
Reference	RING(incoming call), use this command to answer the incoming calls from remote users.
Example	

5.2.3 ATH

ATH: hang up all(one or several)connecting or connected calls	
Test Command	None
Return	
Read Command	None
Return	
Write Command	ATH
Return	OK
Reference	
Example	

5.2.4 AT+VTD

AT+VTD: define DTMF tone duration when DTMF is sent over the GSM
--

network	
Test Command	AT+VTD=?
Return	+VTD: (0-255) OK
Read Command	AT+VTD?
Return	+VTD: <n> OK
Write Command	AT+VTD=<n>
Return	OK
Reference	<n>: (0-255) n*100ms
Example	

5.2.5 AT+VTS

AT+VTS: transmit DTMF after a successful call connection							
Test Command	AT+VTS=?						
Return	+VTS: (0-9,*,#,A,B,C,D) OK						
Read Command	None						
Return							
Write Command	AT+VTS=<Tone>[,<start>]						
Return	OK / +CME ERROR:<err>						
Reference	<table border="0"> <thead> <tr> <th>start</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Stop DTMF</td> </tr> <tr> <td>1</td> <td>Start DTMF</td> </tr> </tbody> </table> <p>Tone: {0-9,*,#,A,B,C,D}</p> <p>Note: when using <start>= 0 to send a DTMF, users should use <start>=0 to stop DTMF operation. In this way, only one DTMF char could be sent in one times.</p>	start	description	0	Stop DTMF	1	Start DTMF
start	description						
0	Stop DTMF						
1	Start DTMF						
Example	<pre> AT+VTS=2 OK AT+VTS=6,1 OK AT+VTS=6,0 OK </pre>						

5.2.6 AT+CICB

AT+CICB: set the type of incoming calls, which is data, fax or speech	
Test Command	AT+CICB=?

Return	+CICB: (0-2) OK	
Read Command	AT+CICB?	
Return	+CICB: 2 OK	
Write Command	AT+CICB=<value>	
Return	OK	
Reference	Value	description
	0	Data
	1	Fax
	2	Speech
Example		

5.2.7 AT+CIND

AT+CIND: indicate voltage of battery, strength of signal, availability of network, stillness, whether receive short messages, existence of a call, roam status and full status of SMS		
Test Command	AT+CIND=?	
Return	+CIND: (0-5),(0-31),(0-1), (0-1), (0-1), (0-1), (0-1), (0-1), (0-1) OK	
Read Command	AT+CIND?	
Return	+CIND: <battery>, <signal level>, <service>, <sounder>, <message>, <call>, <roam>, <smsfull> OK	
Write Command	None	
Return		
Reference	<Descr>	description
	battery	Voltage of battery
	signal	Strength of signal (0-31)
	service	Availability of network (0-1) (value=1 means registered to network)
	sounder	Stillness (0-1) (1=mute)
	message	Whether receive short messages (0-1)
	call	Existence of a call (0-1)
	roam	Net status (0-1) (1=roam status)
	smsfull	Short message memory storage has become full(1), or memory locations are available(0)
Example		

6. Supplementary service commands

Supplementary service commands are related to the services offered by the GSM network, such as call forwarding, call waiting and so on.

6.1 Overview of supplementary service commands

number	command	description
1	AT+CCFC	Call forwarding number and conditions control
2	AT+CCWA	Call waiting
3	AT+CHLD	Call hold and multiparty
4	AT+CLIP	Calling line identification presentation
5	AT+CLIR	Calling line identification restriction
6	AT+COLP	Connected line identification presentation
7	AT+COLR	Get the status of connected line identification restriction
8	AT+CLCK	Refers to segment 7.2.3
9	AT+CPWD	Refers to segment 7.2.2
10	AT+CACM	Accumulated call meter(ACM) reset or query
11	AT+CAMM	Accumulated all meter maximum set(ACMmax) or query
12	AT+CPUC	Price per unit and currency table
13	AT+CLCC	Give a list of all calls
14	AT+CUSD	Supplementary service notifications
15	AT+CSSN	Supplementary service notifications

6.2 Detailed description of supplementary service commands

6.2.1 AT+CCFC

AT+CCFC: control call forwarding supplementary service		
Test Command	AT+CCFC=?	
Return	+CCFC: (0-5),(0-4),(128,129,145,161),(5-30) OK	
Read Command	None	
Return		
Write Command	AT+CCFC=<reason>,<mode>,<number>,<type>,<time>	
Return	OK / ERROR	
Reference	reason	description
	0	Unconditional

1	Mobile busy
2	No reply
3	Not reachable
4	All call forwarding
5	All conditional call forwarding
mode	description
0	Deactivation
1	Activation
2	Query
3	Registration
4	Erase
type	description
128	Unknown number type
129	ISDN number type(default)
145	International ISDN
161	National ISDN
Number: forwarding number(numeric character)	
Time: time to wait (5-30) in seconds before call is forwarded.	
Example	<pre> AT+CCFC=3, 3, "02154452248" , 129 OK AT+CCFC=3, 1, "02154452248" , 129 OK AT+CCFC=3, 2 +CCFC: 1, 0, "+862154452248" , 145 OK </pre>

6.2.2 AT+CCWA

AT+CCWA: control the waiting supplementary service	
Test Command	AT+CCWA=?
Return	+CCWA: (0-1),(0-2),(1,2,4,128) OK
Read Command	AT+CCWA?
Return	+CCWA: <mode> OK
Write Command	AT+CCWA=<n>[,<mode>[,<class>]]
Return	OK or +CCWA: <status>,<class> (mode==2)

OK		
Reference	n	description
	0	Disable
	1	Enable
	mode	description
	0	Disable
	1	Enable
	2	Query status
	class	description
	1	Voice service
	2	Data service
	4	Fax service (Currently,it is not supported)
	128	All service
Example		

6.2.3 AT+CHLD

AT+CHLD: manage supplementary services related with call, such as call hold and multiparty conversation		
Test Command	AT+CHLD=?	
Return	+CHLD: (0-3,11-17,21-27) OK	
Read Command	None	
Return		
Write Command	AT+CHLD=<n>	
Return	OK	
Reference	n	description
	0	Release all held calls or set User Determined User Busy(UDUB) for a waiting call
	1	Release all active calls and accepts the other(hold or waiting) call
	1x	Release a call
	2	Hold all active calls and the waiting calls, activate all held calls
	2x	Disconnect a call from the conversation
	3	Add an held call to the conversation
Example		

6.2.4 AT+CLIP

AT+CLIP: set and query the calling line identification presentation service	
Test Command	AT+CLIP=?

Return	+CLIP: (0,1) OK	
Read Command	AT+CLIP?	
Return	+CLIP: <n>,<m> OK or ERROR	
Write Command	AT+CLIP=<n>	
Return	OK / ERROR	
Reference	n	description
	0	Disable +CLIP
	1	Enable +CLIP
	m	description
	0	CLIP not provisioned
	1	CLIP provisioned
	2	Unknown
Example		

6.2.5 AT+CLIR

AT+CLIR: allow the control of calling line identification restriction supplementary service		
Test Command	AT+CLIR=?	
Return	+CLIR: (0,1) OK	
Read Command	AT+CLIR?	
Return	+CLIR: <n>,<m> OK or ERROR	
Write Command	AT+CLIR=<n>	
Return	OK / ERROR	
Reference	n	description
	0	Disable CLIR
	1	Enable CLIR
	m	description
	0	CLIR not provisioned
	1	CLIR provisioned in permanent mode
	2	Unknown(e.g. no network)
	3	CLIR temporary mode presentation restricted
	4	CLIR temporary mode presentation allowed

Note: At present, write command is not supported by network

Example

6.2.6 AT+COLP

AT+COLP: allow control of connected line identification presentation supplementary service

Test Command	AT+COLP=?	
Return	+COLP: (0,1) OK	
Read Command	AT+COLP?	
Return	+COLP: <n>,<m> OK or ERROR	
Write Command	AT+COLP=<n>	
Return	OK / ERROR	
Reference	n	description
	0	Deactive
	1	active
	m	description
	0	COLP not provisioned
	1	COLP provisioned
	2	Unknown(no network)

Example

6.2.7 AT+COLR

AT+COLR: get the status of connected line identification restriction

Test Command	AT+COLR=?	
Return	+COLR: OK	
Read Command	AT+COLR?	
Return	+COLR: 0,<m> OK or ERROR	
Write Command	None	
Return		

Reference	m	description
	0	COLR not provisioned
	1	COLR provisioned
	2	Unknown(no network)
Note: Currently, write command is not supported by network.		
Example		

6.2.8 AT+CLCK

This command refers to segment 7.2.3

6.2.9 AT+CPWD

This command refers to segment 7.2.2

6.2.10 AT+CACM

AT+CACM: reset the accumulated call meter value in SIM card	
Test Command	AT+CACM=?
Return	+CACM: OK
Read Command	AT+CACM?
Return	+CACM: <ACM> OK
Write Command	AT+CACM=<PIN2>
Return	OK / ERROR
Reference	ACM: accumulated call meter value
Example	

6.2.11 AT+CAMM

AT+CAMM: set the maximum of accumulated call meter	
Test Command	AT+CAMM=?
Return	+CAMM: (0-16777215) OK
Read Command	AT+CAMM?
Return	+CAMM: <ACMmax> OK
Write Command	AT+CAMM=<ACMmax>,<PIN2>
Return	OK / +CME ERROR: 16
Reference	When ACM reaches ACMmax, calls are prohibited.

Example

6.2.12 AT+CPUC

AT+CPUC: set the currency price per unit charged through calls	
Test Command	None
Return	
Read Command	AT+CPUC?
Return	+CPUC: "<Currency>","<price>" OK
Write Command	AT+CPUC="<Currency>","<Price>",<PIN2>
Return	OK / +CME ERROR: <Err>
Reference	
Example	

6.2.13 AT+CLCC

AT+CLCC: give a list of all calls	
Test Command	AT+CLCC=?
Return	+CLCC: OK
Read Command	None
Return	
Write Command	AT+CLCC
Return	+CLCC (if no current calls are available) +CLCC: <id1>,<dir>,<stat>,<mode>,<empty>,<number>
Reference	<idx>: call id <number>: MO/MT telephone number dir description 0 Mobile originated call(MO) 1 Mobile terminated call(MT) stat description 0 Activate 1 Hold 2 Dialing(MO) 3 Alerting(MO) 4 Incoming(MT) 5 Waiting(MT) mode description 1 Speech(call)

	2	Data(all services)
	4	Fax
	9	Unknown
	mpty	description
	0	Call is not one of multiparty call parties
	1	Call is one of multiparty call parties
Example	ATD02154452248 +SIND: 5,1 +SIND: 2 AT+CLCC +CLCC:1,0,3,1,0,"02154452248"	

6.2.14 AT+CUSD

AT+CUSD: request users to enter sequences of numerical string(such as “*188”), in order to get the services provided by network																	
Test Command	AT+CUSD=?																
Return	+CUSD: (0-2),, OK																
Read Command	None																
Return																	
Write Command	AT+CUSD=<n>[,<str>[<dcs>]]																
Return	OK / ERROR																
Reference	<p>The network may reply a string, for display only, or for display plus request for the next sequence.</p> <p>This command is used to:</p> <ol style="list-style-type: none"> enable or disable the indication presentation(when an incoming USSD is received) send and receive USSD strings <p>set command parameter:</p> <table> <tbody> <tr> <td>n</td> <td>description</td> </tr> <tr> <td>0</td> <td>Disable the indication presentation</td> </tr> <tr> <td>1</td> <td>Enable the indication presentation</td> </tr> <tr> <td>2</td> <td>Cancel USSD service</td> </tr> </tbody> </table> <p>In case of enable indication presentation, it should be indicated with:</p> <p>+CUSD:<m>[,<str>,<dcs>]</p> <table> <tbody> <tr> <td>m</td> <td>description</td> </tr> <tr> <td>0</td> <td>No further user action required</td> </tr> <tr> <td>1</td> <td>Further user action required</td> </tr> <tr> <td>2</td> <td>USSD terminated by network</td> </tr> </tbody> </table>	n	description	0	Disable the indication presentation	1	Enable the indication presentation	2	Cancel USSD service	m	description	0	No further user action required	1	Further user action required	2	USSD terminated by network
n	description																
0	Disable the indication presentation																
1	Enable the indication presentation																
2	Cancel USSD service																
m	description																
0	No further user action required																
1	Further user action required																
2	USSD terminated by network																

<p>4 Operation not supported</p> <p><str>: text</p> <p><dc>: text format(such as UCS2)</p> <p>Sended or received USSD format:</p> <p>AT+CUSD=<n>[,<str>[,<dc>]]</p> <p>Note: Users should initiate USSD services,AT+CUSD=1,"*188#",etc. Then network will response related information +CUSD:Users could select corresponding services to communication with network. Finally, users could use AT+CUSD=2 or AT+SAC to stop present USSD service (Former USSD service must be stopped, before initiating new USSD service.)</p>
<p>Example</p>

6.2.15 AT+CSSN

AT+CSSN: provide the control of supplementary service notification presentation																															
Test Command	AT+CSSN=?																														
Return	+CSSN: (0,1)(0,1) OK																														
Read Command	AT+CSSN?																														
Return	+CSSN: <n>,<m>																														
Write Command	AT+CSSN=<n>,<m>																														
Return	OK / ERROR																														
Reference	<p>When <n>=1 and a call is being originated, a supplementary service notification is sent. +CSSI: <code1>:</p> <table style="margin-left: 20px;"> <tr><td>n</td><td>description</td></tr> <tr><td>0</td><td>Enable</td></tr> <tr><td>1</td><td>Disable</td></tr> </table> <p>When <m>=1 and a call is being received, corresponding supplementary service notification is sent. : <code2></p> <table style="margin-left: 20px;"> <tr><td>m</td><td>description</td></tr> <tr><td>0</td><td>Enable</td></tr> <tr><td>1</td><td>Disable</td></tr> </table> <table style="margin-left: 20px;"> <tr><td>code1</td><td>description</td></tr> <tr><td>0</td><td>Unconditional forwarding activated</td></tr> <tr><td>1</td><td>Some conditional forwarding activated</td></tr> <tr><td>2</td><td>Call has been forwarded</td></tr> <tr><td>3</td><td>Call has been put on hold</td></tr> <tr><td>4</td><td>Closed user groups with restricted access(CUG)</td></tr> <tr><td>5</td><td>Outgoing calls are barred</td></tr> <tr><td>6</td><td>Incoming calls are barred</td></tr> <tr><td>7</td><td>CLIR rejected</td></tr> </table>	n	description	0	Enable	1	Disable	m	description	0	Enable	1	Disable	code1	description	0	Unconditional forwarding activated	1	Some conditional forwarding activated	2	Call has been forwarded	3	Call has been put on hold	4	Closed user groups with restricted access(CUG)	5	Outgoing calls are barred	6	Incoming calls are barred	7	CLIR rejected
n	description																														
0	Enable																														
1	Disable																														
m	description																														
0	Enable																														
1	Disable																														
code1	description																														
0	Unconditional forwarding activated																														
1	Some conditional forwarding activated																														
2	Call has been forwarded																														
3	Call has been put on hold																														
4	Closed user groups with restricted access(CUG)																														
5	Outgoing calls are barred																														
6	Incoming calls are barred																														
7	CLIR rejected																														

Code2	description
0	Belong to call forwarding(MT)
1	Belong to closed user group call(CUG)
2	Call has been held
3	Call has been retrieved
4	Multiparty call entered
5	Call on held has been released
7	Call is being connected(alerting) with other remote party in multiparty conversation
8	Call has been connected with other remote party in multiparty conversation

Example


CONFIDENTIAL

7. Security commands

Security commands allow the external application to determine various security related settings, such as modifying or setting PIN, locking or unlocking or negotiating the facilities between mobile and network service provider.

7.1 Overview of security commands

number	command	description
1	AT+CPIN	PIN authentication
2	AT+CPWD	Change password
3	AT+CLCK	Facility lock
4	AT+XX	Get the remaining times of valid attempts for PIN and PUK

7.2 Detailed description of security commands

7.2.1 AT+CPIN

AT+CPIN: input or modify the PIN	
Test Command	AT+CPIN=?
Return	+CPIN: <PIN> OK
Read Command	AT+CPIN?
Return	+CPIN: <code> OK
Write Command	AT+CPIN=<pin> / AT+CPIN=<puk>,<newpin>
Return	OK / +CME ERROR:<err>
Reference	pin, new pin length is 4-8 digits; puk length is 8 digits code description READY PIN is not required SIM PIN Enter PIN SIM PUK Enter PUK while ME is waiting for SIM SIM PIN2 Enter PIN2 while ME is waiting for SIM2 SIM PUK2 Enter PUK2 while ME is waiting for SIM BLOCK locked
Example	AT+CPIN? +CPIN: SIM PUK AT+CPIN=12345678,1111 //PIN1 is modified to"1111" OK

```

AT+CPIN?
+CPIN: SIM PIN
AT+CPIN=1111
OK

AT+CPIN?
+CPIN: READY
    
```

7.2.2 AT+CPWD

AT+CPWD: modify password																																			
Test Command	AT+CPWD=?																																		
Return	+CPWD:(“PS”,8),(“SC”,8),(“AO”,4),(“OI”,4),(“OX”,4),(“AI”,4),(“IR”,4),(“AB”,4),(“AG”,4),(“AC”,4),(“P2”,8),(“FD”,8),(“PN”,8),(“PU”,8),(“PP”,8),(“PC”,8) OK																																		
Read Command	None																																		
Return																																			
Write Command	AT+CPWD=<fac>,<oldpwd>,<newpwd>																																		
Return	OK / +CME ERROR:16																																		
Reference	<table border="0"> <thead> <tr> <th>fac</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>PS</td> <td>SIM is locked, password is 8 digits;</td> </tr> <tr> <td>SC</td> <td>PIN enabled/disabled;</td> </tr> <tr> <td>AO</td> <td>Bar all outgoing calls</td> </tr> <tr> <td>OI</td> <td>Bar all outgoing international calls</td> </tr> <tr> <td>OX</td> <td>Bar all outgoing international calls, expect to home country</td> </tr> <tr> <td>AI</td> <td>Bar all incoming calls</td> </tr> <tr> <td>IR</td> <td>Bar all calls. When roaming outside home country</td> </tr> <tr> <td>AB</td> <td>All barring service</td> </tr> <tr> <td>AG</td> <td>All outgoing barring service</td> </tr> <tr> <td>AC</td> <td>All incoming barring service</td> </tr> <tr> <td>PN</td> <td>Network lock with 8 digits password</td> </tr> <tr> <td>PU</td> <td>Network subset lock with 8 digits password</td> </tr> <tr> <td>PP</td> <td>Service provider lock with 8 digits password</td> </tr> <tr> <td>PC</td> <td>Corporate lock with 8 digits password</td> </tr> <tr> <td>FD</td> <td>SIM fixed FDN Dialing lock, PIN2 is required as a password</td> </tr> <tr> <td>P2</td> <td>PIN2 lock</td> </tr> </tbody> </table>	fac	description	PS	SIM is locked, password is 8 digits;	SC	PIN enabled/disabled;	AO	Bar all outgoing calls	OI	Bar all outgoing international calls	OX	Bar all outgoing international calls, expect to home country	AI	Bar all incoming calls	IR	Bar all calls. When roaming outside home country	AB	All barring service	AG	All outgoing barring service	AC	All incoming barring service	PN	Network lock with 8 digits password	PU	Network subset lock with 8 digits password	PP	Service provider lock with 8 digits password	PC	Corporate lock with 8 digits password	FD	SIM fixed FDN Dialing lock, PIN2 is required as a password	P2	PIN2 lock
fac	description																																		
PS	SIM is locked, password is 8 digits;																																		
SC	PIN enabled/disabled;																																		
AO	Bar all outgoing calls																																		
OI	Bar all outgoing international calls																																		
OX	Bar all outgoing international calls, expect to home country																																		
AI	Bar all incoming calls																																		
IR	Bar all calls. When roaming outside home country																																		
AB	All barring service																																		
AG	All outgoing barring service																																		
AC	All incoming barring service																																		
PN	Network lock with 8 digits password																																		
PU	Network subset lock with 8 digits password																																		
PP	Service provider lock with 8 digits password																																		
PC	Corporate lock with 8 digits password																																		
FD	SIM fixed FDN Dialing lock, PIN2 is required as a password																																		
P2	PIN2 lock																																		
Example	AT+CPWD="AI",1234,1111 OK																																		

7.2.3 AT+CLCK

AT+CLCK: lock,unlock,and negotiate the facilities between mobile and network		
Test Command	AT+CLCK=?	
Return	+CLCK: (list all supported<fac>s)	
Read Command	AT+CLCK?	
Return	+CLCK: (list all supported<fac>s, list corresponding<status>s)	
Write Command	AT+CLCK=<fac>,<mode>[,<password>[,<class>]]	
Return	OK or +CME ERROR:<err> +CLCK: <status>[,<class>](when mode=2, it's in inquiry status)	
Reference	fac	description
	PS	SIM is locked, password is 8 digits;
	SC	PIN enabled/disabled;
	AO	Bar all outgoing calls
	OI	Bar all outgoing international calls
	OX	Bar all outgoing international calls, expect to home country
	AI	Bar all incoming calls
	IR	Bar all calls. When roaming outside home country
	AB	All barring service
	AG	All outgoing barring service
	AC	All incoming barring service
	PN	Network lock with 8 digits password
	PU	Network subset lock with 8 digits password
	PP	Service provider lock with 8 digits password
	PC	Corporate lock with 8 digits password
	FD	SIM fixed FDN Dialing lock, PIN2 is required as a password
	P2	PIN2 lock
	Note: Currently, "PS", "PN", "PU", "PP", "PC", "FD" is not supported	
	mode	description
	0	Unlock this facility
	1	Lock this facility
	2	Query status
	class	description
	1	Voice(telephony)
	2	Data(to all beared services)
	4	Fax
	8	Short messages service
	7	All classes, default value

	status	description
	0	Deactivate
	1	Activate
	<password>: (0-9)characters, the maximum length determined by AT+CPWD=? command.	
Example	AT+CLCK="AP",1,1234 OK AT+CLCK="AP",2 +CLCK:1,0	

7.2.4 AT+XX

AT+XX: get the remaining times of valid attempts for PIN and PUK		
Test Command	None	
Return		
Read Command	None	
Return		
Write Command	AT+XX=<value>	
Return	+XX: <remaining_num> OK	
Reference	value	description
	0	PIN1
	1	PIN2
	2	PUK1
	3	PUK2
Example	AT+XX=0 +XX: 3 OK	

8. SMS commands

SMS commands are related to allow external application to use the short message service, such as sending messages, receiving messages, deleting messages and so on.

8.1 Overview of SMS commands

number	command	description
1	<u>AT+CSMS</u>	Select message service
2	<u>AT+CSAS</u>	Store settings of +CSAS and +CSMP to EEPROM or SIM card
3	<u>AT+CRES</u>	Restore the settings specified by AT+CSCA and AT+CSMP commands to EEPROM
4	<u>AT+CSDH</u>	Show SMS text mode parameters
5	<u>AT+CPMS</u>	Preferred SMS message storage
6	<u>AT+CSCA</u>	SMS service center address
7	<u>AT+CMGF</u>	Select SMS message format
8	<u>AT+CMGL</u>	List SMS message from preferred store
9	<u>AT+CMGR</u>	Read SMS message
10	<u>AT+CMGS</u>	Send short message
11	<u>AT+CSMP</u>	Set SMS text mode parameters
12	<u>AT+CMGW</u>	Write short message to memory
13	<u>AT+CMSS</u>	Send short message from storage
14	<u>AT+CMGD</u>	Delete short message
15	<u>AT+CSCB</u>	Select Cell Broadcast Message Indication
16	<u>AT+CNMI</u>	New short message indication
17	<u>+CMTI</u>	Indicate the MEM index location of received message(Enabled by AT+CNMI)
18	<u>+CMT</u>	Indicate the short message was sent to DTE directly after received
19	<u>+CBM</u>	Indicate that the cell broadcast message was sent to DTE device after received
20	<u>AT+SMSC</u>	Change the status of message stored in SIM card
21	<u>AT+SUSS</u>	Set REC UNREAD status of these messages which remain unchanged

8.2 Detailed description of SMS commands

8.2.1 AT+CSMS

AT+CSMS: inquire and set the classes of supported short message service

Test Command	AT+CSMS=?	
Return	+CSMS: <service> OK	
Read Command	AT+CSMS?	
Return	+CSMS: <service>,<mo>,<mt>,<cb> OK	
Write Command	AT+CSMS=<service>	
Return	+CSMS=<mo>,<mt>,<cb> OK	
Reference	service	description
	0	SMS AT commands are compatible with GSM07.05 PHASE 2
	1	SMS AT commands are compatible with GSM07.05 PHASE 2+
	mo	description
	0	Short message which don't supported mo
	1	Short message which support mo
	mt	description
	0	Short message which don't support mt
	1	Short message which support mt
	cb	description
	0	cb not provisioned
	1	cb provisioned
	Note: Currently, GSM07.05 PHASE 2 and GSM07.05 PHASE 2+ are not distinguished	
Example		

8.2.2 AT+CSAS

AT+CSAS: store settings of +CSAS and +CSMP to EEPROM or SIM card	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+CSAS
Return	OK
Reference	
Example	

8.2.3 AT+CREG

AT+CREG: restore the settings specified by AT+CSCA and AT+CSMP commands to EEPROM	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+CREG
Return	OK
Reference	
Example	

8.2.4 AT+CSDH

AT+CSDH: set the additional information on text mode result codes							
Test Command	AT+CSDH=?						
Return	+CSDH: (0-1) OK						
Read Command	AT+CSDH?						
Return	+CSDH: <value> OK						
Write Command	AT+CSDH=<value>						
Return	OK						
Reference	<table border="0"> <thead> <tr> <th>value</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Do not show additional information</td> </tr> <tr> <td>1</td> <td>Show additional information</td> </tr> </tbody> </table> <p>Notes: Currently, additional information facility is not supported.</p>	value	description	0	Do not show additional information	1	Show additional information
value	description						
0	Do not show additional information						
1	Show additional information						
Example							

8.2.5 AT+CPMS

AT+CPMS: select the short message storage area(for reading, writing, receiving, sending)	
Test Command	AT+CPMS=?
Return	+CPMS: (("BM", "SM", "SR"), ("BM", "SM", "SR")) OK
Read Command	AT+CPMS?
Return	+CPMS: <mem1>, <used1>, <total1>, <mem2>, <used2>, <total2> OK
Write Command	AT+CPMS=<mem1>, <mem2>

Return	+CPMS: <used1>,<total1>,<used2>,<total2> OK or ERROR
Reference	<mem1>: memory used to read and delete messages. "SM","BM","SR" <mem2>: memory used to write messages: "SM","BM", memory used to send messages: "SM" <usedx>: the used space of <memx> <totalx>: total space of <memx> "SM" SIM storage "BM" ME short message storage "SR" ME short message status report storage Note: Currently, only "SM","BM" are supported.
Example	AT+CPMS="BM","SM" +CPMS: 0,200,5,50 OK

8.2.6 AT+CSCA

AT+CSCA: set and read the short message service center address	
Test Command	AT+CSCA=?
Return	+CSCA: OK
Read Command	AT+CSCA?
Return	+CSCA: <sca> OK
Write Command	AT+CSCA=<sca>
Return	OK
Reference	<sca>: short message service center address, {0-9,#,*,+,a,b,c}, its maximum length is 20
Example	AT+CSCA? +CSCA: "+8613800210500",145 OK AT+CSCA="8613800210500" OK AT+CSCA=? +CSCA: OK

8.2.7 AT+CMGF

AT+CMGF: set and read the format of short messages							
Test Command	AT+CMGF?						
Return	+CMGF: <mode> OK						
Read Command	AT+CMGF?						
Return	+CMGF: <mode> OK						
Write Command	AT+CMGF=<mode>						
Return	OK / ERROR						
Reference	<table border="1"> <thead> <tr> <th>mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>PDU mode(default config)</td> </tr> <tr> <td>1</td> <td>TEXT mode</td> </tr> </tbody> </table> <p>Note: the default value is 0</p>	mode	description	0	PDU mode(default config)	1	TEXT mode
mode	description						
0	PDU mode(default config)						
1	TEXT mode						
Example	<pre> AT+CMGF? +CMGF: 0 OK AT+CMGF=1 OK </pre>						

8.2.8 AT+CMGL

AT+CMGL: list different status and all short messages	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+CMGL=<state>
Return	Text mode return: +CMGL:<index>,<dcs>,<stat>,<da/oa>,<valid period>,<CR><LF> (for SMS-SUBMIT) +CMGL:<index>,<dcs>,<stat>,<da/oa>,<time stamp>,<CR><LF> (for SMS-DELIVER) +CMGL: <index>,<dcs>,<st>(for SMS-ATATUS-REPORT)
	PDU mode return: +CMGL: <index>,<stat>,<length>,<CR><LF> <pdu>(for SMS-DELIVER,SMS-SUBMIT, and SMS-ATATUS-REPORT)
Reference	Different result formats are corresponding to different types(SMS-DELIVER, SMS-SUBMIT, SMS-ATATUS-REPORT). SMS-STATUS-REPORT is treated

as ordinary MT short message.

<index> location in memory
 <dcs> text types of short message content
 0: default type
 1: 8 BIT
 2: UCS2(such as Chinese character)
 <da/oa> destination/original addresses
 <vp> vality period of short messages
 <ts> transferring time of short messages
 <st> status report
 <stat> status of short messages
 <data> text content

<stat>	<stat>	description
Text mode	PDU mode	
“REC UNREAD”	0	Unread message
“REC READ”	1	Readed message
“STO UNSENT”	2	Stored and unsended message
“STO SENT”	3	Stored and sended message
“ALL”	4	All short message

Example

Set to PDU mode:

AT+CMGF=0

OK

Display all short messages:

AT+CMGL=4

+CMGL:1,2,,29

**0891683110304105F0000D91683150221320F50000703082519261000AC4A6
F27AA42A832E28**

+CMGL:2,2,,24

**0891683108200305F0314A0B803118665868F50008AD0A00680065006C006
C006F**

+CMGL:3,1,,13

01800000800000000000000000000000

OK

Set to TEXT mode:

AT+CMGF=1

OK

Display all short messages:

AT+CMGL=“ALL”

+CMGL: 1,2,“REC READ”,“10010”,“07/03/15,18:11:16+00”

```

900962E98054901A003100330030FF0C4EAB53D77CBE5F696BCF4E0059
2930026B228FCE52A05165

+CMGL: 2,2,"REC READ","10010","07/03/15,18:11:43+00"
6B228FCE52A051654E0A6D778054901AFF0C670065B04E1A52A163A883
50FF1A53D1003500310035

+CMGL: 3,2,"REC READ","10010","07/03/15,18:11:43+00"
5C0A656C76845BA26237FF0C6B228FCE60A852A051654E0A6D7780549
01A59275BB65EADFF0C8D76

+CMGL: 4,2,"REC READ","8254","07/03/27,11:22:33+00"
8054901A002277ED4FE198CE66B400225E74521D592756DE9988003A60A
85DF283B700334E2A62BD

+CMGL: 5,0,"REC READ","+8613052231025","07/03/28,15:29:16+00"
DMJWGTJA.P
OK
    
```

8.2.9 AT+CMGR

AT+CMGR: read some specified message	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+CMGR=<index>
Return	text mode return: +CMGR:<stat>,<dc>,<oa>,<ts>,<CR><LF> <data> (for SMS-DELIVER only)
	text mode return: +CMGR: <stat>,<dc>,<da>,<ts>,<CR><LF> <data> (for SMS-SUBMIT only)
	text mode return: +CMGR: <stat>,<st> (for SMS-STATUS-REPORT only)
	PDU mode return: +CMGR: <stat>,<length>,<CR><LF><PDU> Note: Regard the status report as ordinary MT message.
Reference	For different types(SMS-DELIVER ,SMS-SUBMIT, SMS-STATUS-REPORT) of message, there are different result types.

	<p><stat> status of message</p> <p><dc> the content of message in text mode</p> <p>0:default value</p> <p>1:8 BIT</p> <p>2:UCS2(such as Chinese character)</p> <p><da/oa> destination/origination address</p> <p><vp> validity period</p> <p><ts> time of sending</p> <p><st> status report</p> <p><data> text content</p>
Example	<pre>AT+CMGR=5 +CMGR:"REC READ",0,"+8613052231025","07/03/28,15:29:16+00" DMJWGTJA.P OK</pre>

8.2.10 AT+CMGS

AT+CMGS: send short message	
Test Command	AT+CMGS=?
Return	+CMGS: ,(0,1) OK
Read Command	None
Return	
Write Command	<p>If the format of sending message is text(AT+CMGF=1) mode:</p> <p>AT+CMGS=<da>[,<moresms>]<CR> >TEXT (ctrl+z/ESC)</p> <p>If the format of sending message is PDU(AT+CMGF=0)mode:</p> <p>AT+CMGS=<length><CR> >PDU (ctrl+z/ESC)</p>
Return	+CMGS: <mr> OK
Reference	<p>In text mode, to send UCS2 characters, dcs has to set to UC32 by AT+CSMP command, meanwhile hexadecimal UCS2 must be transferred to two ASCII characters. For example,0x2A is changed to 2 (ASCII 50) and A(ASCII 65).</p> <p>length: the length of TPDU(bit) with a range of 9-160.</p> <p>PDU: It consists of <Service Center Id>(00 means no service center id) and <TPDU>.Its <Service Center Id>refers to GSM 04.11, and its <TPDU> to 03.40. The 16 bit TPDU must be changed into two ASCII characters. For example, 0x2A is changed to 2(ASCII 50) and A(ASCII 65). The length range is 18-502.</p> <p><da>: destination address with a maximum length of 40.</p> <p><moresms>: flag determines whether sending message continuously. (if choose</p>

sending message continuously, it'll be more efficient, while connected line is not released.)

Text: content ahead (0...9,A...F), if dcs(by AT+CSMP)is a 7bit ASCII character, its length range is 0-160; if dcs is a 8bit ASCII character, or its length range is 0-140; if dcs is a UCS2 character, or its length range is 0-140.

Example

PDU MODE:

AT+CMGS=16

>0031020b803119282071f30008000a00680065006c006c006f (ctrl+z)

00: no service center address

<fo> 0x31

<mr> (TP-MR)0x02

<da> (TP-DA)0x0b0x800x310x190x280x200x710xf3(13918202173)

<pid> (TP-PID)0x00

<dcs> (TP-DCS)0x08

<vp> 0x00

<length> (TP-UDL) 0x0a

TP-UD 0x00 0x68 0x00 0x65 0x00 0x6C 0x00 0x6C 0x00 0x6F(hello)

AT+CMGS=24

>0891683108200105f031020b803119282071f30008ad0a00680065006c006c0

06f (ctrl+z)

08: the length of service center id

The service center id +8613800210500

TEXT MODE

AT+CMGS="13916049104"

>hello(ctrl+z)

Examples of sending UCS2 characters

AT+CMGF=1

AT+CSMP=19,143,0,2(<dcs> is sent to UCS2)

AT+CMGS="13916049104"

>4F60597D (hello)

OK

8.2.11 AT+CSMP

AT+CSMP: set and read <vp>,<pid>, and <dcs> value

Test Command **AT+CSMP=?**

Return **+CSMP: (0-255),(0-255),(0-9,11,12,127),(0-2)**

OK

Read Command **AT+CSMP?**

Return **+CSMP: <fo>,<vp>,<pid>,<dcs>**

Write Command **AT+CSMP=<fo>,<vp>,<pid>,<dcs>**

Return	OK / ERROR																								
Reference	<p><fo>: First Octet, code according to the description below. The default value is 19.</p> <table border="1"> <thead> <tr> <th>b7</th> <th>b6</th> <th>b5</th> <th>b4</th> <th>b3</th> <th>b2</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>RP</td> <td>UDHI</td> <td>SRR</td> <td>VPF</td> <td>RD</td> <td>MTI</td> <td></td> <td></td> </tr> </tbody> </table> <p>RP: reply path, invalid in text mode. UDHI: User Data Header Information. SRR: Status Report Request. b5=1, if a status report is requested. VPF: Validity Period Format b4=0&b3=0-> <vp> field is not present b4=1&b3=0-> <vp> field is present in relative format other formats are not supported RD: Reject Duplicates, b2=1 to instruct the SC to reject an SMS-SUBMIT for and SM still held in the SC which has the same <mr>and the same <da> from the same <oa>. MTI: Message type indicator b1=0&b0=0-> SMS-DELIVER(in the direction SC to MS) b1=0&b0=1-> SMS-SUBMIT(in the direction MS to SC) <vp> validity period with a default value of 143 0-143: (VP+1) × 5 minutes(the maximum period is 12 hours) 144-167: 12 hours+(VP . 143) × 30 minutes) 168-196: (VP . 166) × 1 day 197-255: (VP . 192) × 1 week <pid> is used to indicate the higher layer protocol being used or indicates interworking of a certain type of telematic device. Its default value is 0. 0 implicit-device type is specific to this SC,or can be concluded on the basis of the address 1 telex(or teletex reduced to telex format) 2 group 3 telefax 3 group 4 telefax 4 voice telephone(i.e. conversion to speech) 5 ERMES(European Radio Messaging System) 6 National Paging system(known to the SC) 7 Videotex(T.100/T.101) 8 teletex,carrier unspecified 9 teletex,in PSPDN 10 teletex,in analog PSTN 11 teletex,in digital ISDN 7F SIM DOWNLOAD Coding description of <dcs> information with a default value of 0.</p> <table border="1"> <thead> <tr> <th>dcs</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Default alphabet</td> </tr> <tr> <td>1</td> <td>8 bit data</td> </tr> <tr> <td>2</td> <td>UCS2</td> </tr> </tbody> </table>	b7	b6	b5	b4	b3	b2	b1	b0	RP	UDHI	SRR	VPF	RD	MTI			dcs	description	0	Default alphabet	1	8 bit data	2	UCS2
b7	b6	b5	b4	b3	b2	b1	b0																		
RP	UDHI	SRR	VPF	RD	MTI																				
dcs	description																								
0	Default alphabet																								
1	8 bit data																								
2	UCS2																								

Example	AT+CSMP=19,143,0,0 OK AT+CSMP? +CSMP: 19,143,0,0 OK
---------	---

8.2.12 AT+CMGW

AT+CMGW: store a message in <mem2>											
Test Command	AT+CMGW=?										
Return	+CMGW: , (0-4)										
Read Command	None										
Return											
Write Command	If the SM format is PDU mode: AT+CMGW=<length>,[<stat>]<CR> >PDU is given(ctrl+z/ESC)										
	If the SM format is TEXT mode: AT+CMGW="<da>",<stat>]<CR> >TEXT is given(ctrl+z/ESC)										
Return	+CMGW: <index> OK										
Reference	<length>: the length of TPDU(bit) with a range of 9-160 <da>: destination address with the maximum length of 40 bits <stat>: integer, if don't write this parameter, the default value is 2(unsent message) <table border="1" style="margin-left: 20px; width: 100%;"> <thead> <tr> <th>stat</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Unreaded message(MT)</td> </tr> <tr> <td>1</td> <td>Readed message(MT)</td> </tr> <tr> <td>2</td> <td>Unsent message(MO)</td> </tr> <tr> <td>3</td> <td>Sent message(MO)</td> </tr> </tbody> </table> <index>: index id of <mem2> PDU: same to AT+CMGS Text: same to AT+CMGS Note: when the space of SIM or ME is used, if <mem2>=SIM, return "+CMGW: SIM is full"; if <mem2>=ME, return "+CMGW: ME is full"	stat	description	0	Unreaded message(MT)	1	Readed message(MT)	2	Unsent message(MO)	3	Sent message(MO)
stat	description										
0	Unreaded message(MT)										
1	Readed message(MT)										
2	Unsent message(MO)										
3	Sent message(MO)										
Example	AT+CMGF=1 OK AT+CMGW="13916049104" >TEST(ctrl+z) +CMGW: 16 OK										

8.2.13 AT+CMSS

AT+CMSS: send a stored but unsent message	
Test Command	AT+CMSS=?
Return	+CMSS: (1-65535), OK
Read Command	None
Return	
Write Command	AT+CMSS=<index>[,<da>"]
Return	+CMSS: <mr> OK
Reference	<index>: index num of SIM <da>: destination address with a maximum length of 40
Example	<pre> AT+CMGF=1 OK AT+CMGW="13916049104" >TEST <ctrl+z> +CMGW:16 OK AT+CMSS=16 +CMSS: 113 OK </pre>

8.2.14 AT+CMGD

AT+CMGD: delete one or all messages													
Test Command	AT+CMGD=?												
Return	+CMGD: (1-65535),(0-4) OK												
Read Command	None												
Return													
Write Command	AT+CMGD=<index>[,<DelFlag>]												
Return	OK / ERROR												
Reference	<p><index>: index num of chosen memory <mem1>,which should be less than the maximum num item of <mem1></p> <table border="0"> <thead> <tr> <th>DelFlag</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Delete an message according to index</td> </tr> <tr> <td>1</td> <td>Delete all readed messages</td> </tr> <tr> <td>2</td> <td>Delete all readed or sent messages</td> </tr> <tr> <td>3</td> <td>Delete all readed or sent or unsent messages</td> </tr> <tr> <td>4</td> <td>Delete all messages</td> </tr> </tbody> </table> <p>Note: when <DelFlag> is between 1 and 4 and when <index> is valid, delete all</p>	DelFlag	description	0	Delete an message according to index	1	Delete all readed messages	2	Delete all readed or sent messages	3	Delete all readed or sent or unsent messages	4	Delete all messages
DelFlag	description												
0	Delete an message according to index												
1	Delete all readed messages												
2	Delete all readed or sent messages												
3	Delete all readed or sent or unsent messages												
4	Delete all messages												

fitted messages begin from <index>

Example

8.2.15 AT+CSCB

AT+CSCB: select which types of messages are to received. This command is allowed in TEXT mode

Test Command	AT+CSCB=?	
Return	+CSCB: (0-1),(0-65535),(0-255) OK	
Read Command	AT+CSCB?	
Return	+CSCB=<mode>,<mids>,<dcs>	
Write Command	AT+CSCB=<mode>,<mids>,<dcs>	
Return	OK	
Reference	mode	description
	0	DCE receive the message specified by <mid>,<dcs>
	1	DCE doesn't receive the message specified by <mid>,<dcs>
	<mid>: value 0-65535	
	<dcs>: value 0-255	
	Note: Currently, cell broadcast is not supported	

Example

8.2.16 AT+CNMI

AT+CNMI: control the way of indicating DTE, after receiving MT messages

Test Command	AT+CNMI=?	
Return	+CNMI: (0-3),(0-3),(0-1),(0-1)	
Read Command	AT+CNMI?	
Return	+CNMI: 3,0,0,0, OK	
Write Command	AT+CNMI=<mode>,<mt>,<cbm>,<ds>	
Return	OK / ERROR	

Reference	<p><mode>: indication mode, default value is 3. Currently only mode 3 is supported.</p> <table border="1"> <thead> <tr> <th>Mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>Return result code to DTE</td> </tr> <tr> <td>1</td> <td>DCE don't receive result code defined in <mid>,<dcs></td> </tr> </tbody> </table> <p><mt>: set the indication format of MT message with a default value of 0</p> <table border="1"> <thead> <tr> <th>mt</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No indication No SMS-DELIBER</td> </tr> <tr> <td>1</td> <td>Auto indication +CMTI: <mem>,<index></td> </tr> <tr> <td>3</td> <td>Direct indication +CMT: result code</td> </tr> </tbody> </table> <p><cbm>: config the indication of cell broadcast message. Its default value is 0.</p> <table border="1"> <thead> <tr> <th>cbm</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No +CBM indications are routed to the DTE. The CBMs are stored.</td> </tr> <tr> <td>1</td> <td>The +CBM is stored and an indication of memory location is routed to the user.</td> </tr> </tbody> </table> <p><ds>: config the indication for SM status report. Its default value is 0.</p> <table border="1"> <thead> <tr> <th>ds</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No SMS-STATUS-REPORTs are routed to DTE</td> </tr> <tr> <td>1</td> <td>SMS-STATUS-REPORTs are routed to DTE by +CDS</td> </tr> </tbody> </table>	Mode	description	3	Return result code to DTE	1	DCE don't receive result code defined in <mid>,<dcs>	mt	description	0	No indication No SMS-DELIBER	1	Auto indication +CMTI: <mem>,<index>	3	Direct indication +CMT: result code	cbm	description	0	No +CBM indications are routed to the DTE. The CBMs are stored.	1	The +CBM is stored and an indication of memory location is routed to the user.	ds	description	0	No SMS-STATUS-REPORTs are routed to DTE	1	SMS-STATUS-REPORTs are routed to DTE by +CDS
Mode	description																										
3	Return result code to DTE																										
1	DCE don't receive result code defined in <mid>,<dcs>																										
mt	description																										
0	No indication No SMS-DELIBER																										
1	Auto indication +CMTI: <mem>,<index>																										
3	Direct indication +CMT: result code																										
cbm	description																										
0	No +CBM indications are routed to the DTE. The CBMs are stored.																										
1	The +CBM is stored and an indication of memory location is routed to the user.																										
ds	description																										
0	No SMS-STATUS-REPORTs are routed to DTE																										
1	SMS-STATUS-REPORTs are routed to DTE by +CDS																										
Example	<pre> AT+CNMI=3,0,1,1 OK AT+CNMI? +CNMI: 3,0,1,1 OK </pre>																										

8.2.17 +CMTI

+CMTI: indicate the MEM index location of received message(Enabled by AT+CNMI)	
Test Command	None
Return	
Read Command	None
Return	
Write Command	None
Return	

Reference	Indication format: +CMTI: <mem>,<index> Parameter: mem description “SM” SM message storage “ME” ME message storage <index>: index num of <mem>
Example	

8.2.18 +CMT

+CMT: indicate the short message was sent to DTE directly after received. (command AT+CNMI=3,3 should be set first)	
Test Command	None
Return	
Read Command	None
Return	
Write Command	None
Return	
Reference	If short message is PDU mode (AT+CMGF=0) Indication format : +CMT:<length>,<CR><pdu> If short message is TEXT mode(AT+CMGF=1) Indication format : +CMT:<od>,<sc>,<time stamp>,<length>,<CR>,<text>
Example	

8.2.19 +CBM

+CBM: indicate that the cell broadcast message was sent to DTE device after received. Presetting by AT+CNMI command is required	
Test Command	None
Return	
Read Command	None
Return	
Write Command	None
Return	
Reference	Format : +CBM:<mid>,<dcs>,<cr><lf> <text> <mid>: message id <dcs>: data coding format <text>: determined by the value of <dcs>
Example	

8.2.20 AT+SMSC

AT+SMSC: change the status of message stored in SIM card											
Test Command	AT+SMSC=?										
Return	+SMSC: (1-255)										
Read Command	None										
Return											
Write Command	AT+SMSC=<loc>,<status>										
Return	OK +CMS ERROR: 321 <loc> is incorrect +CMS ERROR: 302 <status> doesn't match										
Reference	<loc>: message sequence in SIM card <status>: the new status to be changed can only from unreaded to readed, or from unsend to send. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>PDU MODE</th> <th>TEXT MODE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>REC UNREAD</td> </tr> <tr> <td>1</td> <td>REC READ</td> </tr> <tr> <td>2</td> <td>STO UNSENT</td> </tr> <tr> <td>3</td> <td>STO SENT</td> </tr> </tbody> </table>	PDU MODE	TEXT MODE	0	REC UNREAD	1	REC READ	2	STO UNSENT	3	STO SENT
PDU MODE	TEXT MODE										
0	REC UNREAD										
1	REC READ										
2	STO UNSENT										
3	STO SENT										
Example											

8.2.21 AT+SUSS

AT+SUSS: set REC UNREAD status of these messages which remain unchanged, after AT+CMGR and AT+CMGL command are performed							
Test Command	AT+SUSS=?						
Return	+SUSS: (0-1)						
Read Command	AT+SUSS?						
Return	+SUSS: <mode>						
Write Command	AT+SUSS=<mode>						
Return	OK						
Reference	<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>MODE</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Status of message remains unchanged</td> </tr> <tr> <td>1</td> <td>Status of message will be changed(default value)</td> </tr> </tbody> </table>	MODE	description	0	Status of message remains unchanged	1	Status of message will be changed(default value)
MODE	description						
0	Status of message remains unchanged						
1	Status of message will be changed(default value)						
Example							

9. Phonebook commands

Phonebook commands allow the external application to access the phonebook located in the phone memory or on the attached Subscriber Identity Module (SIM), such as adding, deleting, and modifying and so on.

9.1 Overview of phonebook commands

number	command	description
1	AT+CPBS	Select phonebook memory storage
2	AT+CPBR	Read from phonebook
3	AT+CPBF	Search phonebook with a name string
4	AT+CPBW	Write into phonebook
5	AT+CPBP	Search the phonebook for an item with the same phone number
6	AT+CPBN	Make a forward or backward move in the phonebook
7	AT+CNUM	Read own numbers
8	AT+SDCP	Delete all the calls
9	AT+CSVM	Set/get and enable/disable the voice mail number

9.2 Detailed description of phonebook commands

9.2.1 AT+CPBS

AT+CPBS: select the types of phonebooks	
Test Command	AT+CPBS=?
Return	+CPBS: ("SM", "FD", "LD", "MC", "RC", "ME") OK
Read Command	AT+CPBS?
Return	+CPBS: <storage>(default value "SM"),<num used>,<num available>
Write Command	AT+CPBS=<storage>
Return	OK / ERROR
Reference	<num used>: the number of phonebook items already used <num available>: the available items storage description "SM" SIM card phonebook "FD" Fixed dialing phonebook "LD" Latest dialing phonebook "MC" Missed call phonebook

“RC”	Received call phonebook
“ME”	Mobile phone phonebook
Example	

9.2.2 AT+CPBR

AT+CPBR: return entries for a range of locations specified by entered parameters	
Test Command	AT+CPBR=?
Return	+CPBR: <list supported <index>s>,<nlength>,<tlength> OK
Read Command	None
Return	
Write Command	AT+CPBR=<index1>[,<index2>]
Return	+CPBR=<index1>,<number>,<type>,<text>,<CR>,<CF> <index2>,<number>,<type>,<text>,<CR>,<CF>
Reference	If the second parameter is default, only return the entries specified by the first parameter. <nlength>: maximum length of telephone number <tlength>: maximum length of name
Example	AT+CPBR=1 +CPBR: 1,"13916049104",129,"aa" OK AT+CPBR=1,2 +CPBR: 1,"13916049104",129,"aa" +CPBR: 2,"13916976524",129,"bb" OK

9.2.3 AT+CPBF

AT+CPBF: search phonebook with a name string	
Test Command	AT+CPBF=?
Return	+CPBF: <nlength>,<tlength> OK
Read Command	None
Return	
Write Command	AT+CPBF=<name>
Return	+CPBF: <index>,<number>,<type>,<name> or ERROR(not found)

Reference	<nlength>: maximum length of phonebook number <tlength>: maximum length of name
Example	AT+CPBF="aa" +CPBF: 1,"13916049104",129,"aa" OK

9.2.4 AT+CPBW

AT+CPBW: write the current phonebook in specified location<index>	
Test Command	AT+CPBW=?
Return	+CPBW(list supported <index>s),<nlength>,<list supported types>,<tlength> OK
Read Command	None
Return	
Write Command	AT+CPBW=<index>[,"<number>"[,<type>[,"<name>"]]]
Return	OK
Reference	If parameter <number> and <text> are default, erase item of <index> location. <index>: index id <number>: telephone number, its maximum length could not be larger than <nlength>. <type>: types of telephone number <name>: name, its maximum length could not be larger than <tlength> <nlength>: max length of telephone number <tlength>: max length of name
Example	AT+CPBW=3 OK AT+CPBW=3,"54452248",129,"cc" OK When inputting UCS2 [<text>], users must enter ASCII strings begin with 80. For example:"804F60597D"(hello),"0x8000410042"(AB). AT+CPBW=3,"54452248",129,"806797519B" OK

9.2.5 AT+CPBP

AT+CPBP: search the phonebook for an item with the same phone number as that defined in the parameter	
Test Command	AT+CPBP=?
Return	+CPBP: <MaxRecord>,<MaxNumLength> OK

Read Command	None
Return	
Write Command	AT+CPBP=<PhoneNumber>
Return	+CPBP: <index>,<number>,<type>,<name>
Reference	
Example	AT+CPBP="54452248" +CPBP: 3,"54452248",129,"cc" OK

9.2.6 AT+CPBN

AT+CPBN: make a forward or backward move in the phonebook		
Test Command	AT+CPBN=?	
Return	+CPBN: (0-5) OK	
Read Command	None	
Return		
Write Command	AT+CPBN=<mode>	
Return	+CPBN: <index2>,<number>,<type>,<text>,<CR>,<CF>	
Reference	Mode	description
	0	Display the first item
	1	Display the last item
	2	Display the next item
	3	Display the above item
	4	Display the latest readed item
	5	Display the latest written item
Example	AT+CPBN=? +CPBN: (0-5) OK AT+CPBN=0 +CPBN: 15, .+331290101.,145,John. OK AT+CPBN=2 +CPBN: 5, .+33147658987.,145,Steven. OK AT+CPBN=2 +CPBN: 6, .+331290302.,145,Mary. OK AT+CPBN=3	

+CPBN: 5, .+33147658987.,145.,Steven.
OK

AT+CPBN=1
+CPBN: 6, .+331290302.,145.,Mary.
OK

AT+CPBN=2
+CPBP: 15, .+331290101.,145.,John.
OK

AT+CPBF=John
+CPBF: 15, .+331290101.,145.,John.
OK

AT+CPBN=2
+CPBN: 5, .+33147658987.,145.,Frank.
OK

AT+CPBF=John
+CPBF: 15, .+331290101.,145.,John.
OK

AT+CPBN=4
+CPBF: 15, .+331290101.,145.,John.
OK
AT+CPBW=1, .0146290800.,129, Windy
OK

AT+CPBN=4
+CPBF: 15, .+331290101.,145.,John.
OK

AT+CPBF="Frank"
+CPBF: 5, .+33147658987.,145.,Frank.
OK

AT+CPBN=5
+CPBF: 15, .+331290101.,145.,John.
OK

9.2.7 AT+CNUM

AT+CNUM: read subscriber MSISDN	
Test Command	AT+CNUM=?
Return	OK
Read Command	None
Return	
Write Command	AT+CNUM
Return	OK
Reference	
Example	AT+CNUM OK

9.2.8 AT+SDCP

AT+SDCP: delete all the calls listed in "LD" or "MC" or "RC"	
Test Command	AT+SDCP=?
Return	+SDCP: ("LD","MC","RC") OK
Read Command	AT+SDCP?
Return	OK / ERROR
Write Command	AT+SDCP=<calls phonebook>
Return	OK / ERROR
Reference	<calls phonebook>:"LD","MC","RC"
Example	

9.2.9 AT+CSVM

AT+CSVM: set/get and enable/disable the voice mail number	
Test Command	AT+CSVM=?
Return	+CSVM:(0-1),<nlength>,(129,145) OK
Read Command	AT+CSVM?
Return	+CSVM: 0," ",129 OK / ERROR
Write Command	AT+CSVM=<mode>[,<number>[,<type>]]
Return	OK / ERROR
Reference	<nlength>: max length of telephone number <mode>

	0: disable voice mail 1: enable voice mail <number>: (<nlength>) <type>: type of voice mail number
Example	AT+CSVM=1,"13800210166",129 OK

 **SENDTRUE**
CONFIDENTIAL

10. STK commands

10.1 Preface

SIM Application Toolkit is abbreviated to STK. It can be used by service providers to support a broad range of services, such as GO_TONE and MONTERNET supported by China Communication, etc. STK allows service providers to supply new services without changing mobile phones, because new services can be realized by developing new applications and downloaded them to the SIM.

STK refers to GSM 11.14. It introduces about 25 new commands for the SIM: CLASS1 offers a subset of commands, while CLASS3 offers the full range of command.

STK support:

- profile download
- proactive SIM
- data download into SIM
- menu selection
- call control by SIM

Currently, data download into SIM, call control by SIM are not supported.

Profile Download command is used to indicate which STK features the customer application supports. The AT command used for this operation is AT+STSF.

A proactive SIM provides a mechanism whereby certain actions can be performed.

These actions include:

- display menus
- display given text
- get user input
- send a short message
- set up a call

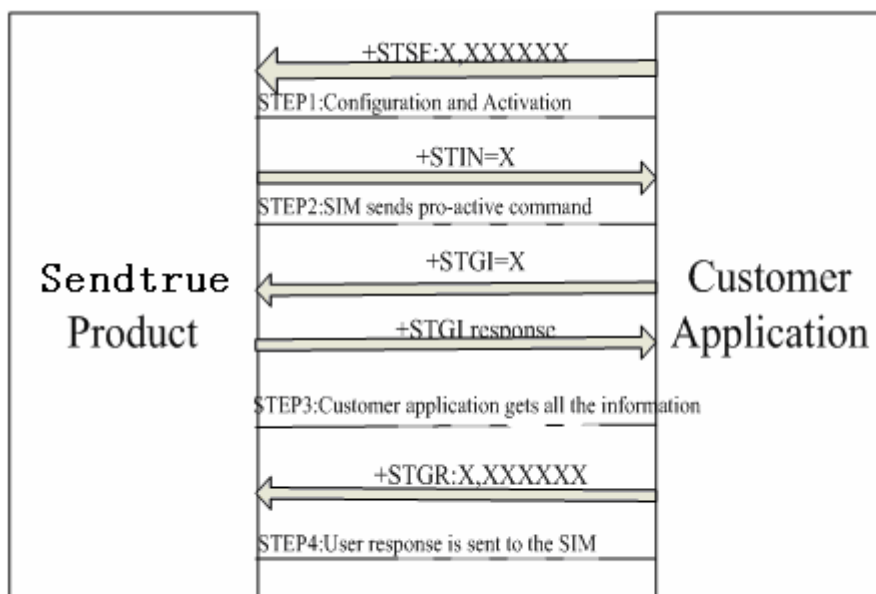
The commands used for this operation are:

- +STIN (SIM Toolkit Indication),
- +STGI (SIM Toolkit Get Information),
- +STGR (SIM Toolkit Give Response).

Menu selection is a set of menu provided by STK. The menu selection command (AT+STGR) informs SIM which menu item is selected. The commands used for this operation are: +STIN, +STGI and +STGR.

10.2 The exchange procedure between STK user and STK

The following scheme shows how the STK user interacts with each other:



On the first step the STK user informs the SMSM5100B-D module which facilities are supported. The operation is performed with the AT+STSF command, which also activates or deactivates the STK functionality. If STK functionality is activated, while boosting, system sends +STIN: 0 to STK customers. If STK functionality is deactivated, when STK functionality is activated by AT+STSF command, system sends +STIN: 0 to STK customers.

On the second step, the SMSM5100B-D module sends +STIN: index to inform STK users which STK command should be performed. The last indication can be request by AT command AT+STIN? .

On the third step the STK user uses AT+STGI command to get STK information respective to +STIN: index

On the fourth step the STK user uses AT+STGR to its response to STK.

All facilities of the STK are realized by sequences of such operations.

10.3 Overview of STK commands

number	command	description
1	AT+STSF	Allow STK facilities to be activated, deactivated or configured
2	AT+STIN	Allow the user to identify the commands sent via SIM card
3	AT+STGI	Get the information of a command sent from the SIM
4	AT+STGR	Allow the application to select an item in the main menu or to answer command

10.4 Detailed description of STK commands

10.4.1 AT+STSF

AT+STSF: allow STK facilities to be activated, deactivated or configured		
Test Command	AT+STSF=?	
Return	+STSF: (0-2),(160060C01F-5FFFFFFF7F),(1-255)	
Read Command	AT+STSF?	
Return	+STSF: <mode>[,<config>][,<Timeout>]	
Write Command	AT+STSF=<mode>[,"<config>"][,<Timeout>]	
Return	OK / ERROR	
Reference	mode	description
	0	Deactivate STK
	1	Activate STK
	2	Configures the STK functionalities
	2、configure STK The STK configuration will be effective immediately without system reboot. All parameters are saved in NV(The value is configured value after reboot) <Config>: give hex value for TERMINAL PROFILE with a value range of (160060C01F-5FFFFFFF7F)(hex format) <Timeout>: set the maximum time the user has for reacting. If waiting time exceeds the value, STK handle as no user reacts. Its value range is 1-255(multiple of 10 seconds)	
Example		

10.4.2 AT+STIN

AT+STIN: allow the user to identify the commands sent via SIM card.(such as GET INKEY)	
Test Command	AT+STIN=?
Return	+STIN: OK
Read Command	AT+STIN?
Return	+STIN: <CmdType> OK
Write Command	None
Return	
Reference	After system received, system will automatically send relative message (+STIN:<CmdType>) to user. AT+STIN? command can be used to receive the latest sent message.(This command can only be available after user

application sends +STIN: and before user application respond with AT+STGI command)

The format of respective message sent automatically by user +STIN:<CmdType>

CmdType	description
0	Setup Menu command has been sent from the SIM
1	Display Text command has been sent from the SIM
2	Get Inkey command has been sent from the SIM
3	Get Input command has been sent from the SIM
4	Setup Call command has been sent from the SIM
6	Setup Menu(Sel Item) subnet command has been sent from the SIM
9	Send SMS command has been sent from the SIM
99	End Session command has been sent from the SIM

Example

10.4.3 AT+STGI

AT+STGI: get the information(text to display, Menu information)of a command sent from the SIM

Test Command **AT+STGI=?**

Return +STGI: (0-11)

OK

Read Command **None**

Return

Write Command **AT+STGI=<CmdType>**

Return OK / ERROR

Reference The information of the return of AT+STGI write command is list below:

When CmdType=0(Setup menu):

<Alpha Identifier menu> Alpha identifier of the main menu(MONTERNET and GO_TONE,etc)

<Idx>(1-255) number of items in the main menu

<NbItems>(1-255) location of present item in the main menu

<Alpha Idx Label> information of current item in the main menu

<HelpInfo>

HelpInfo	description
0	No help information available
1	Help information available

When CmdType=1(Display text):

<Prior>: priority

Prior	description
0	Normal priority of display

1	High priority of display
<Text>:text	
<ClearMode>	
Clear mode	description
0	Clear message after a 3 second delay
1	Waiting for user to clear message

When CmdType=2(Get Inkey):

<Format>:	
format	description
0	Digit(0-9,*,#,and +)
1	SMS alphabet default
2	UCS2
<TextInfo>:	
<HelpInfo>:	
HelpInfo	description
0	No help information available
1	Help information available

When CmdType=3(Get Input):

<Format>:	
format	description
0	Digit(0-9,*,#,and +)
1	SMS alphabet default
2	UCS2
3	Unpacked format
4	Packed format
<EchoMode>:	
EchoMode	description
0	Echo off
1	Echo on
<SizeMin>(1-255): minimum length of input	
<SizeMax>(1-255): maximum length of input	
<TextInfo>:	
<HelpInfo>:	
HelpInfo	description
0	No help information available
1	Help information available

When CmdType=4(Setup Call):

<Type>:	
type	description
0	Set up call but only if not currently busy on
1	Set up call but only if not currently busy on. Redial, if failed.

2	Block current call, if busy, and set up a new call
3	Block current call, if busy, and set up a new call. Redial, if failed.
4	Disconnect current call, if busy, and set up a new call
5	Disconnect current call, if busy, and redial, if failed
<CalledNb>: call number	
<SubAddress>:	
When CmdType=6(Sel Item):	
<Idx>(1-255): total number of submenus	
<NbItems>(1-255): location of current item	
<Alpha Idx Label>: location information of current item	
<HelpInfo>: help information	
HelpInfo	description
0	No help information available
1	Help information available
When CmdType=9(Send SMS)	
<TextInfo>:	
Note: In all returned information, if it begins with 0x80 then its format is UCS2 mode: such as 8079FB52A868A67F51(MONTERNET), or is SMS alphabet default mode.	
Example	

10.4.4 AT+STGR

AT+STGR: allow the application to select an item in the main menu or to answer command	
Test Command	AT+STGR=?
Return	+STGR: (0,1,2,3,4,6,11,95,96,97,98,99),(0-2),(0-255)
Read Command	None
Return	
Write Command	AT+STGR=<CmdType>[,<Result>,<Data>] When CmdType=2(Get Inkey) or CmdType=3(Get Input) and character strings are required, user must enter. AT+STGR=<CmdType>[,<Result>]enter, system return>,users input character strings, then confirm by ctrl+z, give up by Esc
Return	OK / ERROR
Reference	The answer command is as follows: 1、 GET INKEY 2、 GET INPUT 3、 SELECT ITEM 4、 SETUP CALL

5、DISPLAY TEXT

It is also possible to terminate or backward the current command session with following parameters:

- | | |
|-----------------|-------------------------|
| 1、BACKWARD MOVE | Process a backward move |
| 2、NO RESPONSE | No response from user |
| 3、END SESSION | Customer aborts |

CmdType	description
0	User select an item in main menu
1	Response to Disp Text
2	Response to Get Inkey
3	Response to Get Input
4	Response to Setup call
6	Response to Sel Item
95	Backward move
98	No response from the user
99	User abort

When CmdType=0 (user selects an item in main menu):

<Result>:

result	description
1	Item in main menu selected by the user
2	Help information required by user

<Data>: user's option

When CmdType=1(response to Disp Text), there are no <Result>,<Data>

When CmdType=2(Get Inkey)

<Result>:

result	description
0	STK terminated by user
1	User input key

<Data>: the value of user input key

Note: For inputs in UCS2 format, the data are entered in ASCII format which begins with 0x80.Example: for "80597D"

When CmdType=3(Get Input)

<Result>:

result	description
0	STK aborted by user
1	Character string entered by user

<Data>: input character string

Note: For inputs in UCS2 format, the data are entered in ASCII format which begins with 0x80,Example:entered "804F60597D"(hello),"8000410042"(AB).

When CmdType=4(Setup call)

<Result>:

result	description
0	User refuses the call
1	User accepts the call

When CmdType=6(Select Item)

<Result>:

result	description
0	STK terminated by the user
1	Item selected by the user
2	Help information required by the user
3	User requires to backmove

<Data>:

send response to SIM:

when CmdType=95(backmove)

when CmdType=98(no response from user)

when CmdType=99(user aborts)

AT+STGR can be performed, only after AT+STGI has done

Example

SENDTRUE
CONFIDENTIAL

11. GPRS commands

GPRS commands are related to GPRS Mobile Termination that set PDP、QOS parameters, set MT and response from network terminal.

11.1 Overview of GPRS commands

number	command	description
1	<u>AT+CGDCONT</u>	Define PDP context
2	<u>AT+CGQREQ</u>	Quality of service profile(requested)
3	<u>AT+CGQMIN</u>	Quality of service profile(minimum acceptable)
4	<u>AT+CGPCO</u>	Configure the PDP context parameters of PCO
5	<u>AT+CGATT</u>	Attach or detach GPRS services
6	<u>AT+CGACT</u>	PDP context activate or deactivate
7	<u>AT+CGPADDR</u>	Show PDP address
8	<u>AT+CGDATA</u>	Enter data state
9	<u>AT+CGAUTO</u>	Automatic response to a network for PDP context activation
10	<u>AT+CGANS</u>	Manual response to a network for PDP context activation
11	<u>AT+CGCLASS</u>	Set the GPRS type of MT
12	<u>AT+CGEREP</u>	GPRS event reporting
13	<u>AT+CGREG</u>	GPRS network registration status
14	<u>AT+CGSMS</u>	Select service for MO SMS messages
15	<u>AT+CRC</u>	Decide whether shows the supplementary information of incoming calls
16	<u>AT+CR</u>	Decide whether to present that this CONNECT is GPRS
17	<u>AT+CEER</u>	Extend the error report
18	<u>Extension of ATD</u>	Build the connections between terminal devices and networks
19	<u>AT+SSST</u>	Set the MS service type
20	<u>AT+SATT</u>	Attach or detach GPRS service
21	<u>AT+SAUTOATT</u>	Allow MT to perform auto attach operation
22	<u>AT+SGPRSDATA</u>	Specify the data length of GPRS data sent by MT
23	<u>ATO</u>	Switch from command mode to data mode
24	<u>+++</u>	Switch from data mode or PPP online mode to command mode

11.2 Detailed description of GPRS commands

11.2.1 AT+CGDCONT

AT+CGDCONT: configure the context parameters of PDP, when MT is sending the activation message of PDP context	
Test Command	AT+CGDCONT=?
Return	+CGDCONT: (range of supported <cid>s),<pdp_type>,(list of supported <d_comp>s and <h_comp>s) OK
Read Command	AT+CGDCONT?
Return	+CGDCONT:<cid>,<pdp_type>,<APN>,<pdp_addr>,<d_comp>,<h_comp>,<CR>,<LF> [+CGDCONT:<cid>,<pdp_type>,<APN>,<pdp_addr>,<d_comp>,<h_comp>,<CR>,<LF>[.....]] OK
Write Command	AT+CGDCONT=[<cid>[,<pdp_type>[,<APN>[,<pdp_addr>[,<d_comp>[,<h_comp>]]]]]]]
Return	OK / ERROR
Reference	<p>The settings will not be saved in MS after system reboot.</p> <p><cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.</p> <p><pdp_type>: (Packet Data Protocol type), Currently, only IP(Internet Protocol) is supported.</p> <p><APN>: (Access Point Name) character string, which is used to select GGSN or other data subnets. Please consult local network providers. China mobile Communication APN who services Internet is "cmnet", while the one who serves Wap is "cmwap".</p> <p><pdp_address>: character string, specified PDP address. This string can be blank, because an address will be distributed by network dynamically.</p> <p><d_comp>: whether the PDP data should be compressed, This bit does not need to be filled, for its default value is 0. Currently, MT data compression is not supported by any network. 0: no compression 1: compression</p> <p><h_comp>: whether the PDP header should be compressed, This bit does not need to filled, for its default value is 0. Currently, data compression is not supported by any network. 0: no compression 1: compression</p>
Example	AT+CGDCONT=1, "IP", "cmnet"<cr>

```

OK

AT+CGDCONT=1,"IP","cmnet",,1,1
+CME ERROR: 4

AT+CGDCONT=4,"IP","cmnet","1.1.1.1",0,0
OK
    
```

11.2.2 AT+CGQREQ

AT+CGQREQ: configure QOS parameter when MT is sending the activation message of PDP context																	
Test Command	AT+CGQREQ=?																
Return	+CGQREQ:<pdp_type>,(list of supported <precedence>s,<delay>s,<reliability>s,<peak>s,and <mean>s) OK																
Read Command	AT+CGQREQ?																
Return	+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF> [+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[...]] OK																
Write Command	AT+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]																
Return	OK / ERROR																
Reference	<p>If PDP has already been activated and any QOS values of QOS parameters are larger than the minimal value of acceptable QOS parameters, the regulations for PDP context must be modified.</p> <p><cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.</p> <p><precedence>: present the priority</p> <table border="0"> <tr> <td style="padding-right: 20px;">precedence</td> <td>description</td> </tr> <tr> <td>0</td> <td>Subscribed(from network) value used</td> </tr> <tr> <td>1</td> <td>High priority</td> </tr> <tr> <td>2</td> <td>Normal priority</td> </tr> <tr> <td>3</td> <td>Low priority</td> </tr> </table> <p><delay>: present the classes of delay; 4----minimal delay,best performance,1----worst performance</p> <table border="0"> <tr> <td style="padding-right: 20px;">delay</td> <td>description</td> </tr> <tr> <td>0</td> <td>Subscribed (from network) value used</td> </tr> <tr> <td>1--4</td> <td>Delay class</td> </tr> </table> <p><reliability>: present reliability classes; 1 is the best reliability,3,6 is the same</p>	precedence	description	0	Subscribed(from network) value used	1	High priority	2	Normal priority	3	Low priority	delay	description	0	Subscribed (from network) value used	1--4	Delay class
precedence	description																
0	Subscribed(from network) value used																
1	High priority																
2	Normal priority																
3	Low priority																
delay	description																
0	Subscribed (from network) value used																
1--4	Delay class																

class,5 is the worst one

reliability	description
0	Subscribed (from network) value used
1--6	reliability class

<peak>: present the throughput classes in peak

peak	description
0	Subscribed (from network) value used
1	Up to 1000(8 kbit/s)
2	Up to 2000(16 kbit/s)
3	Up to 4000(32 kbit/s)
4	Up to 8000(64 kbit/s)
5	Up to 16000(128 kbit/s)
6	Up to 32000(256 kbit/s)
7	Up to 64000(512 kbit/s)
8	Up to 128000(1024 kbit/s)
9	Up to 256000(2048 kbit/s)

<mean>: present average throughput

mean	description
0	Subscribed (from network) value used
1	100(~0.22 bits/s)
2	200(~0.44 bits/s)
3	500(~1.1 bits/s)
4	1 000(~2.2 bits/s)
5	2 000(~4.4 bits/s)
6	5 000(~11.1 bits/s)
7	10 000(~22 bits/s)
8	20 000(~44 bits/s)
9	50 000(~111 bits/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 bits/s)
18	50 000 000(~111 bits/s)

<pdp_type>: present PDP type

pdp_type	description
“IP”	Internet Protocol
“PPP”	Point-to-Point Protocol

Example	AT+CGQREQ=1,2,4,5,5,16<cr> OK
---------	----------------------------------

11.2.3 AT+CGQMIN

AT+CGQMIN: set the minimal value of acceptable QOS parameters, when MT is sending the activation message of PDP context

Test Command	AT+CGQMIN=?																						
Return	+CGQMIN: <pdp_type>,<reliability>s,<peak>s OK																						
Read Command	AT+CGQMIN?																						
Return	+CGQMIN:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF> [+CGQMIN:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean><CR><LF>[...]] OK																						
Write Command	AT+CGQMIN=[<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>]]]]]]																						
Return	OK / ERROR																						
Reference	<p>MT initiates PDP context deactivation activity, if the value of negotiated QOS parameters in the accepted PDP context message is less than the least value of acceptable QOS parameters. The AT+CGQREQ,AT+CGQMIN command is the spread of AT+CGDCONT.</p> <p><cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.</p> <p><precedence>: present the priority</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">precedence</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Subscribed(from network) value used</td> </tr> <tr> <td>1</td> <td>High priority</td> </tr> <tr> <td>2</td> <td>Normal priority</td> </tr> <tr> <td>3</td> <td>Low priority</td> </tr> </tbody> </table> <p><delay>: present the classes of delay;</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">delay</th> <th style="text-align: left;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Subscribed (from network) value used</td> </tr> <tr> <td>1--4</td> <td>Delay class</td> </tr> </tbody> </table> <p><reliability>: present reliability classes; described in AT+CGQREQ.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">reliability</th> <th style="text-align: left;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Subscribed (from network) value used</td> </tr> <tr> <td>1--6</td> <td>reliability class</td> </tr> </tbody> </table> <p><peak>: present the throughput classes in peak</p>	precedence	Description	0	Subscribed(from network) value used	1	High priority	2	Normal priority	3	Low priority	delay	description	0	Subscribed (from network) value used	1--4	Delay class	reliability	description	0	Subscribed (from network) value used	1--6	reliability class
precedence	Description																						
0	Subscribed(from network) value used																						
1	High priority																						
2	Normal priority																						
3	Low priority																						
delay	description																						
0	Subscribed (from network) value used																						
1--4	Delay class																						
reliability	description																						
0	Subscribed (from network) value used																						
1--6	reliability class																						

peak	description
0	Subscribed (from network) value used
1	Up to 1000(8 kbit/s)
2	Up to 2000(16 kbit/s)
3	Up to 4000(32 kbit/s)
4	Up to 8000(64 kbit/s)
5	Up to 16000(128 kbit/s)
6	Up to 32000(256 kbit/s)
7	Up to 64000(512 kbit/s)
8	Up to 128000(1024 kbit/s)
9	Up to 256000(2048 kbit/s)

<mean>: present average throughput

mean	description
0	Subscribed (from network) value used
1	100(~0.22 bits/s)
2	200(~0.44 bits/s)
3	500(~1.1 bits/s)
4	1 000(~2.2 bits/s)
5	2 000(~4.4 bits/s)
6	5 000(~11.1 bits/s)
7	10 000(~22 bits/s)
8	20 000(~44 bits/s)
9	50 000(~111 bits/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 bits/s)
18	50 000 000(~111 bits/s)

<pdp_type>: present PDP type

pdp_type	description
"IP"	Internet Protocol
"PPP"	Point-to-Point Protocol

Example **AT+CGQMIN=1,2,4,5,5,16<cr>**
OK

11.2.4 AT+CGPCO

AT+CGPCO: configure the PDP context parameters of PCO, when MT is sending the activation message of PDP context							
Test Command	AT+CGPCO=?						
Return	+CGPCO: (0-1),,,(1-15) OK						
Read Command	AT+CGPCO?						
Return	+CGPCO: <type>,<user>,<password>,<cid><CR><LF> [+CGPCO: <type>,<user>,<password>,<cid><CR><LF>[...]] OK						
Write Command	AT+CGPCO=<type>,<user>,<password>,<cid>						
Return	OK / ERROR						
Reference	<type> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 10%;">type</th> <th style="text-align: left;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>User and password are code as ASCII character</td> </tr> <tr> <td>1</td> <td>User and password are code as PDU character</td> </tr> </tbody> </table> <user>: The user name used by pco, which the max length is 64 bytes in ASCII character or max length is 128 bytes in PDU character. <password>: The user password used by pco, which the max length is 64 bytes in ASCII character or max length is 128 bytes in PDU character. <cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.	type	description	0	User and password are code as ASCII character	1	User and password are code as PDU character
type	description						
0	User and password are code as ASCII character						
1	User and password are code as PDU character						
Example	<pre> AT+CGPCO=0,"wap@cmnet.com","wap1",1 OK AT+CGPCO? +CGPCO: 0,,2 +CGPCO: 0,"wap@cmnet.com","wap1",1 OK </pre>						

11.2.5 AT+CGATT

AT+CGATT: Attach or detach GPRS services	
Test Command	AT+CGATT=?
Return	+CGATT: (list of supported <state>s) OK
Read Command	AT+CGATT?
Return	+CGATT: <state> OK
Write Command	AT+CGATT=[<state>]
Return	OK / ERROR
Reference	If MT has been in required status, the writting command is omitted and returns

	<p>OK; If the required status can not be retrieved, returns ERROR. After MT deattaches GPRS services, any activated PDP CONTEXT deactivates automatically.</p> <p><state>:</p> <table border="1"> <thead> <tr> <th>State</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Detach GPRS service</td> </tr> <tr> <td>1</td> <td>Attach GPRS service</td> </tr> </tbody> </table>	State	description	0	Detach GPRS service	1	Attach GPRS service
State	description						
0	Detach GPRS service						
1	Attach GPRS service						
Example	<pre>AT+CGATT=1<cr> OK</pre>						

11.2.6 AT+CGACT

AT+CGACT: activate or deactivate specified PDP context							
Test Command	AT+CGACT=?						
Return	+CGACT: (list of supported <state>s) OK						
Read Command	AT+CGACT?						
Return	+CGACT: <cid>,<state><CR><LF>[+CGACT: <cid>,<state><CR><LF>[...]] OK						
Write Command	AT+CGACT=[<state>[,<cid>[,<cid>[,...]]]]						
Return	OK / ERROR						
Reference	<p>If MT has been in required status, the writing command is omitted and returns OK; If the required status can not be retrieved, returns ERROR. While performing activate specified PDP context operation, MT performs GPRS ATTACH first, if GPRS ATTACH has not been performed yet. If GPRS ATTACH operation failes, return ERROR.</p> <p><state>:</p> <table border="1"> <thead> <tr> <th>state</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Deactivate PDP context</td> </tr> <tr> <td>1</td> <td>Activate PDP context</td> </tr> </tbody> </table> <p><cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID. In default case, AT+CGACT=1 and AT+CGACT=1,1 indicates activate PDP context , AT+CGACT=0 indicates deactivates all the activated PDP context.</p>	state	description	0	Deactivate PDP context	1	Activate PDP context
state	description						
0	Deactivate PDP context						
1	Activate PDP context						
Example	<pre>AT+CGACT=1,1<cr> OK AT+CGACT=0,1<cr> OK</pre>						

11.2.7 AT+CGPADDR

AT+CGPADDR: return specified PDP CONTEXT address

Test Command	AT+CGPADDR=?
Return	+CGPADDR: (list of supported <cid>s) OK
Read Command	None
Return	
Write Command	AT+CGPADDR=[<cid>[,<cid>[,...]]]
Return	+CGPADDR: <cid>,<pdp_addr><CR><LF> [+CGPADDR: <cid>,<pdp_addr><CR><LF>[...]] OK
Reference	<cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID. If no specification, return all PDP context. <pdp_address>: character string; PDP context address
Example	AT+CGPADDR=1<cr> +CGPADDR: 1,0.0.0.0 OK AT+CGPADDR=?<cr> +CGPADDR: (1-15) OK

11.2.8 AT+CGDATA

AT+CGDATA: make terminal device and network into connection status	
Test Command	AT+CGDATA=?
Return	+CGDATA: (list of supported <L2P>s) OK
Read Command	None
Return	
Write Command	AT+CGDATA=[<L2P>[,<cid>[,<cid>[,...]]]]
Return	CONNECT / ERROR
Reference	This process includes one GPRS attach process and one or more than one PDP CONTEXT activation process. If the value of cid has not been defined in MT, return ERROR, otherwise return CONNECT. <L2P>: specifies the Layer2 protocol between TE and MT. Currently, only PPP is supported. <cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.
Example	AT+CGDATA="PPP",1<cr> CONNECT

11.2.9 AT+CGAUTO

AT+CGAUTO: whether or not MT automatically respond to the PDP context	
--	--

activation request initiated by network terminal											
Test Command	AT+CGAUTO=?										
Return	+CGAUTO: (list of supported <state>s) OK										
Read Command	AT+CGAUTO?										
Return	+CGAUTO: <state> OK										
Write Command	AT+CGAUTO=[<state>]										
Return	OK / ERROR										
Reference	<state>: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">state</th> <th style="width: 90%;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disable GPRS auto response, use AT+CGANS command to response to PDP context activation request manually, which is initiated by network terminal.</td> </tr> <tr> <td>1</td> <td>Enable GPRS auto response, automatically response to the PDP context activation request automatically</td> </tr> <tr> <td>2</td> <td>Automatic acceptance of GPRS network requests is controlled by the 'SO' command</td> </tr> <tr> <td>3</td> <td>Automatic acceptance of both GPRS network requests and incoming circuit switched calls is controlled by the 'SO' command</td> </tr> </tbody> </table>	state	description	0	Disable GPRS auto response, use AT+CGANS command to response to PDP context activation request manually, which is initiated by network terminal.	1	Enable GPRS auto response, automatically response to the PDP context activation request automatically	2	Automatic acceptance of GPRS network requests is controlled by the 'SO' command	3	Automatic acceptance of both GPRS network requests and incoming circuit switched calls is controlled by the 'SO' command
state	description										
0	Disable GPRS auto response, use AT+CGANS command to response to PDP context activation request manually, which is initiated by network terminal.										
1	Enable GPRS auto response, automatically response to the PDP context activation request automatically										
2	Automatic acceptance of GPRS network requests is controlled by the 'SO' command										
3	Automatic acceptance of both GPRS network requests and incoming circuit switched calls is controlled by the 'SO' command										
Example	AT+CGAUTO=0<cr> OK										

11.2.10 AT+CGANS

AT+CGANS: configure MT to respond to the request of PDP context(which has already been notified TE by RING and CRING) from network terminal							
Test Command	AT+CGANS=?						
Return	+CGANS: (list of supported <response>s),(list of supported <L2P>s) OK						
Read Command	None						
Return							
Write Command	AT+CGANS=[<response>],[<L2P>],[<cid>]]						
Return	OK / ERROR						
Reference	<response>: data, presents how to respond, accept it or reject it <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">response</th> <th style="width: 90%;">description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Refuse the PDP context requests initiated by network terminals</td> </tr> <tr> <td>1</td> <td>Accept it and initiate PDP CONTEXT activation</td> </tr> </tbody> </table> <cid>: (PDP Context Identifier)interger(range, 1--15), presents PDP context ID.	response	description	0	Refuse the PDP context requests initiated by network terminals	1	Accept it and initiate PDP CONTEXT activation
response	description						
0	Refuse the PDP context requests initiated by network terminals						
1	Accept it and initiate PDP CONTEXT activation						
Example	+CRING:GPRS"IP", "104.156.74.8"						

```
AT+CGANS=1<cr>
OK
```

11.2.11 AT+CGCLASS

AT+CGCLASS: set the GPRS type of MT

Test Command	AT+CGCLASS=?						
Return	+CGCLASS: (list of supported <class>s) OK						
Read Command	AT+CGCLASS?						
Return	+CGCLASS: <class> OK						
Write Command	AT+CGCLASS=[<class>]						
Return	OK / ERROR						
Reference	<p><class>: present GPRS type</p> <table border="1"> <thead> <tr> <th>Class</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>class B</td> </tr> <tr> <td>1</td> <td>class C in circuit switched only mode(lowest)</td> </tr> </tbody> </table> <p>If MT is in GPRS attach status, and set the GPRS type of MT to CC, MT will initiate GPRS detach process.</p>	Class	description	0	class B	1	class C in circuit switched only mode(lowest)
Class	description						
0	class B						
1	class C in circuit switched only mode(lowest)						
Example	<pre>AT+CGCLASS="CC"<cr> OK AT+CGCLASS="A"<cr> ERROR</pre>						

11.2.12 AT+CGEREP

AT+CGEREP: set whether MT sends response initiatively

Test Command	AT+CGEREP=?
Return	+CGEREP: <mode>,<bfr> OK
Read Command	AT+CGEREP?
Return	+CGEREP: <mode>,<bfr> OK
Write Command	AT+CGEREP=[<mode>[,<bfr>]]
Return	OK / ERROR

Reference	<pre> <mode>: mode description 0 Stores echoed characters in MT cache 1 If MT-TE link is not available, discard initiative echo characters, Otherwise send them to TE directly 2 If MT-TE link is not available, store echo character to cache and echo it when it's available. Otherwise send them directly to TE. <bfr>: bfr description 0 Clear echo characters in MT cache(effective to 1 and 2 mode) 1 Send the content in MT cache to TE(effective to 1 and 2 mode) </pre>
Example	<pre> AT+CGEREP=0,1 <cr> OK AT+CGEREP=2,0 <cr> OK </pre>

11.2.13 AT+CGREG

AT+CGREG: allow MT to echo network register status and location message	
Test Command	AT+CGREG=?
Return	+CGREG: (list of supported <n>s) OK
Read Command	AT+CGREG?
Return	+CGREG: <n>,<stat>[,<lac>,<ci>] or +CME ERROR:<err>
Write Command	AT+CGREG=[<n>]
Return	N=1 +CGREG: <stat> N=2 +CGREG: <stat>[,<lac>,<ci>]
Reference	<pre> <n>: n description 0 Disable the auto echo of network register status 1 Enable the auto echo of network register status. +CGREG:<stat> 2 Enable the auto echo of network register status and the location message . +CREG:<stat>[,<lac>,<ci>] <stat>: stat description 0 Not register and no attempt of ME 1 Registered local network 2 Not register and ME is attempting to do 3 Registration rejected 4 Network registration unknown </pre>

	5 Registered and roam <lac>: two bytes, location coding, hex format, for example "00C3" is equal to 195 <ci>: two bytes, Cell ID, hex format
Example	AT+CGREG=1<cr> +CGREG: <stat> AT+CGREG=2<cr> +CGREG: <stat>[,<lac>,<ci>]

11.2.14 AT+CGSMS

AT+CGSMS: select the service type of SMS sending											
Test Command	AT+CGSMS=?										
Return	+CGSMS: (list of currently available <service>s) OK										
Read Command	None										
Return											
Write Command	AT+CGSMS=[<service>]										
Return	OK / ERROR										
Reference	<service>: parameters, present service type <table border="0"> <thead> <tr> <th>service</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>GPRS</td> </tr> <tr> <td>1</td> <td>circuit switched</td> </tr> <tr> <td>2</td> <td>GPRS preferred(use circuit switched if GPRS not available)</td> </tr> <tr> <td>3</td> <td>circuit switched preferred(use GPRS if circuit switched not available)</td> </tr> </tbody> </table> <p>Note: Currently, GPRS SMS is not supported by network.</p>	service	description	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)
service	description										
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)										
Example											

11.2.15 AT+CRC

AT+CRC: decide whether shows the supplementary information of incoming calls	
Test Command	AT+CRC=?
Return	+CRC: (list of supported <n>s) OK
Read Command	AT+CRC?
Return	+CRC: [<n>] OK
Write Command	AT+CRC=[<n>]
Return	OK / ERROR

Reference	After this function has been set, the indication of incoming calls is not RING, but +CRING: <type>(such as +CRING:voice) <n>: present the validity of this command n description 0 Invalid 1 valid Note: Currently, <type> only support voice
Example	AT+CR=1 <cr> OK

11.2.16 AT+CR

AT+CR: decide whether to present that this CONNECT is GPRS, before send "CONNECT", which shows the connection is successful	
Test Command	AT+CR=?
Return	+CR: (list of supported <n>s) OK
Read Command	AT+CR?
Return	+CR: [<n>] OK
Write Command	AT+CR=[<n>]
Return	OK / ERROR
Reference	<n>: present whether to show the GPRS type of this connect n description 0 Invalid 1 Valid
Example	AT+CR=1<cr> OK

11.2.17 AT+CEER

AT+CEER: extend the error report	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+CEER
Return	Error cause id. Please refer to the error message description in this document 1.5 +CEER: Error<XXX>
Reference	It reads last failed connection or the reason why the Attach of GPRS and

Activate PDP context are failed.	
Example	AT+CEER +CEER: Error 3 OK

11.2.18 Extension of ATD

Extension of ATD: built the connections between terminal devices and networks, in order to send data	
Test Command	None
Return	
Read Command	None
Return	
Write Command	ATD *<GPRS_SC_IP>[***<cid>]#
Return	CONNECT / ERROR
Reference	While performing this command, if MT has not perform GPRS attach and PDP CONTEXT ACTIVATION operation, these operations should be performed first; if not, build the connections between terminal device and network directly. <GPRS_SC_IP>: data string, GPRS service numbers are required(its value is 99) <cid>: (PDP Context Identifier),integer (range 1--15), presents PDP context ID. This value can be blank, with a default value of 1.
Example	ATD*99#<cr> or ATD*99***1#<cr>] CONNECT

11.2.19 AT+SSST

AT+SSST: set the MS service type	
Test Command	AT+SSST=?
Return	+SSST: <service_type> OK
Read Command	AT+SSST?
Return	+SSST: <service_type> OK
Write Command	AT+SSST=[<service_type>]
Return	OK / ERROR

Reference	<pre><service_type>: service_type description 0 Services unavailable for customers 1 Customers can only choose GSM service 2 Customers can choose GSM and GPRS service at the same time Note: Command AT+SSST is SENDTRUE's specific.</pre>
Example	

11.2.20 AT+SATT

AT+SATT: attach or detach GPRS service	
Test Command	AT+SATT=?
Return	+SATT: <state>, <action_type> OK
Read Command	AT+SATT?
Return	+SATT: <state> OK
Write Command	AT+SATT=[<state>[,<action_type>]]
Return	OK / ERROR
Reference	<pre><state>: state description 0 Detach 1 Attach <action_type>: When state=1: action_type description 0 GPRS attach; same as "AT+CGATT=1" 1 GPRS combine attach When state=0: action_type description 0 GPRS detach; same as "AT+CGATT=0" 1 GPRS IMSI detach 2 GPRS combine detach Note: Command AT+SATT is SENDTRUE's specific.</pre>
Example	AT+SATT=1,0<cr> OK

11.2.21 AT+SAUTOATT

AT+SAUTOATT: allow MT to perform auto attach operation	
Test Command	AT+SAUTOATT=?

Return	+SAUTOATT: <state> OK
Read Command	AT+SAUTOATT?
Return	+SAUTOATT: <state> OK
Write Command	AT+SAUTOATT=[<state>]
Return	OK / ERROR
Reference	<state>: state description 0 Set to auto attach 1 Set to manual attach(cancel auto attach) Note: Command AT+SAUTOATT is SENDTRUE's specific.
Example	AT+SAUTOATT=1<cr> OK

11.2.22 AT+SGPRSDATA

AT+SGPRSDATA: specify the data length of GPRS data sent by MT	
Test Command	AT+SGPRSDATA=?
Return	+SGPRSDATA: (0-10000) OK
Read Command	AT+SGPRSDATA?
Return	support +SGPRSDATA OK
Write Command	AT+SGPRSDATA=[<data_len>]
Return	OK / ERROR
Reference	<data_len>: integer,the length of sent data with the range 0-10000 Note: The data used in the command AT+SGPRSDATA is generated randomly.They are mainly used in test.This command is SENDTRUE's specific.
Example	Send 2000 data: AT+SGPRSDATA=2000<cr> OK

11.2.23 ATO

ATO: Switch from command mode to data mode	
Execution	ATO
Command	
Return	CONNECT/NO CARRIER
Reference	

Example

11.2.24 +++

+++ : Switch from data mode or PPP online mode to command mode	
Execution	+++
Command	
Return	OK
Reference	<p>This Command is only available during a CSD call or a GPRS connection. The +++ character sequence causes the TA to cancel the data flow over the AT interface and switch to Command mode. This allows you to enter AT Command while maintaining the data connection to the remote server or, accordingly, the GPRS connection.</p> <p>To prevent the +++ escape sequence from being misinterpreted as data, it should comply to following sequence:</p> <ol style="list-style-type: none"> 1. No characters entered for T1 time (0.5 seconds) 2. “+++” characters entered with no characters in between 3. No characters entered for T1 timer (0.5 seconds) 4. Switch to Command mode, otherwise go to step 1. <p>Note: To return from Command mode back to data or PPP online mode: Enter ATO</p>
Example	

12. TCP/IP commands

TCP/IP commands are relate to network communication that set TCP/IP parameters, configure network relative parameters.

12.1 Overview of special commands

number	command	Description
1	AT+SDATACONF	Config the configure parameters of data sent by AT commands based on GPRS
2	AT+SDATASTART	Enable GPRS service
3	AT+SDATASEND	Send the data specified by user in transparent mode.
4	AT+SDATATREAD	Read the received data and display in transparent mode.
5	AT+SDATASEND	Send the character string data specified by user
6	AT+SSTRSEND	Send the character strings specified by customer
7	AT+SDATAREAD	Read the received data from the buffer.
8	AT+SDATARXMD	Configure the display format and the mode when received data.
9	AT+SDATASTATUS	Require socket status
10	AT+TRT	Set network data resend times after failing to send data

12.2 Detailed description of TCP/IP commands

12.2.1 AT+SDATACONF

AT+SDATACONF: config the configure parameters of data sent by AT commands based on GPRS

Test Command	AT+SDATACONF=?
Return	+SDATACONF: <connect_id>,<connect_type>,,<server_port>,<self_port> OK
Read Command	AT+SDATACONF?
Return	+SDATACONF:[<connect_id>,<connect_type>,<server_port>,<server_ip_addr> ><self_port>] [<connect_id>,<connect_type>,<server_port>,<server_ip_addr>,<self_port>] [<connect_id>,<connect_type>,<server_port>,<server_ip_addr>,<self_port>]
Write Command	AT+SDATACONF=[<connect_id>,<connect_type>,<server_ip_addr>/server

_DSN>,<server_port>[,<self_port>]]	
Return	OK / ERROR
Reference	<p>After configuration, AT+SDATASTART command builds the lower data links between GPRS and networks. If the link is built successfully, user can send specified data by AT+SDATASEND and receive data by AT+SDATAREAD.</p> <p><connect_id>: integer; range 1-10, used in connection built by local identification.</p> <p><connect_type>: character string; Currently, "UDP" and "TCP" are supported.</p> <p><server_ip_addr>: character string; presents server ip addresses</p> <p><server_DSN>:character string; presents server DNS</p> <p><server_port>: integer; presents server port id</p> <p><self_port>: integer; present port id of itself</p> <p>Note: Command AT+SDATACONF is SENDTRUE's specific.</p>
Example	<p>The command sequence below checks whether PDP context has been activated, then config the parameter of GPRS data service and send UDP data:</p> <pre>AT+CGACT=1,1<cr> OK AT+SDATACONF=1,"UDP","211.144.193.27",7000<cr> OK AT+SDATASTART=1,1<cr> OK AT+SSTRSEND=1," FROM SENDTRUE"<cr> OK</pre> <p>The command sequence below checks whether PDP context has been activated, then config the parameter of GPRS data service and send TCP data:</p> <pre>AT+CGACT=1,1<cr> OK AT+SDATACONF=1,"TCP","202.106.182.230",110<cr> OK AT+SDATASTART=1,1<cr> OK AT+SDATAREAD=1<cr> <+OK 16614.1112663146@sina.com> OK</pre>

12.2.2 AT+SDATASTART

AT+SDATASTART: enable GPRS service, after configures parameters. It refers to AT+SDATACONF command

Test Command	AT+SDATASTART=?
Return	+SDATASTART: <connect_id>,<state> OK

Read Command	AT+SDATASTART?
Return	+SDATASTART: [<connect_id>,<state>] [<connect_id>,<state>] [<connect_id>,<state>] OK
Write Command	AT+SDATASTART=[<connect_id>,<state>]
Return	OK / ERROR
Reference	<connect_id>: integer, range 1-10, used in connection built by local identification. <state>: State description 0 Deactivate UDP/TCP connection 1 Activate UDP/TCP connection Note: Command AT+SDATASTART is SENDTRUE's specific.
Example	AT+SDATASTART=1,1<cr> OK

12.2.3 AT+SDATATSEND

AT+SDATATSEND: send the data specified by user. Refer to AT+SDATACONF	
Test Command	AT+SDATATSEND=?
Return	+SDATATSEND: <connect_id>,<data_len> OK
Read Command	None
Return	
Write Command	AT+SDATATSEND=[<connect_id>,<data_len><cr> > <data> <ctrl+z/ESC>]
Return	OK / ERROR
Reference	<connect_id>: integer, range 1-10, used in connection built by local identification. <data_len>: integer, presents the length of sent data. The max length is 1460. At any time, the length should be equal to or less than the MAX length, or sending data will be failed. <data>: send the data.
Example	

12.2.4 AT+SDATATREAD

AT+SDATATREAD:

Test Command	AT+SDATATREAD=?
Return	+SDATATREAD: <connect_id> OK
Read Command	None
Return	
Write Command	AT+SDATAREAD=[<connect_id>]
Return	Display the received data according to the type . ASCII type: +SSTR:<connect_id>,< data in ASCII type >
Reference	<connect_id>: integer with a range of 1-10, used in connection built by local identification
Example	

12.2.5 AT+SDATASEND

AT+SDATASEND: send the character string data specified by user. Refer to AT+SDATACONF	
Test Command	AT+SDATASEND=?
Return	+SDATASEND: <connect_id>, OK
Read Command	None
Return	
Write Command	AT+SDATASEND=[<connect_id>,<length><cr> > <data> <ctrl+z/ESC>] Or AT+SDATASEND=<connect_id>,<length>,<data><cr>
Return	OK / ERROR
Reference	<connect_id>: integer, range 1-10, used in connection built by local identification. <length>: integer, presents the length of sent data. The max length is 1000. At any time, the length should be equal to or less than the MAX length, or sending data will be failed. <data>: send the data. Note: Command AT+SDATASEND is SENDTRUE's specific.
Example	AT+SDATASEND=1,4<cr> >44454647 <ctrl+z> OK

12.2.6 AT+SSTRSEND

AT+SSTRSEND: send the character strings specified by customer. It refers to command AT+SDATACONF	
---	--

Test Command	AT+SSTRSEND=?
Return	+SSTRSEND: <connect_id> OK
Read Command	None
Return	
Write Command	AT+SSTRSEND=[<connect_id>,<data>]
Return	OK / ERROR
Reference	<connect_id>: integer with a range of 1-10, used in connection built by local identification <data>: character string type, data needed to be sent by users, with a length of (1-1000) Note: Command AT+SSTRSEND is SENDTRUE's specific.
Example	AT+SSTRSEND=1,"Sendtrue"<cr> OK

12.2.7 AT+SDATAREAD

AT+SDATAREAD: Read the received data from buffer and display the data in the format of the command AT+SDATARXMD setting.	
Test Command	AT+SDATAREAD=?
Return	+SDATAREAD: <connect_id> OK
Read Command	None
Return	
Write Command	AT+SDATAREAD=[<connect_id>]
Return	Display the received data according to the type . ASCII type: +SSTR:<connect_id>,< data in ASCII type > HEX type: +SDATA:<connect_id>,<data_length>,< data in HEX type> The context of the data in ASCII type or in HEX type will be empty if there has no data received.
Reference	<connect_id>: integer with a range of 1-10, used in connection built by local identification Note: Command AT+SDATAREAD is SENDTRUE's specific.
Example	

12.2.8 AT+SDATARXMD

AT+SDATARXMD: Configure the display format of the received data, set the mode of the module when received the data.	
Test Command	AT+SDATARXMD=?

Return	+SDATARXMD: <connect_id>,<state>,<mode> OK												
Read Command	AT+SDATARXMD?												
Return	All connect_id status, format as follows: +SDATARXMD:<connect_id>,<state>,<mode><cr> OK												
Write Command	AT+SDATARXMD=[<connect_id>,<state>,<mode>]												
Return	OK / ERROR												
Reference	<p><connect_id>: integer with a range of 1-10, used in connection built by local identification</p> <p><state>:</p> <table border="1"> <thead> <tr> <th>State</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0 (default value)</td> <td>The received data accord to HEX character string</td> </tr> <tr> <td>1</td> <td>The received data accord to ASCII character string</td> </tr> </tbody> </table> <p><mode>:</p> <table border="1"> <thead> <tr> <th>Mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0 (default value)</td> <td> UDP: module echoes the received data in unsolicited mode, user can also to use the command AT+SDATAREAD to read data again. TCP: module notifies the user with +STCPD:<connect_id> in unsolicited mode to indicate there are TCP data received in the connect_id. User should use command AT+SDATAREAD to read TCP data. In addition, module will send unsolicited message +STCPC:<connect_id> to indicate that the peer entity closed the TCP connect(socket disconnect unconventionally will not send unsolicited notification) </td> </tr> <tr> <td>1</td> <td> UDP: module do not echo UDP data when received data TCP: module do not send the notification to user when received TCP data or connection closed by the peer entity. </td> </tr> </tbody> </table> <p>Note: Command AT+SDATARXMD is SENDTRUE's specific.</p>	State	description	0 (default value)	The received data accord to HEX character string	1	The received data accord to ASCII character string	Mode	description	0 (default value)	UDP: module echoes the received data in unsolicited mode, user can also to use the command AT+SDATAREAD to read data again. TCP: module notifies the user with +STCPD:<connect_id> in unsolicited mode to indicate there are TCP data received in the connect_id. User should use command AT+SDATAREAD to read TCP data. In addition, module will send unsolicited message +STCPC:<connect_id> to indicate that the peer entity closed the TCP connect(socket disconnect unconventionally will not send unsolicited notification)	1	UDP: module do not echo UDP data when received data TCP: module do not send the notification to user when received TCP data or connection closed by the peer entity.
State	description												
0 (default value)	The received data accord to HEX character string												
1	The received data accord to ASCII character string												
Mode	description												
0 (default value)	UDP: module echoes the received data in unsolicited mode, user can also to use the command AT+SDATAREAD to read data again. TCP: module notifies the user with +STCPD:<connect_id> in unsolicited mode to indicate there are TCP data received in the connect_id. User should use command AT+SDATAREAD to read TCP data. In addition, module will send unsolicited message +STCPC:<connect_id> to indicate that the peer entity closed the TCP connect(socket disconnect unconventionally will not send unsolicited notification)												
1	UDP: module do not echo UDP data when received data TCP: module do not send the notification to user when received TCP data or connection closed by the peer entity.												
Example													

12.2.9 AT+SDATASTATUS

AT+SDATASTATUS: Query sockets status and every socket communication information.	
Test	AT+ SDATASTATUS =?
Command	
	+SDATASTATUS: (0-10)
Return	OK
Execution	AT+SDATASTATUS

Command	+SOCKETSTATUS:												
Return	<id>,<flag>,<status>,<send_data_counter>,<acked_data_counter>,<recv_data_counter><CRF>,<LF> [+SOCKETSTATUS: <id>,<flag>,<status>,<send_data_counter>,<acked_data_counter>,<recv_data_counter><CRF>,<LF>[.....]] OK												
Write Command	AT+SDATASTATUS=<id>												
Return	+SOCKETSTATUS: <id>,<flag>,<status>,<send_data_counter>,<acked_data_counter>,<recv_data_counter><CRF>,<LF> OK / ERROR												
Reference	<p><id>:integer; the id of the socket with the range 0-10</p> <table border="0"> <tr> <td><id></td> <td>description</td> </tr> <tr> <td>0</td> <td>Clear all the data counters.</td> </tr> <tr> <td>1-10</td> <td>The id of the socket.</td> </tr> </table> <p><flag>:integer;this is online flag</p> <table border="0"> <tr> <td><flag></td> <td>description</td> </tr> <tr> <td>0</td> <td>The socket is out of line.</td> </tr> <tr> <td>1</td> <td>The socket is online.</td> </tr> </table> <p><status>:integer;current status of the socket</p> <p><send_data_counter>:integer;send data counter for the socket</p> <p><acked_data_counter>:integer; acked data counter for the socket</p> <p><recv_data_counter>:integer;recevice data counter for the socket</p>	<id>	description	0	Clear all the data counters.	1-10	The id of the socket.	<flag>	description	0	The socket is out of line.	1	The socket is online.
<id>	description												
0	Clear all the data counters.												
1-10	The id of the socket.												
<flag>	description												
0	The socket is out of line.												
1	The socket is online.												
Example													

12.2.10 AT+TRT

AT+ TRT: Set network data resend times after failing to send data	
write Command	AT+TRT=<data_resend_times>
Return	OK / ERROR
Reference	<data_resend_times>:data resend times with the range 1-12
Example	

13. AUDIO commands

AUDIO commands are relate to the control and the parameters of the audio partment.

13.1 Overview of AUDIO commands

number	command	description
1	AT+SSAM	Configure the sound mode
2	AT+SPEAKER	Config MIC and SPEAKER channels
3	AT+SDMUT	Mute the downlink voice
4	AT+CMUT	Mute control
5	AT+CRMP	Test ring of incoming calls
6	AT+STONE	Play sound in a certain frequency
7	AT+VGR	Tune the sound level of the speaker
8	AT+SDTMF	Play a DTMF tone on the current speaker
9	AT+SCDM	Select the specific ring melody
10	AT+ECHO	Configure the ECHO CANCELLATION function for voice calls
11	AT+SSAP	Config the parameter of audio gain
12	AT+STMF	Store and delete the file in MIDI format
13	AT+SEQT	Set the speaker equalizer type
14	AT+SSEA	Configure the sound parameters in project mode

13.2 Detailed description of AUDIO commands

13.2.1 AT+SSAM

AT+SSAM: configure the sound mode		
Test Command	AT+SSAM=?	
Return	+SSAM: (0-2) OK	
Read Command	AT+SSAM?	
Return	+SSAM: <current value> OK	
Write Command	AT+SSAM=<mode>	
Return	OK	
Reference	<mode>:	
	mode	description
	0	Hand hold mode
	1	Earphone mode

Example

13.2.2 AT+SPEAKER

AT+SPEAKER: config MIC and SPEAKER channels													
Test Command	AT+SPEAKER=?												
Return	+SPEAKER: (0-1),(0-1) OK												
Read Command	AT+SPEAKER?												
Return	+SPEAKER: <mic_mode>,<spk_mode> OK												
Write Command	AT+SPEAKER=<mic_mode>,<spk_mode>												
Return	OK / ERROR												
Reference	<p>After setting audio mode through AT+SSAM command, user should set MIC and SPEAKER channel again if necessary.</p> <p><mic_mode>:</p> <table border="0"> <tr> <td>mic_mode</td> <td>description</td> </tr> <tr> <td>0</td> <td>MIC mode</td> </tr> <tr> <td>1</td> <td>MIC aux mode</td> </tr> </table> <p><spk_mode></p> <table border="0"> <tr> <td>mode</td> <td>description</td> </tr> <tr> <td>0</td> <td>SPEAKER mode</td> </tr> <tr> <td>1</td> <td>SPEAKER aux mode</td> </tr> </table> <p>Default setting: MIC and SPEAKER channels are set to master channel</p>	mic_mode	description	0	MIC mode	1	MIC aux mode	mode	description	0	SPEAKER mode	1	SPEAKER aux mode
mic_mode	description												
0	MIC mode												
1	MIC aux mode												
mode	description												
0	SPEAKER mode												
1	SPEAKER aux mode												
Example													

13.2.3 AT+SDMUT

AT+SDMUT: mute the downlink voice	
Test Command	AT+SDMUT=?
Return	+SDMUT: <supported value> OK
Read Command	AT+SDMUT?
Return	+SDMUT: <mode> OK
Write Command	AT+SDMUT=<mode>
Return	OK / ERROR
Reference	<p><mode>:</p> <p>0: downlink voice mute off</p> <p>1: downlink voice mute on</p>

Example

13.2.4 AT+CMUT

AT+CMUT: mute the microphone		
Test Command	AT+CMUT=?	
Return	+CMUT: <supported value> OK	
Read Command	AT+CMUT?	
Return	+CMUT: <mode> OK	
Write Command	AT+CMUT=<mode>	
Return	OK / ERROR	
Reference	mode	description
	0	Microphone mute off
	1	Microphone mute on
	Note: currently, write command is not be supported.	
Example		

13.2.5 AT+CRMP

AT+CRMP: test ring of incoming calls		
Test Command	AT+CRMP=?	
Return	+CRMP: (0-3),(0-65535),(0-47) OK	
Read Command	None	
Return		
Write Command	AT+CRMP=<call type>[,<num>,<index>]	
Return	OK	
Reference	Call type	description
	0	Receive data
	1	Receive fax
	2	Receive short messages
	num	description
	0	Keep on playing until user stops it(default value)
	1-65536	Play <num> time/times
	index	(<call type> =0,1,2) (<call type>=4)
	0	Stop playing ring music 0 Stop playing short message melody

	1-15	The manufacture defined melody in module	1-4	Types of short message melody
	16-47	Downloaded melodies by users	>4	The index of short message is equal to 1
Example Play ring melody: AT+CRMP=0, 1, 5 +CRMP: 5 OK Play short message melody: AT+CRMP=3, 1, 4 +CRMP: 4 OK				

13.2.6 AT+STONE

AT+STONE: play sound in a certain frequency. Frequency and volume and duration can all be set		
Test Command	AT+STONE=?	
Return	+STONE: (0,1),(0-3400),(0-50) OK	
Read Command	AT+STONE?	
Return	OK / ERROR	
Write Command	AT+STONE=<mode>,<freq>,<duration>]	
Return	OK / ERROR	
Reference	mode	description
	0	Stop playing
	1	Begin playing
	Freq: speaker(1-3400Hz) Buzzer (1-3400Hz)	
	Duration: (0-50), unit 100ms.0 is default value, time is infinite. Playing can be stopped by AT+STONE=0.	
Example		

13.2.7 AT+VGR

AT+VGR: tune the sound level of the speaker	
Test Command	AT+VGR=?
Return	+VGR: (1-9) OK

Read Command	AT+VGR?
Return	+VGR: <current value> OK
Write Command	AT+VGR=<value>
Return	OK
Reference	<value>: the value of speaker, value range 1-9
Example	

13.2.8 AT+SDTMF

AT+SDTMF: play DTMF tone on the current speaker							
Test Command	AT+SDTMF=?						
Return	+SDTMF: (0-1),(0-9,*,#,A,B,C,D),(0-50) OK						
Read Command	None						
Return							
Write Command	AT+SDTMF=<mode>[,<dtmf>,<duration>]						
Return	OK / +CME ERROR:<err>						
Reference	<table border="1"> <thead> <tr> <th>mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Stop sending keyboard tone</td> </tr> <tr> <td>1</td> <td>Send keyboard tone</td> </tr> </tbody> </table> <p><dtmf>: {-9,*,#,A,B,C,D} Character Set <duration> : (0-50) unit 100ms.0 is default value, time is infinite. Playing can be stopped by AT+STONE=0.</p>	mode	description	0	Stop sending keyboard tone	1	Send keyboard tone
mode	description						
0	Stop sending keyboard tone						
1	Send keyboard tone						
Example							

13.2.9 AT+SCDM

AT+SCDM: select the specific ring melody							
Test Command	AT+SCDM=?						
Return	+SCDM: (0-47) OK						
Read Command	AT+SCDM?						
Return	+SCDM: <melody> OK						
Write Command	AT+SCDM=<melody>						
Return	OK						
Reference	<table border="1"> <thead> <tr> <th>melody</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No ring melody, the default value;</td> </tr> <tr> <td>1...15</td> <td>The manufacturer defined melody in module</td> </tr> </tbody> </table>	melody	description	0	No ring melody, the default value;	1...15	The manufacturer defined melody in module
melody	description						
0	No ring melody, the default value;						
1...15	The manufacturer defined melody in module						

16...47 Downloaded melodies by users(if do not have downloaded melodies, it will be wrong when you set.)

Example

13.2.10 AT+ECHO

AT+ECHO: configure the ECHO CANCELLATION function for voice calls

Test Command	None	
Return		
Read Command	AT+ECHO?	
Return	+ECHO: <status>, <Algold>, <param1>, <param2>, <param3>, <param4>, <param5>, <param6> OK	
Write Command	AT+ECHO= <mode>, <Algold>, <param1>, <param2>, <param3>, <param4>, <param5>, <param6>	
Return	OK / ERROR	
Reference	mode	description
	0	Deactivate ECHO
	1	Activate ECHO
	Algold	description
	0	1 Echo Cancellation
	1	3 Echo Cancellation
	Echo Cancellation 1 : (4 parameters)	
	1	<Volout> 0: 31db(default) 1: 29db 2: 27db ... 15: 1db
	2	<step> 0: 1db 1: 2db 2: 3db 3: 4db(default)
	3	<PcmThRel>: [0...31] (10 by default)
	4	<PcmThMax>: [0...31] (7 by default)
	Echo Cancellation 3: (3 parameters)	
	1	<AlgoParam>: [0...63] (30 by default)
	2	<NoiseThres>: [0...32767] (8000 by default)
	3	<NmbTaps>: [64...256] (256 by default)
	Status	description
	0	Echo Deactivated
	1	Echo Activated for Mic/Spk one
	2	Echo Activated for Mic/Spk two
	3	Reset the product

Note: currently, this command is not be supported.

Example

13.2.11 AT+SSAP

AT+SSAP: config the parameter of audio gain															
Test Command	AT+SSAP=?														
Return	+SSAP: (0-2),(0-1),(0-11),(0-32767) OK														
Read Command	AT+SSAP?														
Return	+SSAP: <mode>,<UL_PGA_gain>,< UL_digital_gain >,< DL_PGA_gain >,< DL_digital_gain ><CR><LF> [+SSAP: <mode>,<UL_PGA_gain>,< UL_digital_gain >,< DL_PGA_gain >,< DL_digital_gain ><CR><LF>] [[+SSAP: <mode>,<UL_PGA_gain>,< UL_digital_gain >,< DL_PGA_gain >,< DL_digital_gain ><CR><LF>]] OK														
Write Command	AT+SSAP=<mode>,<type>,<PGA_gain>,<digital_gain>														
Return	OK														
Reference	The settings will not be saved in MS after system reboot. <mode>: <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 20px;">mode</td> <td>description</td> </tr> <tr> <td>0</td> <td>Set HANDHOLD gain parameter</td> </tr> <tr> <td>1</td> <td>Set HANDFREE gain parameter</td> </tr> <tr> <td>2</td> <td>Set EARPHONE gain parameter</td> </tr> </table> <type> <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 20px;">type</td> <td>description</td> </tr> <tr> <td>0</td> <td>Set downlink gain parameter</td> </tr> <tr> <td>1</td> <td>Set uplink mode gain parameter</td> </tr> </table> <PGA_gain>: the range of PGA_gain is between 0 and 11, which is setting the stimulant gain <digital_gain>: the range of digital_gain is between 0 and 32767, which is setting the digital gain	mode	description	0	Set HANDHOLD gain parameter	1	Set HANDFREE gain parameter	2	Set EARPHONE gain parameter	type	description	0	Set downlink gain parameter	1	Set uplink mode gain parameter
mode	description														
0	Set HANDHOLD gain parameter														
1	Set HANDFREE gain parameter														
2	Set EARPHONE gain parameter														
type	description														
0	Set downlink gain parameter														
1	Set uplink mode gain parameter														
Example	AT+SSAP? +SSAP: 0,7,12288,0,4096 +SSAP: 1,6,32767,2,4096 +SSAP: 2,6,4595,2,5785 OK														

13.2.12 AT+STMF

AT+STMF: store and delete the file in MIDI format	
Test Command	AT+STMF=?
Return	+STMF: (16-47),(1-1024),(1-500) OK

Read Command	AT+STMF?
Return	+STMF: <remain_size>,<total_size> OK
Write Command	AT+STMF=<index>,<block_num>,<block_length> >midi_data (ctrl+z)
Return	OK
Reference	<p>Users input file information via terminal, input Ctrl+Z store or input Esc to give up storing all input data. They can use this command continuously to store more than one block_num(successfully) blocks in the same index.</p> <p>index: 16-47(1-15 are module configured MIDI) block_num: 0-255 block num of input files(0: delete respective midi) block_length: the length of 1-500 files remain_size: 0-192k(space left to store midi) total_size: 192k, maximum space of file to store midi</p>
Example	<p>Write the first data block AT+STMF=16,1,20 >45D678F3E8F9D34249A9(ctrl+z) OK</p> <p>Write the second data block AT+STMF=16,2,20 >87D675F3E8F9C34249A9(ctrl+z) OK</p> <p>Get the size of file 16 AT+STMF=16 +STMF:40 OK</p> <p>Delete MIDI file 16 AT+STMF=16,0 OK</p>

13.2.13 AT+SEQT

AT+SEQT: set the speaker equalizer type	
Test Command	AT+SEQT=?
Return	+SEQT: (0-3) OK
Read Command	AT+SEQT?
Return	+SEQT: <type> OK

Write Command	AT+SEQT=<type>											
Return	OK / ERROR											
Reference	<type>: <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Normal type</td> </tr> <tr> <td>1</td> <td>BASS type</td> </tr> <tr> <td>2</td> <td>ALT type</td> </tr> <tr> <td>3</td> <td>Special effect</td> </tr> </tbody> </table> <p>Default setting: Speaker is set to normal type in default. Note: SM5100B-D module does not support this function</p>		Type	description	0	Normal type	1	BASS type	2	ALT type	3	Special effect
Type	description											
0	Normal type											
1	BASS type											
2	ALT type											
3	Special effect											
Example												

13.2.14 AT+SSEA

AT+SSEA: configure the sound parameters in project mode																									
Test Command	AT+SSEA=?																								
Return	+SSEA: (0-11) OK																								
Read Command	None																								
Return																									
Write Command	AT+SSEA=<mode><CR> > DATA (ctrl+z/ESC)																								
Return	OK / ERROR																								
Reference	<p>The sound parameters are gain via AT command by inputting DATA confirmed by ctrl+z (given by pressing ESC), after command AT+SSEA=<mode><CR> (setting parameters) is performed.</p> <p><mode>: configured parameters</p> <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Set sidetone digital gain parameter</td> </tr> <tr> <td>1</td> <td>Set hand hold gain 1 parameter</td> </tr> <tr> <td>2</td> <td>Set free hand digital gain 1 parameter</td> </tr> <tr> <td>3</td> <td>Set hand hold analog gain parameter</td> </tr> <tr> <td>4</td> <td>Set free hand analog gain parameter</td> </tr> <tr> <td>5</td> <td>Set main MIC equalizer parameter</td> </tr> <tr> <td>6</td> <td>Set supplementary MIC equalizer parameter</td> </tr> <tr> <td>7</td> <td>Set main SPEAKER equalizer parameter</td> </tr> <tr> <td>8</td> <td>Set supplementary SPEAKER equalizer parameter</td> </tr> <tr> <td>10</td> <td>Set hand hold digital gain 2 parameter</td> </tr> <tr> <td>11</td> <td>Set free hand digital gain 2 parameter</td> </tr> </tbody> </table> <p>DATA are parameter values of upload an downloaded transfer. It is in AUTO_TEST_DATA_T ASCII mode and in the same row with</p>	Type	description	0	Set sidetone digital gain parameter	1	Set hand hold gain 1 parameter	2	Set free hand digital gain 1 parameter	3	Set hand hold analog gain parameter	4	Set free hand analog gain parameter	5	Set main MIC equalizer parameter	6	Set supplementary MIC equalizer parameter	7	Set main SPEAKER equalizer parameter	8	Set supplementary SPEAKER equalizer parameter	10	Set hand hold digital gain 2 parameter	11	Set free hand digital gain 2 parameter
Type	description																								
0	Set sidetone digital gain parameter																								
1	Set hand hold gain 1 parameter																								
2	Set free hand digital gain 1 parameter																								
3	Set hand hold analog gain parameter																								
4	Set free hand analog gain parameter																								
5	Set main MIC equalizer parameter																								
6	Set supplementary MIC equalizer parameter																								
7	Set main SPEAKER equalizer parameter																								
8	Set supplementary SPEAKER equalizer parameter																								
10	Set hand hold digital gain 2 parameter																								
11	Set free hand digital gain 2 parameter																								

AUDIO_TEST_DATA. If UL_equalizer_coeff[0]=0x54F2 is going to be set, DATA must begin with “54F2...” with a total length of 352(reserved must be also be filled).

```
Typedef_struct
{
    int16 UL_equalizer_coeff[33];
    int16 DL_equalizer_coeff[33];

    int16 UL_PGA_gain;
    int16 DL_PGA_gain;

    int16 UL_digital_gain;
    int16 DL_digital_gain;
    int16 UL_digital_scale;
    int16 DL_digital_scale;

    int16 midi_PGA_gain_base;
    int16 Digital_sidetone_gain;

    int16 DL_IIR1_coeff[6];
    int16 DL_IIR2_coeff[6];

    int16 reserved[2];
}AUDIO_TEST_DATA_T;
```

Example

14. Special commands

Special commands are related to set and query serial link handler, MIC, SPEAKER, GPIO, NV and so on.

14.1 Overview of special commands

number	command	description
1	AT+SMUX	Configure the multiplexing mode
2	AT+S32K	Allow or forbid entering of sleep mode
3	AT+SIND	Set some status of a system
4	AT+SBAND	Select the frequency of module
5	AT+SMGF	Manage files
6	AT+SMGD	Manage directory
7	AT+SSMP	Require ME be sent in maximum power
8	AT+SSGF	Configure GPIO direction
9	AT+SSGS	Set and query GPIO level
10	AT+SNVM	Manage the NVITEM data through NVITEM id

14.2 Detailed description of GPRS commands

14.2.1 AT+SMUX

AT+SMUX: configure the multiplexing mode, but the default mode will be used, after the product reboot	
Test Command	AT+SMUX=?
Return	+SMUX: <mode> OK
Read Command	AT+SMUX?
Return	+SMUX: <mode> OK
Write Command	AT+SMUX=<mode>
Return	OK / ERROR
Reference	The multiplexing mode refers to the appendix 16.1 <mode>: mode description 0 Multiplexing mode disabled. AT commands should not be used, while the module is transferring data 1 Multiplexing mode enabled. AT commands could be used, while the module is transferring data

Example

14.2.2 AT+S32K

AT+S32K: allow or forbid entering of sleep mode							
Test Command	AT+S32K=?						
Return	+S32K: (0-1) OK						
Read Command	AT+S32K?						
Return	+S32K: <mode> OK						
Write Command	AT+S32K=<mode>						
Return	OK / ERROR						
Reference	<mode>: <table border="0"> <thead> <tr> <th>mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Forbid to enter into sleep mode</td> </tr> <tr> <td>1</td> <td>Allow to enter into sleep mode</td> </tr> </tbody> </table> Note: <mode> can not be saved to NV. The default value is 0 at each time system reboots	mode	description	0	Forbid to enter into sleep mode	1	Allow to enter into sleep mode
mode	description						
0	Forbid to enter into sleep mode						
1	Allow to enter into sleep mode						
Example							

14.2.3 AT+SIND

AT+SIND: set some status of a system which sends indication automatically									
Test Command	AT+SIND=?								
Return	+SIND: (0-1023) OK								
Read Command	AT+SIND?								
Return	+SIND: <IndLevel> OK								
Write Command	AT+SIND=<IndLevel>								
Return	OK / ERROR								
Reference	The status as follows: -----Indication status of the SIM card -----Indication status of the call -----Indication status of the AT command <IndLevel>: <table border="0"> <thead> <tr> <th>Indlevel</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>1(bit-0)</td> <td>SIM card Insert/Remove indications</td> </tr> <tr> <td>2(bit-1)</td> <td>Calling party alert indication</td> </tr> <tr> <td>4(bit-2)</td> <td>Indication that product is ready(except for phonebooks, AOC, SMS), but still in emergency mode</td> </tr> </tbody> </table>	Indlevel	description	1(bit-0)	SIM card Insert/Remove indications	2(bit-1)	Calling party alert indication	4(bit-2)	Indication that product is ready(except for phonebooks, AOC, SMS), but still in emergency mode
Indlevel	description								
1(bit-0)	SIM card Insert/Remove indications								
2(bit-1)	Calling party alert indication								
4(bit-2)	Indication that product is ready(except for phonebooks, AOC, SMS), but still in emergency mode								

8(bit-3)	Indication that the product is ready to process all AT commands
16(bit-4)	Indication that a new call identifier has been created
32(bit-5)	Indication that a call has been released
64(bit-6)	Network service available indication
128(bit-7)	Network lost indication
256(bit-8)	Audio on indication
512(bit-9)	SIM phonebook status indication

If <IndLevel>=0(default value), no indication +SIND:<IndNb>will be sent. Above value is available. The value range is 0<=IndLevel<=1023. Value set by AT+SIND command will be stored in FLASH automatically. Indication format: +SIND: <event>[,<idx>]

<idx>: call id

If the indication is about SIM card phonebook:

+SIND: <event>,<phonebook>,<status>,,<phonebook>,<status>

<phonebook>: SIM phonebook () (.SM., .FD., .LC., .MC.)

<status>:

status	description
0	Not load from SIM
1	loaded from SIM

<event>:

Event	description
0	SIM card removed
1	SIM card inserted
2	Ring melody
3	AT module is partially ready
4	AT module is totally ready
5	ID of released calls
6	Released call whose ID=<idx>
7	The network service is available for an emergency call
8	The network is lost
9	Audio ON
10	Show the status of each phonebook after init phrase
11	Registered to network

Example

14.2.4 AT+SBAND

AT+SBAND: select the frequency of module(such as GSM900)

Test Command	AT+SBAND=?
Return	+SBAND: (0-10) OK

Read Command	AT+SBAND?	
Return	+SBAND: <current value> OK	
Write Command	AT+SBAND=<value>	
Return	OK	
Reference	value:0-10	
	value	description
	0	GSM900
	1	DCS1800
	2	PCS1900
	3	GSM850
	4	GSM900&DCS1800
	5	GSM850&GSM900
	6	GSM850&DCS1800
	7	GSM850&PCS1900
	8	GSM900&PCS1900
	9	GSM850&GSM900&DCS1800
	10	GSM850&GSM900&PCS1900
Example		

14.2.5 AT+SMGF

AT+SMGF: manage files. Users can use this command more than once to store more than (continuous) data blocks of block_num in the same <file_name>		
Test Command	AT+SMGF=?	
Return	+SMGF: (0-5),,(0-65535),(1-1024),(0-65535), OK	
Read Command	AT+SMGF?	
Return	+SMGF: (free space),(used space) OK	
Write Command	AT+SMGF=<mode>,[“<filename>”,<block_num>,<block_length>,<block_total>,”<new file name>”]	
Return	OK / ERROR	
Reference	<mode>:	
	mode	description
	0	Read a file
	1	Read the size of a file
	2	Delete a file
	3	Add a file
	4	Replace a file
	5	Rename a file
	<block_num>: 1-65535 of transferred files, the first block must be block_num=1.	

<block_length>: the length of the downloaded data block(its max value is 1024), which must be consistent with the length of transferred data.

<block_total>: total number of downloaded data block with a range of 1-65535.

<file_name>: the name in HEX style(includes direct path)

<new file name>: modified file name in HEX style(includes direct path)

Example

read file "FILE/PIC/PHOTO.GIF":

```
AT+SMGF=0,"46494C452F5049432F47462E474946",0
```

```
+SMGF: <total_num>,<block_ID>,<block_size>,data
```

OK

read the size of file "FILE/PIC/PHOTO.GIF":

```
AT+SMGF=1,"46494C452C5049432F47462E474946"
```

```
+SMGF: <file size>
```

OK

Delete file "FILE/PIC/ PHOTO.GIF":

```
AT+SMGF=2,"46494C452C5049432F47462E474946"
```

OK

Add a new file "FILE/PIC/ PHOTO.GIF":

```
AT+SMGF=3,"46494C452C5049432F47462E474946",1,10,10
```

```
>A5b7d7089<ctrl+z>
```

OK

```
AT+SMGF=3,"46494C452C5049432F47462E474946",2,10,10
```

```
>A5b7d7089<ctrl+z>
```

OK

Replace file "FILE/PIC/ PHOTO.GIF"(if it is the first time, <block_ID> must be 1):

```
AT+SMGF=4,"46494C452C5049432F47462E474946",1,10,10
```

```
>A5b7d7089<ctrl+z>
```

OK

Rename file "FILE/PIC/OLD.GIF" to "FILE/PIC/NEW.GIF":

```
AT+SMGF=5,"46494C452F5049432F4F4C442E474946",0,1,0,"46494C452
```

```
F5049432F4E5572E474946"
```

OK

14.2.6 AT+SMGD

AT+SMGD: manage directory

Test Command AT+SMGD=?

Return	+SMGD: (0-3),, OK										
Read Command	None										
Return											
Write Command	AT+SMGD=<mode>,"<dir name>","["<new dir name>"]										
Return	OK / ERROR										
Reference	<p><mode>:</p> <table border="1"> <thead> <tr> <th>Mode</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Query a directory</td> </tr> <tr> <td>1</td> <td>Add a directory</td> </tr> <tr> <td>2</td> <td>Delete a directory</td> </tr> <tr> <td>3</td> <td>Rename a directory</td> </tr> </tbody> </table> <p><dir_name>: directory name in HEX style(includes direct path)</p>	Mode	description	0	Query a directory	1	Add a directory	2	Delete a directory	3	Rename a directory
Mode	description										
0	Query a directory										
1	Add a directory										
2	Delete a directory										
3	Rename a directory										
Example	<p>Query directory "FILE/PIC": AT+SMGD=0,"46494C452F504943" +SMGD:128,22129664,FILE/PIC OK</p> <p>Add directory "FILE/PIC": AT+SMGD=1,"46494C452F504943" OK</p> <p>Delete directory "FILE/PIC": AT+SMGD=2,"46494C452F504943" OK</p> <p>Rename directory "FILE/PIC" to "FILE/MIDP": AT+SMGD=3,"46494C452F504943","46494C452F4D494449" OK</p>										

14.2.7 AT+SSMP

AT+SSMP: require ME be sent in maximum power	
Test Command	None
Return	
Read Command	None
Return	
Write Command	AT+SSMP
Return	OK / ERROR
Reference	
Example	

14.2.8 AT+SSGF

AT+SSGF: configure GPIO direction													
Test Command	AT+SSGF=?												
Return	+SSGF: (0-255),(0-1),(0-1) OK												
Read Command	None												
Return													
Write Command	AT+SSGF=<gpio_id>,<type>,<value>												
Return	[+SSGF: <value>] OK or ERROR												
Reference	<p><gpio_id>: the max range of gpio_id is between 0 and 255. The available id number is determined by the chip type.</p> <p><type>:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Set GPIO direction</td> </tr> <tr> <td>1</td> <td>Get GPIO direction</td> </tr> </tbody> </table> <p><value>: this parameter is invalid when the type set to 1</p> <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Set the GPIO to input direction when type=0</td> </tr> <tr> <td>1</td> <td>Set the GPIO to output direction when type=1</td> </tr> </tbody> </table> <p>Note: this command will change GPIO function, and inappropriate setting will cause system exception.</p>	Type	description	0	Set GPIO direction	1	Get GPIO direction	Type	description	0	Set the GPIO to input direction when type=0	1	Set the GPIO to output direction when type=1
Type	description												
0	Set GPIO direction												
1	Get GPIO direction												
Type	description												
0	Set the GPIO to input direction when type=0												
1	Set the GPIO to output direction when type=1												
Example	<p>Set GPIO 6 to output direction:</p> <pre>AT+SSGF=6,0,1 OK</pre> <p>Get GPIO 6 direction setting:</p> <pre>AT+SSGF=6,1 +SSGF:1 OK</pre>												

14.2.9 AT+SSGS

AT+SSGS: set and query GPIO level. The operation will fail when the appointed gpio direction does not set to output direction	
Test Command	AT+SSGS=?
Return	+SSGF: (0-255),(0-1),(0-1) OK
Read Command	None

Return													
Write Command	AT+SSGS=<gpio_id>,<type>,<value>												
Return	+SSGS: [<value>] OK or ERROR												
Reference	<p><gpio_id>: the max range of gpio_id is between 0 and 255. The available id number is determined by the chip type.</p> <p><type>:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Set GPIO level</td> </tr> <tr> <td>1</td> <td>Get GPIO level</td> </tr> </tbody> </table> <p><value>: this parameter is invalid when the type set to 1</p> <table border="1"> <thead> <tr> <th>Type</th> <th>description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Set the GPIO level to low(0) when type=0</td> </tr> <tr> <td>1</td> <td>Set the GPIO level to high(1) when type=1</td> </tr> </tbody> </table>	Type	description	0	Set GPIO level	1	Get GPIO level	Type	description	0	Set the GPIO level to low(0) when type=0	1	Set the GPIO level to high(1) when type=1
Type	description												
0	Set GPIO level												
1	Get GPIO level												
Type	description												
0	Set the GPIO level to low(0) when type=0												
1	Set the GPIO level to high(1) when type=1												
Example	<pre> AT+SSGS=7,0,1 Ok AT+SSGS=7,0,0 OK AT+SSGS=7,1 +SSGS: 0 OK </pre>												

14.2.10 AT+SNVM

AT+SNVM: manage the NVITEM data through NVITEM id	
Test Command	AT+SNVM=?
Return	+SNVM: (0-4),(0-1199),(0-1199)
Read Command	None
Return	
Write Command	AT+SNVM=<type>,<nvitem_id>[,<nvitem_id_end>]
Return	OK / ERROR
Reference	<p>This function is only supported by the module production, and the total nvitem data size is determined according to the type of module.</p> <p><type>:</p> <p><type>=0 means to read the appointed NEITEM id's data and the data will be output as HEX format. The output of this command as the following:</p> <p>+SNVM: <length>,<HEX_DATA></p>

OK

Which the <length> indicates the NVITEM data size in binary.

<type>=1 means to write NVITEM id's data into module and the original data will be erased if existing without any prompt. This command will output ">" as a hint for input data. Using <ctrl+z> as the terminator character of input or <ESC> to cancel the input data. The data length of a NVITEM id will not exceed 512 bytes in binary.

<type>=2 means to replace the appointed NVITEM id's data. This command will write data into module if the destination NVITEM id is unoccupied and will erase the data if appointed NVITEM id's data exists already. This command will output ">" as a hint for input data. Using <ctrl+z> as the terminator character of input or <ESC> to cancel the input data. The data length of a NVITEM id will not exceed 512 bytes in binary.

<type>=3 means to query the appointed NVITEM id's data size and the output format as the following:

+SNVM: <length>

OK

<type>=4 means to delete the appointed NVITEM id range data. The NVITEM id range from <nvitem_id> to <nvitem_id_end>, and if <nvitem_id_end> is absence, then only the <nvitem_id> will be erased.

<nvitem_id>: indicates the current operate NVITEM id. The <NVITEM_ID> range is from 0 to 1199.

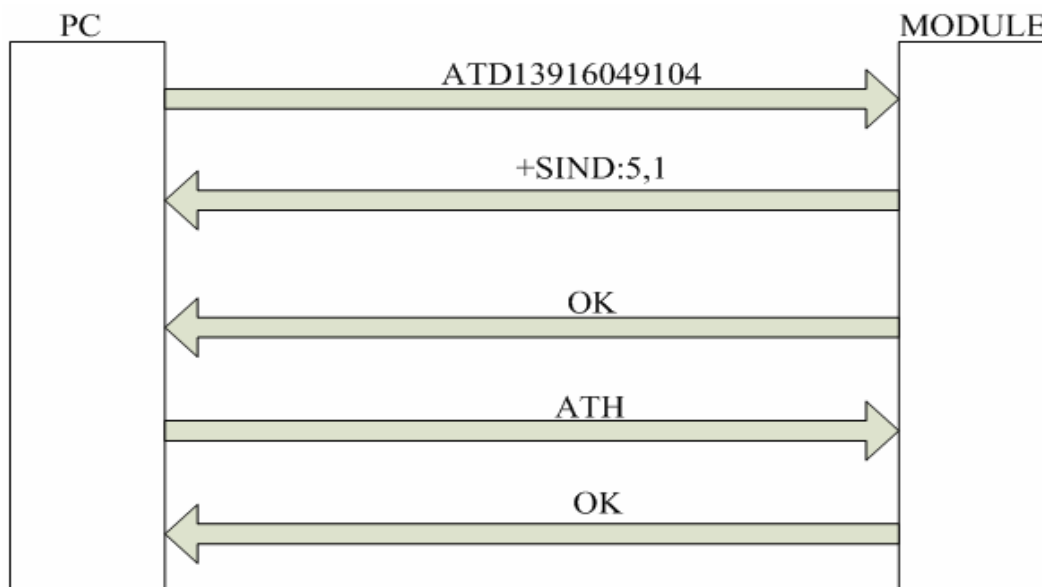
<nvitem_id_end>: This parameter is valid only when parameter <type>=4, and will be discard in others case. When <type>=4, this command will delete NVITEM data from <nvitem_id> to <nvitem_id_end>. If <nvitem_id_end> is absence, then only <nvitem_id> will be deleted. The parameter <nvitem_id_end> should equal or lager than <nvitem_id> if available.

Example

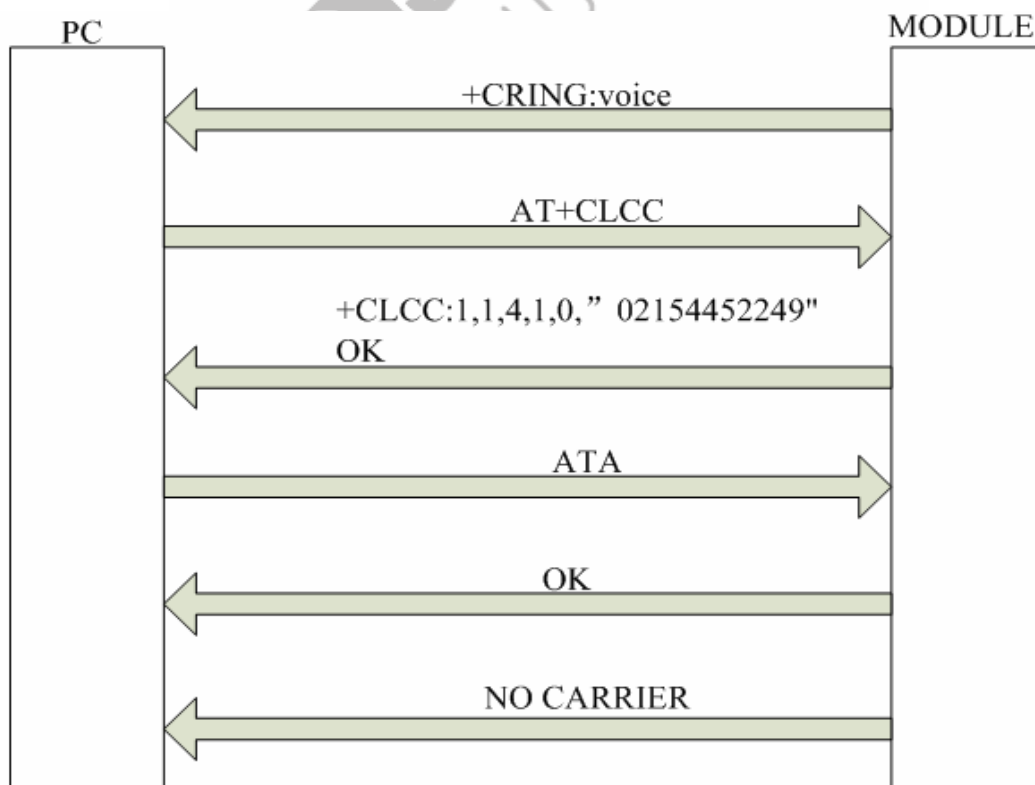
```
AT+SNVM=1,6
>30313233343536<ctrl+z>
OK
```

15. MSC illustration

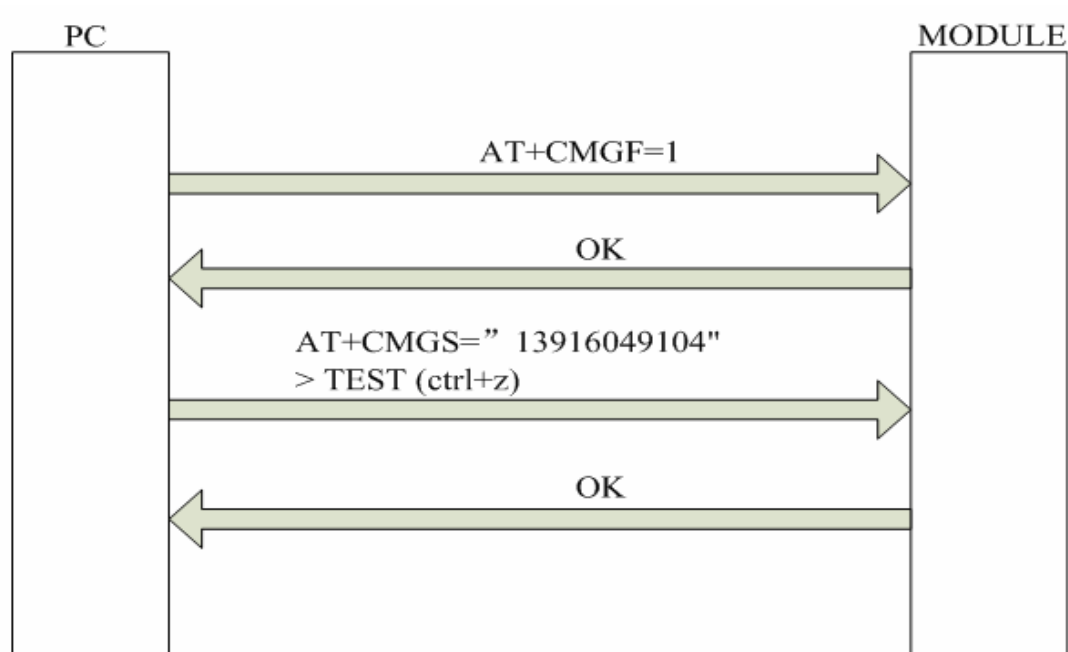
15.1 MO call



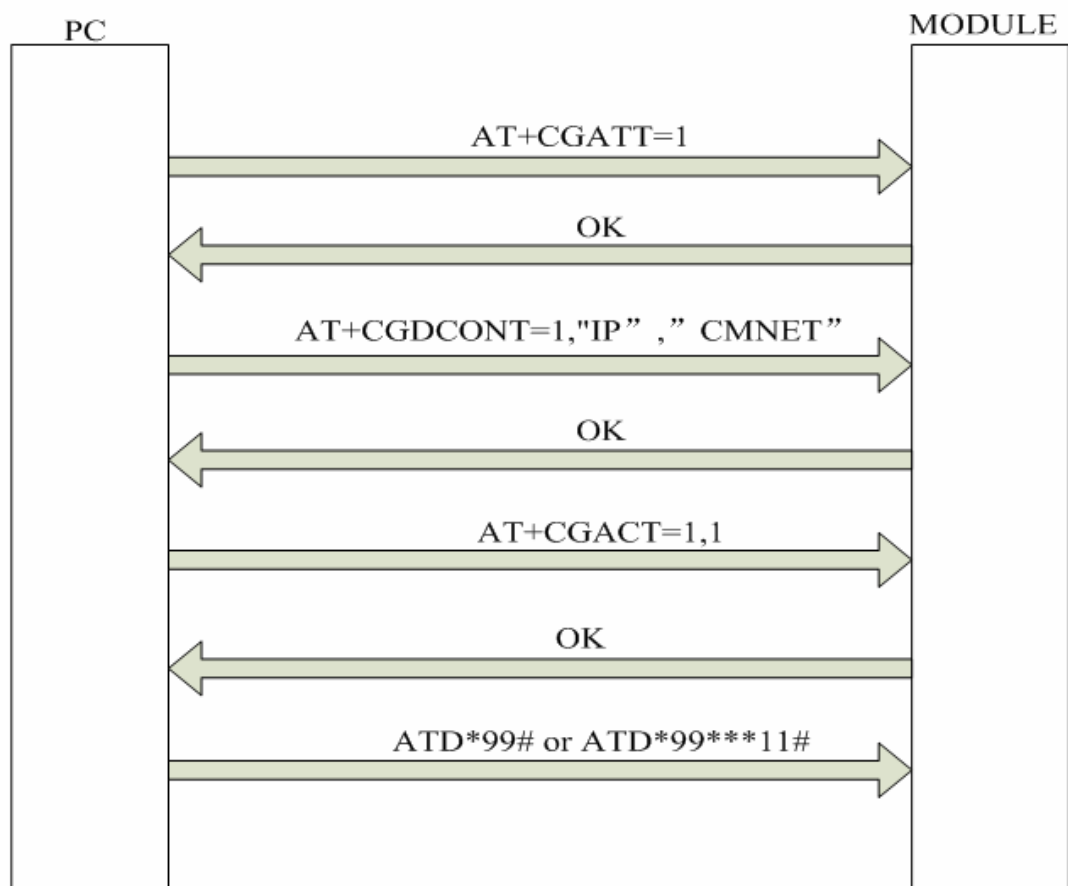
15.2 MT call



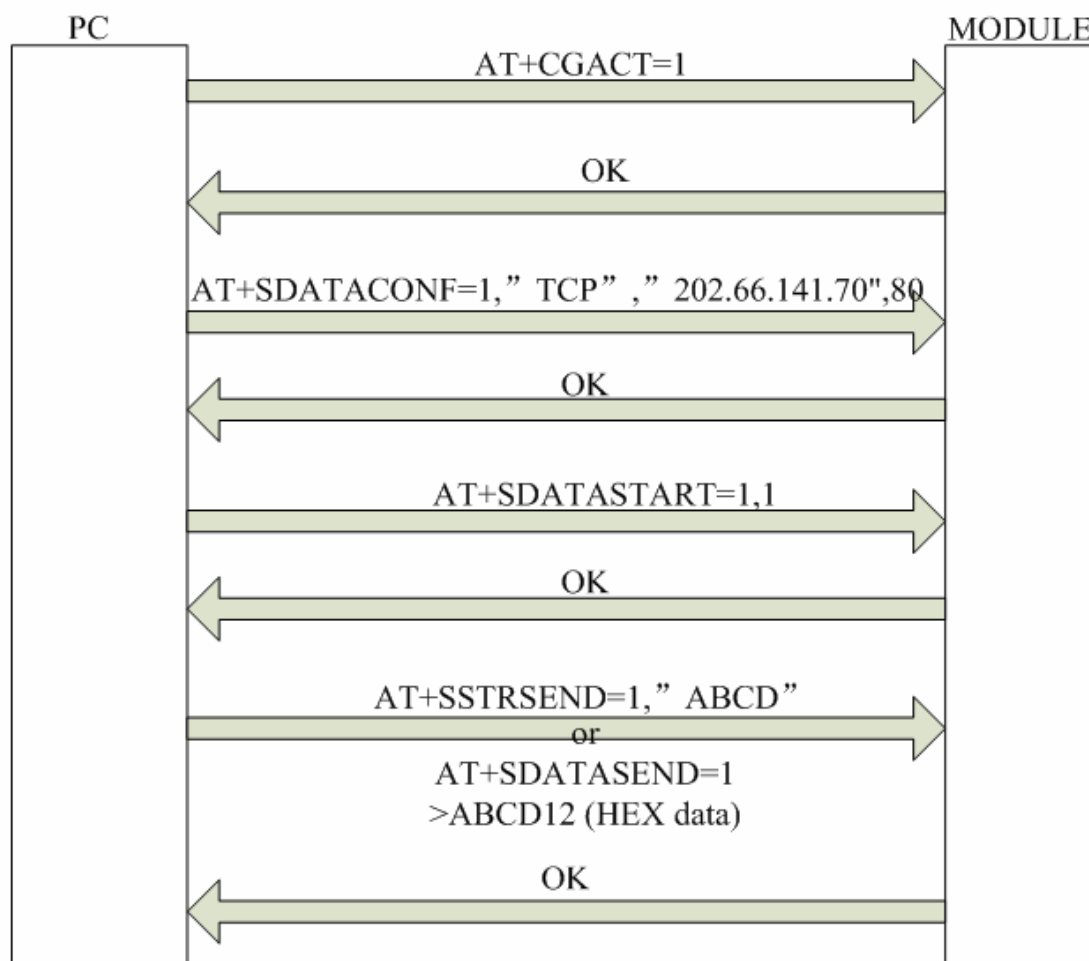
15.3 SMS



15.4 GPRS connect



15.5 Send GPRS data manually



16. Appendix

16.1 Multiplexing protocol

16.1.1 Introduction

The Sendtrue multiplexing protocol operates between a DCE(Data Communication Equipment:the product) and a DTE(Data Terminal Equipment). It allows a double session over a serial interface: one for AT commands and one for DATA communications.

When AT+SMUX=1, activate the multiplexing mode. AT commands DATA communications are encapsulated into packets conforming to the protocol. The header of these packets allows to recognize whether it is a DATA packet or an AT command packet. AT+SMUX=0 deactivates multiplexing protocol. This appendix presents how the multiplexing mode deals with AT commands and data flow. It also describes the format of DATA and AT command packets.

16.1.2 AT commands packets

An AT command is encapsulated into a packet with a header which allows to separate it from DATA packets. This command is formed by a header(3 BYTE), the AT command itself and a CHECKSUM(1 BYTE):

B7	B6	B5	B4	B3	B2	B1	B0
Start pattern,0Xaa							
AT command length LSB							
AT command pattern,0x1D				AT command length MSB			
AT command							
Checksum							

The first byte(0xAA) is used to identify the packet.

The second byte represents the 8 LSB(Low Significant Bits) bits of the length of the AT commands.

The third byte consists of two parts: the 3 LSB bits are the 3 MSB(Most Significant Bit) bits of the length of AT command; the 5 MSB(0xE8)are used to identify an AT command(the maximum possible length of AT command is 2047 bytes. Currently, the system supports the maximum length of AT command is 1100 bytes).

CHECKSUM is the addition of all the bytes.

16.1.3 Data packets

Header and data together can identify AT commands. The packet is composed of header (3 BYTE), data and CHECKSUM (1 BYTE):

B7 B6 B5 B4 B3 B2 B1 B0
Start pattern,0xDD
Data packet length LSB
Data packet type length LSB | Data packet
Data Bytes
Checksum

The first byte(0xDD) is used to identify the packet.

The second byte represents the 8 LSB(Low Significant Bits) bits of the length of the data field.

The third byte consists of two parts: the 3 LSB bits are the 3 MSB bits of the length of data field; the 5 MSB represents the packet type(the maximum possible length of data package is 2047 bytes.

Currently, the system supports the maximum length of data package is 1600 bytes).

The value of data is according to the type of packet:

0--data packet: contains the data to be transmit

1--status packet: includes SA,SB,X bits(1)and breaks condition codes as follows:

S	S	X	BR	R	Spar	Spar	Spar
A	B		K	I	e	e	e

2--READY packet: the packet indicates that the target is ready to receive data.

3--BUSY packet: the packet indicates that the target is busy and can not receive data.

Currently, other values are not used.

CHECKSUM is addition of all the transmitted bytes.

16.2 Result code

If the returned value indicates something wrong, different results can be achieved by AT+CMEE=<value>. The table below lists the possible values of returned wrong numeric error code and their description (except those corresponding with short messages):

number	numeric error code	detailed description
1	+CME ERROR:0	+CME ERROR: phone failure
2	+CME ERROR:1	+CME ERROR: no connection to phone
3	+CME ERROR:2	+CME ERROR: phone-adaptor link reserved
4	+CME ERROR:3	+CME ERROR: operation not allowed
5	+CME ERROR:4	+CME ERROR: operation not supported
6	+CME ERROR:5	+CME ERROR: PH-SIM PIN required
7	+CME ERROR:6	+CME ERROR: PH-FSIM PIN required
8	+CME ERROR:7	+CME ERROR: PH-FSIM PUK required
9	+CME ERROR:10	+CME ERROR: SIM not inserted
10	+CME ERROR:11	+CME ERROR: SIM PIN required
11	+CME ERROR:12	+CME ERROR: SIM PUK required
12	+CME ERROR:13	+CME ERROR: SIM failure
13	+CME ERROR:14	+CME ERROR: SIM busy

14	+CME ERROR:15	+CME ERROR: SIM wrong
15	+CME ERROR:16	+CME ERROR: incorrect password
16	+CME ERROR:17	+CME ERROR: SIM PIN2 required
17	+CME ERROR:18	+CME ERROR: SIM PUK2 required
18	+CME ERROR:20	+CME ERROR: memory full
19	+CME ERROR:21	+CME ERROR: invalid index
20	+CME ERROR:22	+CME ERROR: not found
21	+CME ERROR:23	+CME ERROR: memory failure
22	+CME ERROR:24	+CME ERROR: text string too long
23	+CME ERROR:25	+CME ERROR: invalid characters in text string
24	+CME ERROR:26	+CME ERROR: dial string too long
25	+CME ERROR:27	+CME ERROR: invalid characters in dial string
26	+CME ERROR:28	+CME ERROR: GPRS operation failure
27	+CME ERROR:29	+CME ERROR: GPRS send data failure
28	+CME ERROR:30	+CME ERROR: no network service
29	+CME ERROR:31	+CME ERROR: network timeout
30	+CME ERROR:32	+CME ERROR: network not allowed - emergency calls only
31	+CME ERROR:40	+CME ERROR: network personalisation PIN required
32	+CME ERROR:41	+CME ERROR: network personalisation PUK required
33	+CME ERROR:42	+CME ERROR: network subset personalisation PIN required
34	+CME ERROR:43	+CME ERROR: network subset personalisation PUK required
35	+CME ERROR:44	+CME ERROR: service provider personalisation PIN required
36	+CME ERROR:45	+CME ERROR: service provider personalisation PUK required
37	+CME ERROR:46	+CME ERROR: corporate personalisation PIN required
38	+CME ERROR:47	+CME ERROR: corporate personalisation PUK required
39	+CME ERROR:60	+CME ERROR: AT command discarded
40	+CME ERROR:62	+CME ERROR: SIM card reject by network
41	+CME ERROR:63	+CME ERROR: SIM card service not available
42	+CME ERROR:64	+CME ERROR: SIM card PIN uninitialized
43	+CME ERROR:65	+CME ERROR: SIM card PIN blocked
44	+CME ERROR:66	+CME ERROR: SIM card PUK blocked
45	+CME ERROR:100	+CME ERROR: unknown
46	+CME ERROR:103	+CME ERROR: Illegal MS
47	+CME ERROR:106	+CME ERROR: Illegal ME
48	+CME ERROR:107	+CME ERROR: GPRS services not allowed
49	+CME ERROR:111	+CME ERROR: PLMN not allowed
50	+CME ERROR:112	+CME ERROR: Location area not allowed

51	+CME ERROR:113	+CME ERROR: Roaming not allowed in this location area
52	+CME ERROR:132	+CME ERROR: Service option not supported
53	+CME ERROR:133	+CME ERROR: Requested service option not subscribed
54	+CME ERROR:134	+CME ERROR: Service option temporarily out of order
55	+CME ERROR:149	+CME ERROR: PDP authentication failure
56	+CME ERROR:533	+CME ERROR: Missing or unknown APN

The table below lists the possible numeric error code detailed description in SMS:

num	numeric error code	detailed description
1	+CMS ERROR: 301	+ CMS ERROR: SMS ME reserved
2	+CMS ERROR: 302	+ CMS ERROR: Operation not allowed
3	+CMS ERROR: 303	+ CMS ERROR: Operation not supported
4	+CMS ERROR: 304	+ CMS ERROR: Invalid PDU mode
5	+CMS ERROR: 305	+ CMS ERROR: Invalid text mode
6	+CMS ERROR: 310	+ CMS ERROR: SIM not inserted
7	+CMS ERROR: 311	+ CMS ERROR: SIM PIN required
8	+CMS ERROR: 312	+ CMS ERROR: SIM failure
9	+CMS ERROR: 313	+ CMS ERROR: SIM PUK required
10	+CMS ERROR: 316	+ CMS ERROR: SIM PIN2 required
11	+CMS ERROR: 317	+ CMS ERROR: SIM PUK2 required
12	+CMS ERROR: 318	+ CMS ERROR: SIM failure
13	+CMS ERROR: 321	+ CMS ERROR: Invalid memory index
14	+CMS ERROR: 322	+ CMS ERROR: SIM memory full
15	+CMS ERROR: 330	+ CMS ERROR: SMSC address unknown
16	+CMS ERROR: 334	+ CMS ERROR: no +CNMA acknowledgement expected

The table below lists the possible numeric error code detailed description in call or GPRS service:

num	numeric error code	detailed description
1	+CEER: Error 0	+ CEER ERROR: no detail information
2	+CEER: Error 1	+ CEER ERROR: unassigned number
3	+CEER: Error 3	+ CEER ERROR: no route to destination
4	+CEER: Error 6	+ CEER ERROR: unacceptable channel
5	+CEER: Error 8	+ CEER ERROR: operator determinate barring
6	+CEER: Error 16	+ CEER ERROR: normal clearing
7	+CEER: Error 17	+ CEER ERROR: user busy
8	+CEER: Error 18	+ CEER ERROR: no user responding
9	+CEER: Error 19	+ CEER ERROR: alerting no answer
10	+CEER: Error 21	+ CEER ERROR: call rejected

11	+CEER: Error 22	+ CEER ERROR: number changed
12	+CEER: Error 26	+ CEER ERROR: nonselect user clearing
13	+CEER: Error 27	+ CEER ERROR: destination out of order
14	+CEER: Error 28	+ CEER ERROR: invalid number format
15	+CEER: Error 29	+ CEER ERROR: facility rejected
16	+CEER: Error 30	+ CEER ERROR: response to status query
17	+CEER: Error 31	+ CEER ERROR: normal unspecified
18	+CEER: Error 34	+ CEER ERROR: no circuit channel available
19	+CEER: Error 38	+ CEER ERROR: net out of order
20	+CEER: Error 41	+ CEER ERROR: temporary failure
21	+CEER: Error 42	+ CEER ERROR: switch congestion
22	+CEER: Error 43	+ CEER ERROR: access information discarded
23	+CEER: Error 44	+ CEER ERROR: request circuit channel unavailable
24	+CEER: Error 47	+ CEER ERROR: resources unavailable
25	+CEER: Error 49	+ CEER ERROR: QOS unavailable
26	+CEER: Error 50	+ CEER ERROR: request facility not subscribe
27	+CEER: Error 55	+ CEER ERROR: CUG incoming barred
28	+CEER: Error 57	+ CEER ERROR: bear capability not authorization
29	+CEER: Error 58	+ CEER ERROR: bear capability unavailable
30	+CEER: Error 63	+ CEER ERROR: service unavailable
31	+CEER: Error 65	+ CEER ERROR: bear service not implement
32	+CEER: Error 68	+ CEER ERROR: ACM equal or great ACMMAX
33	+CEER: Error 69	+ CEER ERROR: request facility not implement
34	+CEER: Error 70	+ CEER ERROR: only restrict digital available
35	+CEER: Error 79	+ CEER ERROR: service option not implement
36	+CEER: Error 81	+ CEER ERROR: invalid ti
37	+CEER: Error 87	+ CEER ERROR: user not in CUG
38	+CEER: Error 88	+ CEER ERROR: incompatibility destination
39	+CEER: Error 91	+ CEER ERROR: invalid transit net
40	+CEER: Error 95	+ CEER ERROR: invalid message semantic
41	+CEER: Error 96	+ CEER ERROR: mandatory IE error
42	+CEER: Error 97	+ CEER ERROR: message nonexistent
43	+CEER: Error 98	+ CEER ERROR: message uncompatibility error
44	+CEER: Error 99	+ CEER ERROR: IE nonexistent
45	+CEER: Error 100	+ CEER ERROR: invalid condition IE
46	+CEER: Error 101	+ CEER ERROR: message incompatibility state
47	+CEER: Error 102	+ CEER ERROR: recover on timer
48	+CEER: Error 111	+ CEER ERROR: protocol error
49	+CEER: Error 127	+ CEER ERROR: interworking
50	+CEER: Error 150	+ CEER ERROR: authentication rejected
51	+CEER: Error 151	+ CEER ERROR: emergency call only
52	+CEER: Error 152	+ CEER ERROR: IMSI detach
53	+CEER: Error 153	+ CEER ERROR: T3230 expiry

54	+CEER: Error 154	+ CEER ERROR: connection error
55	+CEER: Error 171	+ CEER ERROR: no network service
56	+CEER: Error 172	+ CEER ERROR: emergency call only
57	+CEER: Error 173	+ CEER ERROR: normal disconnect
58	+CEER: Error 174	+ CEER ERROR: remote disconnect
59	+CEER: Error 175	+ CEER ERROR: low failure
60	+CEER: Error 176	+ CEER ERROR: network reject
61	+CEER: Error 177	+ CEER ERROR: no cell
62	+CEER: Error 202	+ CEER ERROR: supplement not provide


CONFIDENTIAL