Document Name: U6100 AT Command Set

Version: 1.31

Date: Jan. 1st, 2009

DocId: U6100_ATC_V1.31

Status: Confidential / Released

LONGSUNG Cellular Engine

The document is offered to support U6100 module application and development, which is provided to LONGSUNG's customers for testing, evaluation, integration and information purposes.

LONGSUNG reserves the right to make changes without further notice to any products herein. LONGSUNG makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does LONGSUNG assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. LONGSUNG does not convey any license under its patent rights nor the rights of others.

Copyright

VERSION HISTORY

Version	Author	Date	Chapter	What is new
V1.0	DuanPeng	2008-6-2		Create
V1.1	Yonghong Xie	2008-7-4		Modified
V1.2	Bian Shaohui	2008-8-15		Modified 5.2.10
V1.3	Xiong Haiqiao	2008-11-20		1.changed the description for ATH and AT+chup 2.Delete AT+MYTYPE, AT+DEVCHG, AT+BOOTDEV 3. Add AT+DISK
V1.31	Xiong Haiqiao	2009-1-1		1.add AT+VTS 2.add AT+PID 3.add AT+CLUT 4.add AT+CMUT

Contents

Table Index

1. Introduction

1.1 Scope of document

This document describes the AT Command Set for LONGSUNG UMTS/HSPA module U6100.

1.2 Abbreviations

1) ME: Mobile Equipment
2) MS: Mobile Station
3) TA: Terminal Adapter
4) DCE: Data Communication Equipment
5) TE: Terminal Equipment
6) DTE: Data Terminal Equipment

1.3 AT Command syntax

The AT command set implemented by U6100 is a combination of GSM07.05, GSM07.07, ITU-T recommendation V.25ter and the extended ones.
All these AT commands include three parts: “basic”, “S parameter”, and “extended”.

1.4 BASIC

These AT commands have the format of “AT<x><n>”, or “AT&<x><n>”, where “<x>”is the command, and “<n>”is/are the argument(s) for that command. An example of this is “ATE<n>”, which tells the DCE whether received characters should be echoed back to the DTE according to the value of “<n>”. “<n>” is optional and a default which is used if missing.

1.5 S PAREMETER

These AT commands have the format of “ATS<n>=<m>”, where “<n>” is the index of the S register to set, and “<m>”is the value to assign. “<m>” is optional; if it is missing, then a default value is assigned.

1.6 EXTENDED

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

Table 1: Type of AT command and response

Test command	AT+<x>=?	The mobile equipment returns the list of parameters and value ranges set with the corresponding Write command or by internal process.
Read command	AT+<x>?	This command returns the current set value of the parameter.
Write command	AT+<x>=<…>	This command sets the user-defined parameter value.
Execution command	AT+<x>	The execution command

1.7 Combining AT commands on the same command line

You can enter several AT commands on the same line. In this case, you do not need to type the “AT” or “at” prefix before every command. Instead, you only need type “AT” or “at” at the beginning of the command line. Please note to use a semicolon as command delimiter.

The command line buffer can accept a maximum of 256 characters. If the characters entered exceed the limitation then none of the command will executed and TA will

returns “ERROR”.

1.8 Entering successive AT commands on separate lines

When you need to enter a series of AT commands on separate lines, please note that you need to wait to enter the next AT command until the final response (for example OK, CME error, CMS error) of last AT command.

1.9 Supported character sets

The U6100 supports the following character sets:

1）GSM

2）UCS2

3）IRA

The character set can be set and interrogated using the “AT+CSCS” command (GSM 07.07).

2. AT Commands According to V.25TER

These AT command are designed according to the ITU-T (International Telecommunication Union, Telecommunication sector) V.25ter document.

2.1 Overview of AT Commands According to V.25TER

Command	Description
ATD	MOBILE ORIGINATED CALL TO DIALABLE NUMBER
ATD>	ORIGINATE CALL TO PHONE NUMBER IN PHONE BOOK
ATDL	REDIAL LAST TELEPHONE NUMBER USED

ATA	ANSWER INCOMING CALL
ATH	DISCONNECT EXISTING CSD DataCall CONNECTION
ATS0	SET NUMBER OF RINGS BEFORE AUTOMATICALLY ANSWERING THE CALL
+++	SWITCH FROM DATA MODE OR PPP ONLINE MODE TO COMMAND MODE
ATO	SWITCH FROM COMMAND MODE TO DATA MODE

2.2 Detailed Description of AT Commands According to V.25TER

2.2.1 ATD Mobile originate call to dial a number

ATD<str>[;]	Note: This command may be aborted generally by receiving a AT ＋CHUP or ATH command or a character during execution. The aborting is not possible during some states of connection establishment such as handshaking. If no dial tone and (parameter setting ATX2 or ATX4) returns NO DIALTONE If busy and (parameter setting ATX3 or ATX4) returns BUSY If a connection cannot be established returns NO CARRIER If connection successful and non-voice call. CONNECT<text> TA switches to data mode. Note: <text> output only if ATX <value> parameter setting with the <value> >0

	When TA returns to command mode after call release OK If connection successful and voice call OK Response in case of voice call, if successfully connected OK
	Parameter: **<str>:** string of dialling digits and optionally V.25ter modifiers dialling digits:0～9 **<;>** only required to set up voice call , return to command state
Reference GSM07.07/ V.25TER/ GSM02.30	Note: 1. The Max. length of dialling digits is 20 2. The prefix ”+” is not counted to the length of dialling digits. 3. <str> is default for last number that can be dialled by ATDL

2.2.2 ATD> Direct dialling from phonebook

ATD><str>[I][;] **ATD>mem<n>[I][;]** **ATD><n>[I][;]**	Note: This command may be aborted generally by receiving a AT + CHUP or ATH command or a character during execution. The aborting is not possible during some states of connection establishment such as handshaking. If error is related to ME functionality +CME ERROR: <err> If a connection cannot be established NO CARRIER If connection successful OK
	Parameter:

	[;] only required to set up voice call <str>: Name， should be citing by double quotation marks <n>: Integer type memory location should be in the range of locations available in the memory used [I] : Actives CLIR (Disables presentation of own number to called party) mem: Phonebook "DC" ME dialled calls list "FD" SIM fix dialling-phonebook "LD" SIM dialled calls list "MC" ME missed (unanswered received) calls list "ME" ME phonebook "ON" SIM (or ME) own numbers (MSISDNs) list "RC" ME received calls list "SM" SIM phonebook
Reference GSM07.07/ V.25TER/ GSM02.30	

2.2.3 ATDL Redial last telephone number used

ATDL	Redial last telephone number used The response is as same as **ATD**
Reference GSM07.07/V.25TER/GSM02.30	

2.2.4 ATA Answers a call

ATA	Response TA sends off-hook to the remote station. Note1: Any additional commands on the same command line are ignored. Note2: This command may be aborted generally by receiving a character during execution. The aborting is not possible during some states of connection establishment such as handshaking. Response in case of data call, if successfully connected CONNECT<text> TA switches to data mode. Note: <text> output only if ATX <value> parameter setting with the <value> >0 When TA returns to command mode after call release OK Response in case of voice call, if successfully connected OK Response if no connection NO CARRIER
Reference V.25ter	Note: ATA responds coming call by RING. It will display the calling phone number if CLIP (Calling Line Identity Indication Presentation) function is set ATA will return NO CARRIER for responding hang up after connection,

2.2.5 ATH Disconnect existing CSD DataCall connection

ATH	Disconnect existing CSD DataCall connection

	OK
Reference: V.25ter	Note: Only used for CS Domain Data Call.

2.2.6 ATS0 Set number of rings before automatically answering the call

ATS0=?	Response **ERROR** **not support at present.**
ATS0?	Response The value what is set now **S0：<n>** **OK**
ATS0 =< n >	Response This parameter setting determines the number of rings before auto-answer. OK If error **ERROR**
	Parameter **<n>**：0 automatic answering is disable 1-255 enable automatic answering on the ring number specified
Reference V.25TER	

2.2.7 +++ Switch from data mode or PPP online mode to command mode

+++	Response **OK**
Reference v.25.ter	Switching DCE from data mode or PPP online mode to command mode

2.2.8 ATO Switch from command mode to data mode

ATO	Response OK
Reference v.25.ter	Switching DCE from command mode to data mode

3. AT Commands According to GSM07.05

3.1 Overview of AT Commands According to GSM07.05

Command	Description
AT+CPMS	PREFERRED SMS MESSAGE STORAGE
AT+CMGF	SELECT SMS MESSAGE FORMAT
AT+CSCA	SET SMS SERVICE CENTER ADDRESS
AT+CSMP	SELECT SMS MESSAGE FORMAT
AT+CNMI	NEW SMS MESSAGE INDICATIONS

AT+CMGL	LIST SMS MESSAGES FROM PREFERRED STORE
AT+CMGR	READ SMS MESSAGE
AT+CMGS	SEND SMS MESSAGE
AT+CMSS	SEND SMS MESSAGE FROM STORAGE
AT+CMGW	WRITE SMS MESSAGE TO MEMORY
AT+CMGD	DELETE SMS MESSAGE
AT+CSMS	SELECT MESSAGE SERVICE
AT+CSDH	SHOW SMS TEXT MODE PARAMETERS
AT+CSCB	SELECT CELL BROADCAST SMS MESSAGES
AT+CMMS	SEND SEVERAL SMS MESSAGES ONE TIME
AT+CMGPR	PREVIEW SMS MESSAGE

3.2 Detailed Description of AT Commands According to GSM07.05

3.2.1 AT+CPMS Preferred Message Storage

AT+CPMS=?	Response: **+CPMS:**(list of supported <**mem1**>s),(list of supported <**mem2**>s),(list of supported <**mem3**>s) **OK** If error: +CMS ERROR:<err>
AT+CPMS?	Response: +CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>

	OK If error: +CMS ERROR:<err>
AT+CPMS= <mem1>**[,**<m em2>**[,**<mem 3>**]]**	Response: **+CPMS:<used1>,<total1>,<used2>,<total2>,<used3>,<tot al3>** **OK** If error: +CMS ERROR:<err>
	Parameters: <**mem1**> char. Messages to be read and deleted from this memory storage "SM" SIM message storage <**mem2**> char. Messages will be written and sent to this memory storage "SM" SIM message storage <**mem3**> char. Received messages will be placed in this memory storage if routing to PC is not set ("+CNMI") "SM" SIM message storage <**used1**> integer type. Number of messages currently in <mem1> <**used2**> integer type. Number of messages currently in <mem2> <**used3**> integer type. Number of messages currently in <mem3> <**total1**> integer type. Number of messages capacity in <mem1>

	<**total2**> integer type. Number of messages capacity in <mem2> <**total3**> integer type. Number of messages capacity in <mem3>
Reference GSM07.05	Note: <mem1> is the memory storage related to commands +CMGL, +CMGR, +CMGD <mem2> is the memory storage related to commands +CMSS and +CMGW <mem3> is the memory storage which a new received messages will be placed in

3.2.2 AT+CMGF Select SMS Message Format

AT+CMGF=?	Response: **+CMGF:**(list of supported <**mode**>s) **OK** If error: +CMS ERROR:<err>
AT+CMGF?	Response: +CMGF:<mode> **OK** If error: +CMS ERROR:<err>
AT+CMGF=[<mode>]	Response: **OK** If error: +CMS ERROR:<err>

	Parameters: <**mode**> 0 PDU mode 1 TEXTmode
Reference GSM07.05	Note:

3.2.3 AT+CSCA SMS Service Center Address

AT+CSCA=?	**OK**
AT+CSCA?	Response: **+CSCA:<sca>,<tosca>** **OK** If error: +CMS ERROR:<err>
AT+CSCA=<sca>[,<tosca>]	Response: **OK** If error: +CMS ERROR:<err>
Reference GSM07.05	

3.2.4 AT+CSMP Set SMS text mode parameters

Set Text Mode Parameters

AT+CSMP=?	**OK**
AT+CSMP?	Response:

	+CSMP:<fo>,<vp>,<pid>,<dcs> **OK** If error: +CMS ERROR:<err>
AT+CSMP=[<**fo**>[,<**vp**>[,**pid**>[,<**dcs**>]]]]	Response: TA selects values for additional parameters needed when SM is sent to the network or placed in a storage when text mode is selected (+CMGF=1). It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0... 255) or define the absolute time of the validity period termination (<vp> is a string). Note: The command writes the parameters in NON-VOLATILE memory. **OK** If error: +CMS ERROR:<err>
	Parameters: <**fo**> int. depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format <**vp**> depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>) <**pid**> int. GSM 03.40 TP-Protocol-Identifier in integer

	format, Only 0 is valid now. <**dcs**> GSM 03.38 SMS Data Coding Scheme in Integer format. 0 is the default value, and only 0-31 is valid now.
Reference GSM07.05	

3.2.5 AT+CNMI New SMS message indication

AT+CNMI=?	Response: **+CNMI:**(list of supported <**mode**>s),(list of supported <**mt**>s),(list of supported <**bm**>s),(list of supported <**ds**>s),(list of supported <**bfr**>s) **OK** If error: +CMS ERROR:<err>
AT+CNMI?	Response: **+CNMI:<mode>,<mt>,<bm>,<ds>,<bfr>** **OK** If error: +CMS ERROR:<err>
AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	Response: **OK** If error: +CMS ERROR:<err>
	Parameters: <mode> 0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can

	be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications. 1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE. 2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE. 3 Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode. <mt> (the rules for storing received SMs depend on its data coding scheme (refer GSM 03.38 [2]), preferred memory storage (+CPMS) setting and this value): 0 No SMS-DELIVER indications are routed to the TE. 1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> 2 SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: +CMT:[<alpha>],<length><CR><LF><pdu>

	(PDU mode enabled) or +CMT: <oa>, [<alpha>],<scts> [,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH). Class 2 messages result in indication as defined in <mt>=1. 3 Class 3 SMS-DELIVERs are routed directly to TE using nsolicited result codes defined in <mt>=2. Messages of other classes result in indication as defined in <mt>=1. <bm> (the rules for storing received CBMs depend on its data coding scheme (refer GSM 03.38 [2]), the setting of Select CBM Types (+CSCB) and this value): 0 No CBM indications are routed to the TE. 2 New CBMs are routed directly to the TE using unsolicited result code: +CBM: <length><CR><LF><pdu> (PDU mode enabled) or +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled). <ds> 0 No SMS-STATUS-REPORTs are routed to the TE. 1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled) or +CDS:

	<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled) <bfr> 0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes). 1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered. Unsolicited result code +CMTI: <mem>,<index> Indication that new message has been received +CMT: ,<length><CR><LF><pdu> Short message is output directly +CBM: <length><CR><LF><pdu> Cell broadcast message is output directly
Reference GSM07.05	

3.2.6 AT+CMGL List SMS messages from preferred store

AT+CMGL=?	Response: **+CMGL:**(list of supported **<stat>**s) **OK** If error: +CMS ERROR:<err>
AT+CMGL[=	Response: In TEXT mode（+CMGF=1）and execute successfully:

<stat>]	SMS-SUBMIT or SMS-DELIVER： **+CMGL:<index>,<stat>,<oa/da>,[<alpha>],[<scts>]** **[,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF>** +CMGL:<index>,<stat>,<da/oa>,[<alpha>],[<scts>] [,<tooa/toda>,<length>]<CR><LF><data>[...] **OK** In PDU mode（+CMGF=0）and execute successfully: SMS-SUBMIT or SMS-DELIVER： **+CMGL:** **<index>,<stat>,[<alpha>],<length><CR><LF><pdu>** **[<CR><LF>** **+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu>** [...]] **OK** If error: +CMS ERROR:<err>
	Parameters: 1) If text mode: <stat> "REC UNREAD" Received unread messages (default) "REC READ" Received read messages "STO UNSENT" Stored unsent messages "STO SENT" Stored sent messages "ALL" All messages 2) If PDU mode: <stat> 0 Received unread messages (default) 1 Received read messages

	2 Stored unsent messages 3 Stored sent messages 4 All messages
Reference GSM07.05	

3.2.7 AT+CMGR Read SMS message

AT+CMGR=?	**OK**
AT+CMGR=<index>	Read SMS message from the appointed memory storage（by command +CPMS）. Response： In TEXT mode（+CMGF=1）and execute successfully: SMS-DELIVER: **+CMGR:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>** **OK** SMS-SUBMIT: +CMGR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> **OK** In PDU mode（+CMGF=0）and execute successfully: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> **OK**

	If error: +CMS ERROR:<err>
	Parameters <index> integer type; value in the range of location numbers supported by the associated memory
Reference GSM07.05	

3.2.8 AT+CMGS Send SMS message

AT+CMGS=?	**OK**
In TEXT mode （+CMGF=1） **AT+CMGS=<da>[,<toda>]<CR> Text is entered <ctrl-Z/ESC>** In PDU mode （+CMGF=0） **AT+CMGS=<length><CR> pdu is given <ctrl-Z/ESC>**	Response If execute successfully: **+CMGS:<mr> OK** If error: +CMS ERROR:<err>
Reference	Note:

GSM07.05	1 ctrl-z means the end of the input message. 2 ESC means giving up the message, and returning to the command status. And ERROR will be received as response. 3 MS-DELIVER,SMS-SUBMIT and SMS-STATUS-REPORT are supported in PDU mode, but SMS-DELIVER-REPORT, SMS-SUBMIT-REPORT and SMS-COMMAND are not supported.

3.2.9 AT+CMSS Send SMS message from storage

AT+CMSS=?	OK
AT+CMSS=<index>[,<da>[,<toda>]]	TA sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT). If new recipient address <da> is given, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code. +CMSS:<mr> 1) If text mode(+CMGF=1) and sending successful: +CMGS: <mr> OK 2) If PDU mode(+CMGF=0) and sending successful: +CMGS: <mr> OK

	3)If error is related to ME functionality: +CMS ERROR: <err>
Reference GSM07.05	Note: <index> integer type; value in the range of location numbers supported by the associated memory <da> GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS);; type of address given by <toda> <toda> GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) <mr> GSM 03.40 TP-Message-Reference in integer format.

3.2.10 AT+CMGW Write SMS message to memory

AT+CMGW=?	**OK**
In TXT mode （+CMGF=1）： **AT+CMGW[=<oa/da>[,<tooa/toda>[,<**	Response TA transmits SMS message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage <mem2>. Memory location <index> of the stored

stat>]]]<CR> text is entered <ctrl-Z/ESC> In PDU mode（+CMGF=0）: **AT+CMGW=<length>[,<stat>]<CR>** **pdu is given <ctrl-Z/ESC>**	message is returned. By default message status will be set to 'stored unsent', but parameter <stat> allows also other status values to be given. If writing is successful: **+CMGW:<index>** **OK** If error: +CMS ERROR:<err>
Reference GSM07.05	Note: 1 The default value of <stat> is 2(”STO UNSENT”). In TEXT mode the value of <stat> could not be ”REC UNREAD” or ”REC READ”。 2 ctrl-z means the end of message. 3 ESC means giving up the message, and returning to the command state. And ERROR will be received as response. 4 In PDU mode TP-MTI could be SMS-DELIVER, SMS-SUBMIT and SMS-STATUS-REPORT. But SMS-DELIVER-REPORT, SMS-SUBMIT-REPORT and SMS-COMMAND are not allowed.

3.2.11 AT+CMGD Delete SMS message

AT+CMGD=?	**OK**
AT+CMGD=<index>	TA deletes message from preferred message storage <mem1> location <index>. If execute successfully: **OK** If error +CMS ERROR:<err>
Reference GSM07.05	

3.2.12 AT+CSMS Select Message Service

AT+CSMS=<service>	Response: +CSMS :<MO>, <MT> ,<CB>
AT+CSMS?	Response: +CSMS:<service>,<MO>, <MT> ,<CB>
AT+CSMS=?	Response: +CSMS (service)
Reference GSM07.05	Parameters: <MO> 0 Mobile Originated Messages is not s supported 1 Mobile Originated Messages is supported <MT> 0 Mobile Terminated Messages is not supported 1 Mobile Terminated Messages is supported

	<CB> 0 Broadcast Type Messages is not supported 1 Broadcast Type Messages is supported

3.2.13 AT+CSDH Show SMS text mode parameters

AT+CSDH=?	Response: **+CSDH:**(list of supported **<show>s**) **OK** If error: +CMS ERROR:<err>
AT+CSDH?	Response: **+CSDH:<show>** OK If error: +CMS ERROR:<err>
AT+CSDH=<show>	Response: OK If error: +CMS ERROR:<err>
	Parameters: **<show>** 0 do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR

	result codes in text mode 1 show the values in result codes
Reference GSM07.05	

3.2.14 AT+CSCB Select cell broadcast SMS messages

AT+CSCB=?	Response: **+CSCB:**(list of supported **<mode>**s) OK If error: +CMS ERROR:<err>
AT+CSCB?	Response: +CSCB:<mode>,<mids>,<dcss> OK If error: +CMS ERROR:<err>
AT+CSCB=[<mode>[,<mids>[,<dcss>]]]	Response: OK If error: +CMS ERROR:<err>
	Parameters： <**mode**> 0 message types specified in <mids> and <dcss> are accepted 1 message types specified in <mids> and <dcss> are not accepted
Reference GSM07.05	Note: <dcss> only supports ”0，1”（Chinese, English）。

3.2.15 AT+CSMP Set SMS text mode parameters

AT+CSMP=?	OK
AT+CSMP?	Response: **+CSMP:<fo>,<vp>,<pid>,<dcs>** **OK** If error +CMS ERROR:<err>
AT+CSMP=[<**fo**>[,<**vp**>[,**pid**>[,<**dcs**>]]]]	Response: OK If error +CMS ERROR:<err>
	Parameters: <**fo**> depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format <**vp**> depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>) <**pid**> GSM 03.40 TP-Protocol-Identifier in integer format. <**dcs**> GSM 03.38 SMS Data Coding Scheme in Integer format.
Reference GSM07.05	

3.2.16 AT+CMMS Send multiple SMS

AT+CMMS	OK
AT+CMMS?	Return current option set +CMMS:<option> **OK**
AT+CMMS=?	Return current supported option set **+** CMMS**:** (list of supported <**option**>) OK
AT+CMMS=<option>	Setoption，if correct return Ok If error return **ERROR**
	Parameter note <option>：0、1、2，default value is 0 0：disable 1:keep enabled until time between message send commands exceeds five seconds 2: enable
	NOTE: It’s recommended to set “AT+CMMS=2” when using +CMGS to send multiple SMS, which can accelerate the send procedure because the system will keep the protocol connection until all the SMS are sent

3.2.17 AT+CMGPR SMS preview

AT+CMGPR=<in	Read message from the assigned register, return format

dex>	is: TEXT Mode, if correct: SMS-DELIVER: **+CMGPR:<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>** **OK** SMS-SUBMIT: +CMGPR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> **OK** PDU Mode, if correct: +CMGPR: <stat>,[<alpha>],<length><CR><LF><pdu> **OK** If error: +CMS ERROR:<err>
	Note: Its function is similar with +CMGR. The only difference is that +CMGPR will not modify SMS status after read, it means that the unread SMS is all the same unread status after read by +CMGPR command.

4. AT Commands According to GSM07.07

4.1 Overview of AT Command According to GSM07.07

Command	Description
AT+ CFUN	SET PHONE FUNCTIONALITY
AT+ CPBS	SELECT PHONEBOOK MEMORY STORAGE
AT+ CPBR	READ CURRENT PHONEBOOK ENTRIES
AT+ CPBW	WRITE PHONEBOOK ENTRY
AT+ CPBF	FIND PHONEBOOK ENTRIES
AT+ CSCS	SELECT TE CHARACTER SET
AT+ CLIP	CALLING LINE IDENTIFICATION PRESENTATION
AT+ CLIR	CALLING LINE IDENTIFICATION RESTRICTION
AT+ COLP	CONNECTED LINE IDENTIFICATION PRESENTATION
AT+ CCFC	CALL FORWARDING NUMBER AND CONDITIONS CONTROL
AT+ CCWA	CALL WAITING CONTROL
AT+ CHLD	CALL HOLD AND MULTIPARTY
AT+ CLCC	LIST CURRENT CALLS OF ME
AT+ CACM	ACCUMULATED CALL METER(ACM) RESET OR QUERY
AT+ CAMM	ACCUMULATED CALL METER MAXIMUM(ACMMAX) SET OR QUERY
AT+ CPUC	PRICE PER UNIT CURRENCY TABLE
AT+ CCWV	CALL METER WARNING VALUE
AT+ CSSN	SUPPLEMENTARY SERVICES NOTIFICATION

AT+CHUP	HANG UP Voice Call
AT+CR	SERVICE REPORTING CONTROL
AT+CRC	SET CELLULAR RESULT CODES FOR INCOMING CALL INDICATION
AT+CRLP	SELECT RADIO LINK PROTOCOL PARAM. FOR ORIG. NON-TRANSP. DATA CALL
AT+CBST	SELECT BEARER SERVICE TYPE
AT+CNUM	SUBSCRIBER NUMBER
AT+COPS	OPERATOR SELECTION
AT+CPOL	PREFERRED OPERATOR LIST
AT+COPN	READ OPERATOR NAMES
AT+CREG	NETWORK REGISTRATION
AT+CSQ	SIGNAL QUALITY REPORT

4.2 Detailed Descriptions of AT Command According to GSM07.07

4.2.1 AT+ CFUN Set phone functionality

AT+ CFUN =?	Response +CFUN: (list of supported <fun>s), (list of supported <rst>s
AT+ CFUN = [<fun>[,<rst>]]	Set the function OK If error: **ERROR**
	Parameters:

	<fun> 1 full functionality (Default) 4 disable phone both transmit and receive RF circuits 5 FTM 6 RESET 7 OFFLINE <rst> 0 Set the ME to <fun> power level immediately. This is the default when <rst> is not given. 1 Set the ME to <fun> power level after the ME been reset.
Reference GSM07.07	

4.2.2 AT+CPBS Select phone book memory storage

AT+CPBS=?	Response +CPBS: (list of supported <storage>s) OK
AT+CPBS?	Response **+CPBS:<storage>[,<used>,<total>]** **OK** If error: **+CME ERROR:<err>**
AT+CPBS=<storage>	Response TA selects current phone book memory storage, which is used by other phone book commands. OK If error:

	+CME ERROR:<err>
	Parameters: **<storage>** “LD” SIM last-dialling-phone book “MC” ME missed (unanswered) calls list “RC” ME received calls list “ON” SIM (or ME) own numbers (MSISDNs) list “ME” ME phonebook “SM” SIM phonebook <**used**> Number of records currently in phone book <**total**> Number of records storable in phone book
Reference GSM07.07	+CPBS? Command will return +CPBS: “LD”,,<total> while no <used> with command +CPBS=<LD> or <MC> or <RC>

4.2.3 AT+CPBR Read current phone book entries

AT+CPBR=?	Response TA returns location range supported by the current storage as a compound value and the maximum lengths of <number> and <text> fields. +CPBR: (list of supported <index>s), <nlength>, <tlength> OK If error **+CME ERROR:<err>**
AT+CPBR=<index1>[,<index2>]	Response TA returns phone book entries in location number range <index1>... <index2> from the current phone book memory

	storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. **OK** If error: **+CME ERROR:<err>**
Reference GSM07.07	Patameters: **<nlength>** max. length of phone number **<tlength>** max. length of text for number
Note	1. It requires <index2> no less than <index1> where there are <index2> and <index1> coexisting. It returns <number>,<type>,<text> related to <index1> where there is only <index1>. 2. It will not read if the name is Chinese when +CSCS="GSM" command read the name corresponding the phone number, it will return +CPBR=<index>,"1111",129,"". All the name expressed with GSM and UCS2 can be read when +CSCS="UCS2"

4.2.4 AT+CPBW Write phone book entry

AT+CPBW=?	Response TA returns location range supported by the current storage, the maximum length of <number> field, supported number formats of the storage, and the maximum length of <text> field. +CPBW: (list of supported <index>s), <nlength>, (list of supported <typ>s), <tlength> OK

	If error: **+CME ERROR:<err>**
AT+CPBW=[<**index**>][,<**number**>[,<**type**>[,<**text**>]]]	Response TA writes phone book entry in location number <index> in the current phone book memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text>associated with the number. If those fields are omitted, phone book entry is deleted. If <index> is left out, but <number> is given, entry is written to the first free location in the phone book. OK If error: **+CME ERROR:<err>**
	Parameters: **The same as +CPBR**
Reference GSM07.07	Note: 1. It means <number> will be written into the first free location in phonebook if there is only <number> without<index> 2. It means the label corresponding to <index> will be delete if there is only <index> without <number> 3. It will add one item at the <index> if there are <index>, <number>, <type>, <text> existing
Note	1. The phone number can only be modified but not deleted if +CPBS=”ON”, which means command +CPBW=<index> can not be operated 2. It can not assign the <index> when add phone number if +CPBS=”ME”, which means

	+CJPBW=,”111111”,129,”abc” is permitted while +CPBW=<index>,”111111”,129,”abc” is not permitted 3. It can only be deleted but not modified or added for missed call, answered call and outgoing call if +CPBS=”MC”,”RC”,”LD” 4. It can not be Chinese for the name corresponding to the phone number when add the phone number if +CSCS=”GSM”. It can be read for all the name expressed with GSM and UCS2 if +CSCS=”UCS2”

4.2.5 AT+CPBF Find phone book entries

AT+CPBF=?	Response: **+CPBF:**[<**nlength**>],[<**tlength**>] OK If error: **+CME ERROR:<err>**
AT+CPBF=<find text>	Response TA returns phone book entries (from the current phone book memory storage selected with +CPBS) which contain alphanumeric string <findtext>. [+CPBF: <index1>,<number>,<type>,<text>[[...] <CR><LF>+CBPF: <index2>,<number>,<type>,<text>] OK If error: **+CME ERROR:<err>**
	Paremeters:

	<findtext> string type field of maximum length <tlength> in current TE character set specified by +CSCS
Reference GSM07.07	Note: It can not return all the matched record, only return the first matched record
Note	1. The command will search all the item in ”ME” and ”SM” when +CPBS=”ME”和+CPBS=”SM”. It can not supported when +CPBS=”MC” or +CPBS=”LD” or +CPBS=”RC” 2. It can only be GSM character for parameter <findtext> when +CSCS=”GSM”, which UCS2 character is illegal. It can only be GSM character and UCS2 character for parameter <findtext> when +CSCS=”UCS2”

4.2.6 AT+CSCS Select TE Character Set

AT+CSCS=?	Response: **+CSCS:** (list of supported <**chset**>s) OK
AT+CSCS?	Response: +CSCS: <chset> **OK**
AT+CSCS=<chset>	Response: OK If error: **+CME** ERROR:**<err>**
	Parameters: **< chset >:** “GSM” GSM GSM Default Alphabet “UCS2” 16bit Unicode

Reference GSM07.07	Note: 1. The phone number is transmitted with the format expressed by 7bit, which not the CSCS character. It means the phone number is transmitted according to IRA even if chset=USC2. Other text, such as SMS, phonebook name, shall follow the protocol requirements.

4.2.7 AT+CLIP Calling line identification presentation

AT+CLIP=?	Response: **+CLIP:**（list of supported **<n>s**） **OK**
AT+CLIP?	Response: **+CLIP<n><m>** **OK**
AT+CLIP=<n>	Response: TA enables or disables the presentation of the CLI at the TE. It has no effect on the execute of the supplementary service CLIP in the network. OK If error is related to ME functionality: +CME ERROR: <err>
	Parameters <n> 0 suppress unsolicited result codes 1 display unsolicited result codes <m> 0 CLIP not provisioned 1 CLIP provisioned 2 unknown

	<number> string type phone number of calling address in format specified by <type> **<type>** type of calling number **<subaddr>** sub-address of calling number. The type is decided by <satype>. **<satype>** the type of sub-address **<alpha>** ignored **<CLI validity>** 0 CLI attained 1 CLI limited 2 CLI invalid
Reference GSM 07.07	Note: <number> is set NULL and <type> has no value assignment when <CLI vadility>=1 or 2

4.2.8 AT+CLIR Calling Line Identification Restriction

AT+CLIR=?	Response: **+CLIR:** (list of supported <**n**>s) **OK**
AT+CLIR?	Response: **+CLIR: <n>, <m>** **OK**
AT+CLIR=[<n>]	Response: TA restricts or enables the presentation of the CLI to the called party when originating a call. The command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a

	default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. OK If error **+CME ERROR: <err>**
	Parameters: <**n**> (parameter sets the adjustment for outgoing calls): 0 presentation indicator is used according to the subscription of the CLIR service 1 CLIR invocation 2 CLIR suppression <**m**> (parameter shows the subscriber CLIR service status in the network): 0 CLIR not provisioned 1 CLIR provisioned in permanent mode 2 unknown (e.g. no network, etc.) 3 CLIR temporary mode presentation restricted 4 CLIR temporary mode presentation allowed
Reference GSM07.07	Note: <n> should only be 0 if the network is unknown, or CLIR is not provisioned or CLIR is provisioned in permanent mode.

4.2.9 AT+COLP Connected Line Identification Presentation

AT+COLP=?	Response: +COLP: (list of supported <n>s) OK

AT+COLP?	Response: +COLP: <n>,<m> OK
AT+COLP=[<n>]	Response: TA enable or disable the presentation of the COL(Connected Line) at the TE for a mobile originated call. It has no effect on the execution of the supplementary service COLR in the network. Intermediate result code is returned from TA to TE before any +CR or V.25ter responses. OK If error: +CME ERROR <err>
	Parameters: <n> (parameter sets/shows the result code presentation status in the TA): 0 disable 1 enable <m> (parameter shows the subscriber COLP service status in the network): 0 COLP not provisioned 1 COLP provisioned 2 unknown (e.g. no network, etc.)
Reference GSM07.07	

4.2.10 AT+CCFC Call Forwarding Number And Conditions Control

AT+CCFC=?	Response: **+CCFC**:(list of supported <**reason**>s) **OK**
AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	Response TA controls the call forwarding supplementary service. Registration, unregister, activation, deactivation, and status query are supported. Only ,<reas> and <mode> should be entered with mode (0-2,4) If there is a network error: +CCFC: 0, 0 If command successful (only in connection with <reas> 0 –3) For registered call forward numbers: +CCFC: <status>, <class1>[, <number>, <type> [, <time>]] [<CR><LF>+CCFC: ....] OK If no call forward numbers are registered (and therefore all classes are inactive): +CCFC: <status>, <class> OK where <status>=0 and <class>=7 If error is related to ME functionality: +CME ERROR: <err>
	Parameters: **<reason>** 0 unconditional 1 mobile busy

	2 no reply 3 not reachable 4 all call forwarding (0-3) 5 all conditional call forwarding (1-3) **<mode>** 0 disable 1 enable 2 query status 3 registration 4 erasure **<number>** string type phone number of forwarding address in format specified by <type> **<type>** type of address in integer format; default 145 when dialling string includes international access code character "+", otherwise 129 **<subaddr>** string type sub-address of format specified by <satype> **<satype>** type of sub-address in integer; default 128 **<classx>** 1 voice **<time>** <time> time, rounded to a multiple of 5 sec.1...20..30 **<status>** 0 not active 1 active
Reference GSM07.07	

4.2.11 AT+CCWA Call Waiting Control

AT+CCWA=?	Response: +CCWA: (list of supported <n>s) OK
AT+CCWA?	Response: +CCWA: <n> OK
AT+CCWA=[<n>] [,<mode> **[,<class>]]**	Response: TA controls the Call Waiting supplementary service. Activation, deactivation and status query are supported. If there is a network error: +CCWA: 0, 0 If command successful +CCWA:<status>,<class1>[<CR><LF>+CCWA:<status>,<class2>[...]] OK Note:<status>=0 should be returned only if service is not active for any <class> ie +CCWA : 0 , 7 will be returned in this case. When mode=2 , all active call waiting classes will be reported. In this mode the command is aborted by pressing any key. If error is related to ME functionality: +CME ERROR: <err>
	Parameters: **<n>** 0 disable presentation of an unsolicited result code 1 enable presentation of an unsolicited result code **<mode>** when <mode> parameter not given, network is not interrogated

	0 disable 1 enable 2 query status **<class>** is a sum of integers each representing a class of information 1 voice (telephony) **<status>** 0 not active 1 enable **<number>** string type phone number of calling address in format specified by <type> **<type>** type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129 **<alpha>,<CLI validity>** as same as command AT+CLIP
Reference GSM07.07	

4.2.12 AT+ CHLD Call hold and multiparty

AT+CHLD=?	Response: +CHLD: (list of supported <n>s) OK
AT+CHLD=[<n>]	Response: TA controls the supplementary services Call Hold, Multi-Party and Explicit Call Transfer. Calls can be put on hold, recovered, released, added to conversation, and transferred. Note: This supplementary services are only used in telecomm service 11 (Speech: Telephony).

	OK If error is related to ME functionality: +CME ERROR: <err>
	Parameters: <n> 0 Terminate all held calls or UDUB (User Determined User Busy) for a waiting call 1 Terminate all active calls (if any) and accept the other call (waiting call or held call) 1X Terminate the active call number X (X= 1-7) 2 Place all active calls on hold (if any) and accept the other call (waiting call or held call) as the active call 2X Place all active calls except call X (X= 1-7) on hold 3 Add the held call to the active calls
Reference GSM07.07	Note 1. The command can only be used in telecom service 11 2. X value range: 1~7 3. The flow above shall be used in the waiting call if there are holding call and waiting call coexisting

4.2.13 AT+CLCC List current calls of ME

AT+CLCC=?	Response: OK
AT+CLCC	Response: TA returns a list of current calls of ME. Note: If command succeeds but no calls are available, no information response is sent to TE. [+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty>[,

	<number>,<type>[,<alpha>]] [<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>,<mpty>[, <number>,<type>[,<alpha>]] [...]]] OK If error is related to ME functionality: +CME ERROR: <err>
	Parameters: **<idx>** integer type; call identification number as described in GSM 02.30[19] subclause 4.5.5.1; this number can be used in +CHLD command operations **<dir>** 0 mobile originated (MO) call 1 mobile terminated (MT) call **<stat>** state of the call: 0 active 1 held 2 dialling (MO call) 3 alerting (MO call) 4 incoming (MT call) 5 waiting (MT call) **<mode>** bearer/telecomm service: 0 voice 1 data 2 fax 9 unknown **<mpty>** 0 call is not one of multiparty (conference) call parties 1 call is one of multiparty (conference) call parties **<number>** <mpty> string type phone number in format

	specified by <type> **<type>** type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129
Reference GSM07.07	Note It returns OK when there is no active call if the operation is successful

4.2.14 AT+CAOC Advice of Charge

AT+CAOC =?	Response: +CAOC: (list of supported <mode>s) OK
AT+CAOC?	Response: **+CAOC：<n>** **OK**
AT+CAOC=<mode>	Response: TA sets the Advice of Charge supplementary service function mode. If error is related to ME functionality: +CME ERROR: <err> If <mode>=0, TA returns the current call meter value +CAOC: <ccm> OK If <mode>=1, TA deactivates the unsolicited reporting of CCM value OK If <mode>=2. TA activates the unsolicited reporting of CCM value

	OK
AT+CAOC	Response: +CAOC:<ccm> OK
	Parameters: **<mode>** 0 query CCM value 1 deactivate the unsolicited reporting of CCM value 2 activate the unsolicited reporting of CCM value <**ccm**> string type; three bytes of the current CCM value in hex-decimal format (e.g. "00001E" indicates decimal value 30); bytes are similarly coded as ACMmax value in the SIM 000000-FFFFFF
Reference GSM 0707_750	

4.2.15 AT+CACM Accumulated Call Meter(ACM) Set or Query

AT+ CACM =?	Response: **OK**
AT+ CACM?	Response: + **CACM：<acm>** **OK**
AT+CACM=<password >	Response: TA resets the Advice of Charge related accumulated call meter(ACM) value in SIM file EF(ACM). ACM contains the total number of home units for both the current and preceding

	calls. OK If error is related to ME functionality: +CME ERROR: <err>
	Parameters: <**password**> string type: SIM PIN2 <**acm**> string type; three bytes of the current ACM value in hex-decimal format (e.g. "00001E" indicates decimal value 30) 000000 - FFFFFF
Reference GSM 0707_750	

4.2.16 AT+CAMM Accumulated Call Meter Maximum (ACMmax) Set or Query

AT+ CAMM =?	Response: OK
AT+ CAMM?	Response: TA returns the current value of ACMmax. +CAMM: <acmmax> OK If error is related to ME functionality: +CME ERROR: <err>
AT+CAMM=<acmMax>,<password>	Response: TA sets the Advice of Charge related accumulated call meter maximum value in SIM file EF(ACMmax). ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. OK

	If error is related to ME functionality: +CME ERROR: <err>
	Parameters: <**password**> string type SIM PIN2 <**acmMax**> string type; three bytes of the max. ACM value in hexa-decimal format (e.g. "00001E" indicates decimal value 30) 000000 disable ACMmax feature 000001-FFFFFF
Reference GSM 0707_750	

4.2.17 AT+ CPUC Price Per Unit and Currency Table

AT+ CPUC =?	Response: OK
AT+ CPUC?	Response: + **CPUC：<currency>,<ppu>** **OK**
AT+CPUC=<currency>,<ppu>,<password>	Response: OK If error +CME ERROR <err>
	Parameters: <**currency**> string type; three-character currency code (e.g. "GBP", "DEM");character set as specified by command

	Select TE Character Set +CSCS <**ppu**> string type; price per unit; dot is used as a decimal separator(e.g. "2.66")
Reference GSM 0707_750	Note: <**ppu**> value range refers to GSM11.11

4.2.18 AT+CCWV Call Meter Warning Value

AT+ CCWV =?	Query the value supported by <mode> + CCWE: (list of supported <mode>s) OK
AT+ CCWV?	Return the current <mode> value **+ CCWE：<mode>** **OK**
AT+CCWV=<mode>	Set <mode> value If successfully return OK If error return +CME ERROR <err> ME shall report +CCWV actively if ACM is approached to AcmMAX when <mode> value is 1. The alarm means there is 30 minutes left for calling
	Note <mode> 0 Shall not report CCWV event actively 1 Report CCWV event actively
Reference to GSM	

0707_750	

4.2.19 AT+CSSN Supplementary Service Notifications

AT+CSSN=?	Response: +CSSN: (list of supported <n>s),(list of supported <m>s) OK
AT+CSSN?	Response: **+CSSN: <n>,<m>** OK
AT+CSSN=[<n>[,<m>]]	Response: OK If error: **+CME ERROR:<err>**
	Parameters **<n>:** a numeric parameter which indicates whether to show the +CSSI result code presentation status after a mobile originated call setup 0 disable 1 enable **<m>:** a numeric parameter which indicates whether to show the +CSSU result code presentation status during a mobile terminated call setup or during a call, or when a forward check supplementary service notification is received. 0 disable 1 enable
Reference	

GSM07.07	

4.2.20 AT+CHUP Hang-up Voice Call

AT+CHUP	Hang up the current ETSI Voice call OK
Reference to V.25ter	Note： only used for voice call

4.2.21 AT+CR Service Reporting Control

AT+CR=?	Response: **+CR: (list of supported <mode>s)** **OK**
AT+CR?	Response: **+CR:** <mode> OK
AT+CR= **[<mode>]**	Response: TA controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE at a call set up. OK If error **+CME ERROR:<err>**
	Parameters **< mode>**： 0 disable 1 enable
Reference	

GSM07.07	

4.2.22 AT+CRC Cellular Result Codes for incoming call indication

AT+CRC=?	Response: **+CRC:** (list of supported <**mode**>s) OK
AT+CRC?	Response: **+CRC:** <mode> OK
AT+CRC=[<mode>]	Response: TA controls whether or not the extended format of incoming call indication is used. OK If error: **+CME ERROR:<err>**
	Parameters **< mode>:** 0 disable extended format 1 enable extended format
Reference GSM07.07	

4.2.23 AT+CRLP Select Radio Link Protocol

AT+CRLP=?	Response: TA returns values supported. RLP versions 0 and 1 share the

	same parameter set. TA returns only one line for this set (where <verx> is not present). +CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s), (list of supported <ver1>s), (list of supported <T4>s) ... OK
AT+CRLP?	Response: TA returns current settings for RLP version. RLP versions 0 and 1 share the same parameter set. TA returns only one line for this set (where <verx> is not present). +CRLP: <iws>,<mws>,<T1>,<N2>,<ver1>,<T4> ... OK
AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]	Response: TA sets radio link protocol (RLP) parameters used when non-transparent data calls are setup. OK If error: **+CME ERROR:<err>**
	Parameters: <iws>: 0-61 <mws>: 0-61 <T1>: 39-255 <N2>: 1-255
Reference GSM07.07	

4.2.24 AT+CBST Select Bearer Service Type

AT+CBST =?	Response: +CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s) OK
AT+CBST?	Response: +CBST: <speed>,<name>,<ce> OK
AT+CBST=[<speed>[,<name>[,<ce>]]]	Response: TA selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated. OK If error: **+CME ERROR:<err>**
	Parameters: <speed> only 7 is legal（9600bps） <name> only 0 is legal（asynchronous modem） <ce> 0 transparent 1 non-transparent
Reference GSM07.07	

Note: ATA and AT＋CHUP can be used in data call when it is used in voice call

4.2.25 AT+CNUM Subscriber Number

AT+CNUM=	Response:

?	**OK**
AT+CNUM	Response: **+CNUM:**[<**alpha1**>],<**number1**>,<**type1**>[,<**speed**>,<**service**>[,<**itc**>]][<**CR**><**LF**>**+CNUM:**[<**alpha2**>],<**number2**>,<**type2**>[,<**speed**>,<**service**>[,<**itc**>]][……]] **OK** If error: **+CME ERROR:<err>**
	Parameters: **<alphax>** optional alphanumeric string associated with <numberx>; used character set should be the one selected with command; Select TE Character Set +CSCS **<numberx>** string type phone number of format specified by <typex> **<typex>** type of address octet in integer format **<service>** 4 Voice **<itc>** not supported **<speed>** not supported
Reference GSM07.07	Note: It returns one local voice number because it support voice call only at present

4.2.26 AT+COPS Operator selection

AT+COPS=?	Response: TA returns a list of quadruplets, each representing an operator present in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in

	order: home network, networks referenced in SIM, and other networks. +COPS: list of supported(<stat>, long alphanumeric <oper>, numeric <oper>)s [,,(list of supported <mode>s),(list of supported <format>s)] OK If error is related to ME functionality: +CME ERROR: <err>
AT+COPS?	Response: TA returns the current mode and the currently selected operator. If no operator is selected, <format> and <oper> are omitted. +COPS: <mode>[, <format>[, <oper>]] OK If error is related to ME functionality: +CME ERROR: <err>
AT+COPS= [<**mode**>[,<**format**>[,<**oper**>]]]	Response: TA forces an attempt to select and register the GSM network operator. If the selected operator is not available, no other operator shall be selected (except <mode>=4). The selected operator name format shall apply to further read commands (+COPS?). OK If error is related to ME functionality: +CME ERROR: <err>
Parameters	<**mode**> 0 automatic mode; <oper> field is ignored 1 manual operator selection; <oper> field shall be present 2 manual deregister from network 3 set only <format> (for read command +COPS?) – not shown in Read command response

	4 manual/automatic selected; if manual selection fails, automatic mode (<mode>=0) is entered <**format**> 0 long format alphanumeric <oper>;can be up to 16 characters long 1 short format alphanumeric <oper> 2 numeric <oper>; GSM Location Area Identification number <**stat**> 0 unknown 2 operator current 3 operator forbidden
Reference GSM07.07	Note: <**stat**> doesn't support "available" because all the return value belong to "available"

4.2.27 AT+CPOL Preferred Operator List

AT+CPOL=?	Response: **+CPOL:**(list of supported <**index**>s),(list of supported <**format**>s) OK If error : +CME ERROR:<err>
AT+CPOL?	Response: Return to all the entry of optimal selection list in SIM card **+CPOL: <index1>,<format>,<oper1>**[**<CR><LF>** **+CPOL:<index2>,<format>,<oper2>**[**...**]] OK

	If error : **+CME ERROR:<err>**
AT+CPOL=[<**index**>][, <**format**>[, <**oper**>]]	Response: **OK** If error: **+CME ERROR:<err>**
	Parameters: <**index**> integer type: order number of operator in SIM preferred operator list <**format**>, <**oper**> as same as command +COPS
Reference GSM07.07	Note: For AT+CPOL= [<index>][，<format>[，<oper>]] 1． It shall delete the optimal network corresponding to <index> where there is only <index> while without <format> and <oper> 2． It shall add the optimal network corresponding to <index> in the next location in SIM card where there is only <oper> while without <index> and <oper> It means the output format for reading command is modified where there is only <oper> while without any other parameter

4.2.28 AT+COPN Read Operator Names

AT+COPN=?	Response: OK
AT+COPN	Response: **+COPN:<numericl>,<alpha1>**[**<CR><LF>+COPN: <numeric2>,<alpha2>[...]**]]

	OK If error: **+CME ERROR:<err>**
	Parameters: As some as command **+COPS**
Reference GSM07.07	

4.2.29 AT+CREG Network Registration

AT+CREG=?	Response: **+CREG ：** (list of supported <**n**>) OK
AT+CREG?	Response: **+CREG ：** <**n**>,<**stat**>[,<**lac**>,<**ci**>] **OK** If error: **+CME ERROR:<err>**
AT+CREG=[<**n**>]	Response: **OK** If error: **+CME ERROR:<err>**
	Parameters: **<n>** 0 disable network registration unsolicited result code 1 enable network registration unsolicited result code **<stat>** 0 not registered, ME is not currently searching a

	new operator to register to 1 registered, home network 2 not registered, but ME is currently searching a new operator to register to 3 registration denied 4 unknown 5 registered, roaming **<lac〉** not supported **<ci >** not supported
Reference GSM07.07	Note: <stat>=6 is extended

4.2.30 AT+CSQ Signal Quality Report

AT+CSQ=?	Response: **+ CSQ:**(list of supported <**rssi**>s),(list of supported <**ber**>s) OK
AT+CSQ	Response: **+ CSQ:**<**rssi**>,<**ber**> OK If error **+CME ERROR:<err>**
	Parameters: <**rssi**> 0 -113dBm or less 1 -111dBm 2-30 -109...-53dBm 31 -51dBm or greater <**ber**> 0 …..7

Reference GSM07.07	

5. Extended vendor AT commands

5.1 Overview of extended vendor AT commands

Command	Description
AT+MODODR	NETWORK MODE
AT+NWLCK	CHECK SIM LOCK
AT+BNDPRF	SET NETWORK BAND
AT+MODPRF	QUERY NETWORK SERVICE MODE
AT+PSRAT	QUERY NETWORK
AT+CPNNUM	QUERY PIN and PUK
AT+LCTSW	LIST SOFTWARE VERSION
AT+DISK	SET THE START-UP MODE
AT+VTS	send DTMF code
AT+PID	change the product ID
AT+CLVL	set Loudspeaker level
AT+CMUT	disable/enable mute user voice
AT+NCKCHECK	PIN UNLOCK
AT+NCKCNT	READ NCK REMAIN TIME
AT+RCKCHECK	RCK UNLOCK
AT+NWLCFG	ACQUIRE LOCK NETWORK CONFIGURATION

	INFORMATION
AT+NWLINDIC	SET LOCK NETWORK IDENTIFIER
AT+NWLPLMN	SET PLMN NETWORK SEARCH SELECTION
AT+TESTINF2	SET TESTING INFORMATION
AT+LCTSN	SET READ AND WRITE MODE OF SN

5.2 Detailed Descriptions of extended vendor AT Command

5.2.1 AT+ MODODR Network Mode

AT+MODODR =?	Response: + MODODR:(list of supported <mode>s) OK
AT+MODODR?	Response: + MODODR: <mode> **OK**
AT+MODODR = <mode>	Response: OK If error: **ERROR**
	Parameters: **<mode>**: 1 UMTS ONLY 2 UMTS PREFERRED 3 GSM ONLY 4 GSM PREFERRED
	Note:

	Network search mode will be changed when network mode is set. For example, the original status is registered in CMCC GSM network manually, it will changed into auto register status after set UMTS PREFERRED

5.2.2 AT+ NWLCK Check SIM Lock

AT+NWLCK**?**	Response: +NWLCK::<state> **OK**
	Parameters: <state>: a NETWORK UNLOCKED b NETWORK LOCKED c UNKNOWN LOCK STATUS
	Note: It needs continue to query using AT command until return NETWORK LOCKED or NETWORK UNLOCKED when in UNKNOWN LOCK STATUS NETWORK LOCKED means it's in SIM LOCK, which needs unlock operation to search network or other operate

5.2.3 AT+BNDPRF Set Network Band

AT+ BNDPRF**?**	Response: +BNDPRF: <mode> **OK**
+BNDPRF=[<nv4	Response:

41>,<nv946>]	OK If error: **ERROR**
	Parameters: <nv441> and <nv946> is NV(Non-Volatile) item corresponding to high frequency band, it is shown in the following table
	Note: It will affect network search mode for modifying frequency band

NV settings for frequency band selection

Band	**Bit position**	**NV_BAND_PREF_I(441)**	**NV_BAND_PREF_16_31_I(946)**
GSM_450	16	0x0000	0x0001
GSM_480	17	0x0000	0x0002
GSM_750	18	0x0000	0x0004
GSM_850	19	0x0000	0x0008
EGSM_900	08	0x0100	0x0000
RGSM_900	20	0x0000	0x0010
PGSM_900	09	0x0200	0x0000
DCS_1800	07	0x0080	0x0000
PCS_1900	21	0x0000	0x0020
WCDMA_I_IMT_2000	22	0x0000	0x0040
WCDMA_II_PCS_1900	23	0x0000	0x0080
WCDMA_III_1700	24	0x0000	0x0100
WCDMA_IV_1700	25	0x0000	0x0200

WCDMA_V_850	26	0x0000	0x0400
WCDMA_VI_800	27	0x0000	0x0800
WCDMA_VII_2600	48	0x0000	0x0000
WCDMA_VIII_900	49	0x0000	0x0000
WCDMA_IX_1700	50	0x0000	0x0000

For example, it means the frequency band is EGSM_900 | PGSM_900 | DCS_1800 | PCS_1900 | WCDMA_I_IMT_2000 when return value is +BNDPRF: 896,96

5.2.4 AT+ MODPRF read the service mode of network

AT+ MODPRF**?**	Response: +MODPRF: <mode> **OK**
AT+MODPRF=?	Response: + MODPRF:(list of supported <mode>s) OK If error: **ERROR**
	Parameters: <mode>： 0 NV_MODE_AUTOMATIC 1 NV_MODE_GSM_ONLY 2 NV_MODE_WCDMA_ONLY

5.2.5 AT+ PSRAT search the network

AT+ PSRAT	Response: +PSRAT: <psrat> **OK**
	Parameters: <psrat>: UMTS HSUPA HSDPA GPRS EDGE NONE
	Note: This command must be used after PIN verification, better inquired after registered in some network. Opening a timer is needed when inquiring, the same process as command “CSQ”

5.2.6 AT+ CPNNUM check the remaining times of query of PIN and PUK

AT+CPNNUM	Response: PIN1=<num>; PUK1=<num>; PIN2=<num>; PUK2=<num> **OK**
	Parameters: PIN1=3 ： the remain times of PIN is 3 PUK1=10 ： the remain times of PUK is 10 not take account of PIN2 and PUK2

	Note:

5.2.7 AT+ LCTSW query the Version of software

AT+ LCTSW	Response: **OK**

5.2.8 AT+ DISK set the boot mode of DataCard and set the function of Diag port

AT+ DISK =?	Response: ERROR(not support query command at present)
AT+ DISK=<var1>,<var2>	Response: OK If error: **ERROR**
	Parameters: Val1： 0：set the flash device as CD or DISK when connected to PC 7: active or deactive the Diag Port 8：change the device boot mode Val2： “HD”: flash device is a DISK (only for Val1=’0’)

	“CD”: flash device is a CD (only for Val1=’0’) “YS”:active the Diag port(only for Val1=’7’) “NO”:deatcive the Diag port(only for Val1=’7’) “D2”: serial port and T card (only for Val1=’8’) “D3”: CD or DISK(only for Val1=’8’) Example: AT+DISK=0,”HD” set the flash device as DISK AT+DISK=0,”CD” set the flash device as CD AT+DISK=8,”D3” change the boot mode to CD or DISK AT+DISK=8,”D2” change the boot mode to “serial port and T card” AT+DISK=7,”YS” active the Diag port AT+DISK=7,”NO” deatcive the Diag port If you want the flash device boot as CD,you should flow these step: 1)AT+DISK=0,”CD” 2)AT+DISK=8,”D3” And then reboot the Module

5.2.9 AT+VTS send DTMF code

AT+ VTS=?	Response: ERROR(not support query command at present)
AT+ VTS?	Response: ERROR(not support query command at present)
AT+ VTS=<var1>	Response: OK If error: **ERROR**

	Parameters: Val1： dtem code For Example: AT+VTS=8022; dail the ext number “8022”

5.2.10 AT+PID change the product ID

AT+ PID=?	Response: AT+PID=""n"",n is a hex number between 1-fffe **OK**
AT+ PID?	Response: The current PID used. OK
AT+ PID=<var1>	Response: OK If error: **ERROR**
	Parameters: Val1： a hex number between 1-fffe For Example: AT+PID=”9000”; set the PID to 0x9000

5.2.11 AT+CLVL set Loudspeaker level

AT+ CLVL=?	Response: +CLVL: n n is the current level of Loudspeaker **OK**
AT+CLVL?	Response: +CLVL: n n is the current level of Loudspeaker

	OK
AT+ CLVL=<var1>	Response: OK If error: **ERROR**
	Parameters: Val1：0-5 For Example: AT+CLVL=2

5.2.12 AT+CMUT disable/enable mute user voice

AT+ CMUT =?	Response: **+CMUT: (0-1)** **OK**
AT+ CMUT?	Response: +CMUT: n if n =0:disable mute the user voice if n =0:enable mute the user voice **OK**
AT+ CMUT =<var1>	Response: OK If error: **ERROR**
	Parameters: Val1：0-1 For Example: AT+CLVL=1 enable mute the user voice Note: This command just enable or disable mute user voice, you can

	use AT+CLVL command to disable/enable user voice transmission.

SIM LOCK related AT commands

Commands related to SIM LOCK are expanded instructions beyond the Protocol. They should be use after the PIN verification.

SIM LOCK is a function optimized by operators requirements. It requires our tools provide service for specific SIM card. For other SIM cards, these commands could only be used after unlocking by the secret key (which we called NCK) provided by the operators.

NCK are similar to PIN.

After power on, the DataCard decides whether it is SIM LOCK(see it before) firstly.

If the SIM card is locked, there will be an Unlock SIM item to unlock the SIM in the Menu.

There are two steps to unlock the SIM card. First, input the NCK(there are times limit), if over the Limit, you should input the RCK. The difference between RCK and PUK is:

1. There is no times limit for RCK, but for PUK, the times limit is 10.
2. After unlocking the RCK, you will be asked to input NCK, while the unlocking for PUK has written new PIN and the PIN verification is over.

5.2.13 AT+ NCKCHECK NCK unlock NCK

AT+NCKCHECK =<NCK>	Response: **OK**
	Parameters: NCK code are 10-digit. <nck> is NCK code.

	For example: AT+NCKCHECK=1234567890 return OK or ERROR
	Note:

5.2.14 AT+ NCKCNT read the remaining times of NCK

AT+ NCKCNT	Response: +NCKCNT:<cnt> **OK**
	Parameters: <cnt> Is the remaining times of NC. For example: +NCKCNT:10. If the remaining times is 0, you will be asked to input RCK code.
	Note:

5.2.15 AT+ RCKCHECK unlock RCK

AT+RCKCHECK =<rck>,0	Response: **OK**
	Parameters: This command is used to reset the times of NCK. <rck> is RCK code. For example: AT+RCKCHECK=1234567890,0 Return OK or ERROR
	Note:

5.2.16 AT+ NWLCFG obtain the configuration of Network lock

AT+NWLCFG?	Response: **OK**
	Parameters: This command is used to obtain the configuration of Network lock <val> means whether the network is locked. For example, AT+ NWLCFG? return 0（unlock），1（locked）.
	Note:

5.2.17 AT+ NWLINDIC set the identifier of Network Lock

AT+NWLINDIC= <val>	Response: **OK**
	Parameters: This command is used to set the sign of Network Lock <val>lock or unlock. For example, AT+ NWLINDIC=0 mean unlock; AT+ NWLINDIC =1 means lock
	Note:

5.2.18 AT+ NWLPLMN set the selection of PLMN Search

AT+NWLPLMN=	Response:

<type>,<plmn>,<index>	**OK**
	Parameters: there are three types 0 Put the new plmn to plmn search list. 1 It means that modify plmn<index> as the new added plmn list. 2 Delete this plmn<list> from plmn search list
	Note:

5.2.19 AT+ TESTINF2 set the testing information

AT++TESTINF2 =<str>	Response: **OK**
AT+ TESTINF2=?	Get testing information TESTINF2：<str> OK If error: **ERROR**
	Parameters: 16 bytes data can be saved at most. <str> means set testing information

5.2.20 AT+ LCTSN set read and write mode of SN

AT+ LCTSN =?	Response: LCTSN:（0-1）,（0-9） **OK**

AT+ LCTSN =<val1>,<val2>,[<str>]	Response: TESTINF2:<str> OK If error: **ERROR**
	Parameters: Val1: 0：Mean a read command 1：Mean a write command Val2: val2=5 mean “sn”，val2=7 mean “imei” For example：AT+ LCTSN =0,5 mean read “sn” return：+LCTSN：”MT123456789123456” for example：AT+ LCTSN =0,7 mean read “imei”. return：+LCTSN：”004400003501192” For example：AT+EGNR=1,5,"xxxx"mean set “sn” to”xxxx” return：OK