User Manual for ZTE Corporation's CDMA 1X Module's AT Command Set

Version: V1.0



This manual applies to CDMA 1X modules.

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With strong technical force, ZTE Corporation can provide CDMA/GPRS module customers with the following all-around technical support:

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3. Provide evaluations and technical diagnosis for principle diagram, PCB, test scenarios;

4. Provide test environment;

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Preface

Summary

This manual is applicable for CDMA 1X modules, and it describes the AT command interfaces of the modules. The AT command set provided by ZTE Corporation's modules not only contains standard CDMA voice and data applications, but adds some commands according to the CDMA specification, as well as some ZTE Corporation's specific commands for users to use conveniently.
This manual can help you understand how to use AT commands of CDMA 1X modules.

Target Readers

- System designing engineers
- Hardware engineers
- Software engineers
- Testing engineers

Brief Introduction

This manual contains 3 chapters, which are described as below:

Chapter	Contents
错误！未找到引用源。 General Description	Describes CDMA background knowledge and basic summary of AT commands.
2 AT Commands	Describes the AT commands regarding CDMA 1X modules in details.
错误！未找到引用源。 Case Applications and Precautions	Describes the case applications of CDMA 1X modules and precautions in details.

Update History

The update history records the description of document update. The updates of all previous versions will be contained in the latest version.

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1 General Description

1.1 CDMA Background Knowledge

1.1.1 CDMA Technology

The remarkable features of CDMA, with large-capacity and short cell radius, are digital expanded frequency technology and specific encode method.

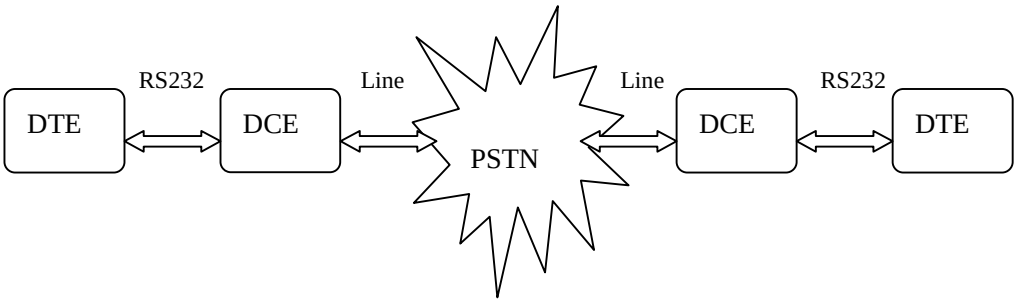
IS-95 is the commercial edition for 1st phase use of China Unicom, which supports circuit switch technique to data service, and is better than GSM in cell phone communication domain. Nowadays it changes a lot.

CDMA-1x technology is the advanced edition of IS-95，which supports both circuit switch and packet switch technique to data service. The maximum data rate is 153.6 kbps, but there is no sacrifice for voice performance. The capacity of 1X is nearly twice than IS-95 CDMA system and has long-time stand by feature. The content of this document is based on CDMA2000 1X technology.

ZTE corporation optimized air interface and researched a digital trunking system called GOTA（Global Open Trunking Architecture）,which is based on 3rd generation mobile communication. GOTA gives solutions around two key technologies: wireless channel share and fast link, at the same time, the new trunking service has no negative effect to traditional communication service and network resources.

Here we compare the relationship between Modem and CDMA module as shown in figure 1.1

Figure 1-1 Traditional Modem Connection



Under CDMA wireless module's application environment:

- Device of Module Users can be used as DTE
- CDMA module can be used as DCE
- The connection of Line can be equal to CDMA wireless network
- MSC, BTS, BSC, IWF are spread in PSTN portion, which are transparent for users.

Because of that, users can comprehend CDMA modules as a traditional MODEM, that's the reason why we call the module "MODEM" under some situations.

For data transmission and increasing network use efficiency, we expand foregoing concept again, supporting TCP/IP protocol stack and interface, virtually keep-online control, GOTA application commands.

- The function of TCP/IP protocol stack likes Berkeley Socket in UNIX system. Users can control it as the same operation process and method, the difference is only that controlling module via AT commands. Note: we only supply client operation. If you want to make a socket server, you should dial-up through module and run server application program. But it is not available if DTE without operation system or OS don't support MODEM.
- Virtually Keep online—VKL technology is an AT interface developed from dormant mode in CDMA standard. The purpose is help users to setup dormant function according to their own service features, and improve air interface resources, reduce operator's cost, finally decrease customers' payment. Commonly, module only occupies network stuff and IP address. When there is data transmitted, it takes air interface stuff. In this way, users only need to pay data transmission time cost. Supposing user's product send 2k data packet per 3 minutes, hence data transmission time is 2 seconds approximately. In traditional way, payment time is 182 seconds. Oppositely, it takes only less than 8 seconds by using VKL technology.
- GOTA application commands supply usage of GOTA technology (ZTE Corporation's patent). We will describe it in another specific document.

1.1.2 Mode& State of Modules

Modules can only receive specific orders in corresponding mode. So mode and states are important for understanding AT commands. They define current status of modules from different angle, hence they can not be comprehended outwardly. Attention, for your convenient understanding, the categories and definitions here are predigested according to ZTE module. Users can consult TIA/EIA-602 standard for more detailed and complete definitions.

- Mode (from operation angle):
  —Data mode: module is transmitting data, including asynchronous circuit data and packet data.
  —Fax mode: module is sending/receiving fax.
  —Voice mode: module is originating/receiving voice call.
  —Idle mode: module is standing by.
  —Off-line mode: CDMA network can not supply service to module, maybe no signal or authentication.

- State:
  —command state: module doesn't connect with remote device, but it can receive AT commands, process and return result.
  —online command state: module connects with remote device, and it also receives AT commands, processes and returns result.
  —online data state: module connects with remote device, all data received is considered from remote transmission.

- States alternation：
  —command state to online data state: module originates a remote link (ATD command) to complete the alternation, or responds remote call (ATA).When ATD command has been executed successfully, the module responds and enters online command state. DCD pin on

firmware is set to low level.

—online data state to command state: +++ command or setting DTR pin to high level could complete this alternation. Module returns OK to quit online state. The link errors or failure of PPP protocol negotiation will bring module to command state automatically. Users judge the reason for alternation with PPP responses and error codes.

—online data state to online command states: DTR (108/2) control; Call TCP/IP protocol stack extended by ZTE.

1.1.3 Design of AT Command Processing Software

AT command process mode is asynchronous, sending commands, waiting for response, processing response and sending a new command. There is no any limit to response time in AT commands design as standards. We also don't promise the consistency of command response time in each version. It must be a great design that monitors all commands from RS-232 interface and processes data. If the load is too heavy for CPU, the response can be delayed, but can't miss any data from UART.

Module should be out of factory with default settings. It was not defined for all by standard but maybe defined by other organizations or individuals. Because of that, for better software design, it needs to set all relative states to anticipant value after powering on. It is the same in Unix and Windows operation system, you can refer that.

Please try to rest module when link error appears so many times. Sometimes network will require terminals to register again, which can be done via AT+ZPWROFF.

- Man-machine interface

AT commands are used to control and configure module, which is designed to read conveniently at the beginning. Along with intelligentizing for terminals, AT commands are explained and applied by processor (CPU, MCU). Extended AT commands Syntax trend to be convenient for processing, for example, application of invisible characters like <ctrl>+z. It will bring inconvenience to manual use, but which is worthy. You can set returned command's Syntax as visible characters in default setting through ATV command, or returning characters with number Syntax through ATV0 command. It will be convenient to process for CPU.

At the same time, perhaps different COM debugging tools process characters (<CR>, <LF>, etc.) in different ways, and the feedback may be distinct. Users don't need to worry about it because processor can understand the meaning within commands. If users want to check display detailed, there are 2 methods: one is hex, another is using hyper terminal.

1.1.4 Save Parameter Settings

The modules can save the AT command settings and parameters in RAM. In order to use the modules conveniently, the module's parameters can be saved into the module's FLASH. After the module is powered again, these parameters are still valid. The parameters saved can be classified into three types:

- Parameters defined by Modem saved through &W.
- Other setting saved through &WDEVICE

- Automatically save. After the commands +IPR, +ZDPB, +CPBW are sent, the Information contained by these commands will be automatically saved immediately.

For processors, the settings can be done via program running, so parameters need not to be saved. Otherwise, FLASH memory will be erased and written too much, at the same time, the responding time will be lengthened. We suggest that you shouldn't save parameters if it is unnecessary.

Because of bad working situation for vehicle-mounted devices, the frequent reading/writing might cause irretrievable damage to the module and UIM card. Therefore we strongly suggest you do not save parameters in vehicle-mounted terminals.

1.2 General Description of AT Commands

1.2.1 Type of AT Commands

At Commands can be classified into four types:

- Commands without parameters:
  A concise command: the module finishes the requirement according to the internal parameters and responds it.
  e. g.: AT+CSQ, AT&V
- Query Commands:
  Used to inquiry the current, responses value set by command.
  e. g.: AT+IPR?
- Help Commands:
  Used to list the possible parameters of the command.
  e.g.: AT+IPR=?
- Commands with parameters:
  Commonly used commands providing great flexibility.
  e. g.: AT+CLIP=1

1.2.2 Returned Type of AT Command

There are two types in which the module is returned:

- The result report for operating AT command
  Once the wrong operating, the wrong code will be returned or via CME ERRO<Err> or "CMS ERROR: <SmsErr>. See AT+CMEE command for details.
- Event report
  As the event is sent from network side, the module will process the event and report it to users, e.g., receiving text message, incoming call ringer, etc.

1.2.3 Syntax of AT Command

All AT commands are started with "AT" or "at" and ended with <CR>, uppercase or lowercase.

- Commands without parameters: AT[+|&]<command>
- Query Commands: AT[+|&]<command>?
- Help Commands: AT[+|&]<command>=?
- Commands with parameters: AT[+|&]<command>=<par1>,<par2>,<par3>…

Returned Syntax of AT commands:

- <CR><LF><character string relative to AT commands><CR><LF>
- Returned error: <CR><LF><ERROR>[ERROR information]<CR><LF>
- Something special, such as ATV0（returned Syntax）, ATQ1（compress result code）

AT commands status report（OK, ERROR）can be classified into such types below:

- It will return “ERROR” string if the Syntax of AT commands is incorrect.
- If extended error report（+CMEE）is enabled, it will return “CME ERROR：<Err>”or “CMS ERROR: <SmsErr>”and different error code.
- If the execution of AT commands is successful, it will return “OK”

1.3 Abbreviations

A		
ADC	Analog-Digital Converter	
AFC	Automatic Frequency Control	
AGC	Automatic Gain Control	
ARFCN	Absolute Radio Frequency Channel Number	
ARP	Antenna Reference Point	
ASIC	Application Specific Integrated Circuit	
B		
BER	Bit Error Rate	
BTS	Base Transceiver Station	
C		
CDMA	Code Division Multiple Access	
CDG	CDMA Development Group	
CS	Coding Scheme	
CSD	Circuit Switched Data	
CPU	Central Processing Unit	
D		
DAI	Digital Audio interface	
DAC	Digital-to-Analog Converter	
DCE	Data Communication Equipment	
DSP	Digital Signal Processor	
DTE	Data Terminal Equipment	
DTMF	Dual Tone Multi-Frequency	
DTR	Data Terminal Ready	

E		
EFR	Enhanced Full Rate	
EGSM	Enhanced GSM	
EMC	Electromagnetic Compatibility	
EMI	Electro Magnetic Interference	
ESD	Electronic Static Discharge	
ETS	European Telecommunication Standard	
F		
FDMA	Frequency Division Multiple Access	
FR	Full Rate	
G		
GPRS	General Packet Radio Service	
GSM	Global Standard for Mobile Communications	
H		
HR	Half Rate	
I		
IC	Integrated Circuit	
IMEI	International Mobile Equipment Identity	
ISO	International Standards Organization	
ITU	International Telecommunications Union	
L		
LCD	Liquid Crystal Display	
LED	Light Emitting Diode	
M		
MCU	Machine Control Unit	
MMI	Man Machine Interface	
MS	Mobile Station	
P		
PCB	Printed Circuit Board	
PCL	Power Control Level	
PCS	Personal Communication System	
PDU	Protocol Data Unit	

PLL	Phase Locked Loop	
PPP	Point-to-point protocol	
R		
RAM	Random Access Memory	
RF	Radio Frequency	
ROM	Read-only Memory	
RMS	Root Mean Square	
RTC	Real Time Clock	
S		
SIM	Subscriber Identification Module	
SMS	Short Message Service	
SRAM	Static Random Access Memory	
T		
TA	Terminal adapter	
TDMA	Time Division Multiple Access	
TE	Terminal Equipment also referred it as DTE	
U		
UART	Universal asynchronous receiver-transmitter	
UIM	User Identifier Management	
USB	Universal Serial Bus	
V		
VSWR	Voltage Standing Wave Ratio	
Z		
ZTE	ZTE Corporation	

2 AT Commands

2.1 Module Identity Commands

2.1.1 +CGMI: inquire manufacturer's information

Description	This command is mainly used to inquire the manufacturer's information. MT will return a character string containing the manufacturer's information.	
Syntax	+CGMI	<CR><LF>+CGMI: <manufacturer><CR><LF> <CR><LF>OK<CR><LF>
	+CGMI=?	<CR><LF>OK<CR><LF>
Parameters	<manufacturer>: manufacturer's information; the value will be a character string with no more than 63 characters.	
Example	AT+CGMI	+CGMI +CGMI: XXX CO., LTD OK

2.1.2 +CGMM: inquire product's name

Description	This command is mainly used to inquire the product's name. The value of Model ID could be the text information with 1 line or multiple lines, which is determined by the manufacturer. The model ID is mainly used to identify the device's model and it can contain the product's name and any information that the manufacturer wants to provide. The number of returned characters should not exceed 2048 bytes, including the end mark.	
Syntax	+CGMM	<CR><LF>+CGMM: <production_name><CR><LF> <CR><LF>OK<CR><LF> if these is any error regarding MT; <CR><LF>+CME ERROR: <err>
	+CGMM=?	<CR><LF>OK<CR><LF>
Parameters	<production_name>: the product's name; the value is a character string. <length limit 63>.	
Example	AT+CGMM	+CGMM: E220 //product name: E220 OK

2.1.3 +CGMR: inquire software version

Description	This command is used to check the software version.	
Syntax	+CGMR	<CR><LF>+CGMR: <softversion><CR><LF> <CR><LF>OK<CR><LF>
	+CGMR=?	<CR><LF>OK<CR><LF>
Parameters	< softversion >: the software version; the value will be a character string with no more than 31 characters.	
Example	AT+CGMR	+CGMM: CT_G_0C.11.61.R OK

2.1.4 ^HWVER: inquire hardware version

Description	This command is used to check the hardware version.	
Syntax	^HWVER	<CR><LF>^HWVER: <hardversion><CR><LF> <CR><LF>OK<CR><LF> if these is any error regarding MT; +CME ERROR: <err>
	< hardversion >: the hardware version; the value will be a character string with no more than 30 characters.	
Parameters		
Example		

2.1.5 ^MEID: inquire MEID

Description	This command is used to inquire the terminal's MEID. The Syntax of returned value will be hexadecimal.	
Syntax	^MEID	<CR><LF>^MEID: <meid><CR><LF> <CR><LF>OK<CR><LF> if these is any error regarding MT; +CME ERROR: <err>
	^MEID=?	<CR><LF>OK<CR><LF>
Parameters	< meid >: directly return with the single board's MEID.	
Example		

2.1.6 +GSN: inquire ESN

Description	This command is used to inquire the terminal's ESN. The Syntax of returned value will be hexadecimal.	
Syntax	+GSN	<CR><LF>+GSN: <ESN><CR><LF> <CR><LF>OK<CR><LF> if these is any error regarding MT; +CME ERROR: <err>
	+GSN?	<CR><LF>OK<CR><LF>
Parameters	< ESN >: directly return with the terminal's ESN.	
Example	AT＋GSN	+GSN: 42FB40B5 OK

2.1.7 +UMID: inquire UIMID

Description	This command is used to return the R-UIM card's UIMID. The Syntax of returned value will be hexadecimal.	
Syntax	+UMID	<CR><LF>+UMID: <un><CR><LF> <CR><LF>OK<CR><LF> if these is any error regarding MT; +CME ERROR: <err>
	+UMID?	<CR><LF>+UMID: <un><CR><LF> <CR><LF>OK<CR><LF>
Parameters	< un >：UIMID	
Example		

2.1.8 +CIMI: inquire IMSI

Description	This command is used to inquire the device's IMSI. The returned value is a decimal character string, which is compose of the following:	

Not exceeding 15 characters		
3 char	2 or 3 char	
MCC	MNC	MSIN

MCC Mobile Country Code
MNC Mobile Network Code, GSM application
MSIN Mobile Subscriber Identity Number

Syntax	+CIMI	<CR><LF>+CIMI: <imsi><CR><LF> <CR><LF>OK<CR><LF> Or: +CME ERROR: <err>

	+CIMI?	<CR><LF>+CIMI: <imsi><CR><LF> <CR><LF>OK<CR><LF> Or: +CME ERROR: <err>
Parameters	< ESN >: directly return the terminal's ESN	
Example	AT＋CIMI	+CIMI: 1234512345678 //MCC is 123, MNC is 45, MSIN is 12345678

2.1.9 +GCAP: inquire transmission capability domain

Description	This command is used to list the transmission capability domain currently supported by the module.	
Syntax	+GCAP	Return the module's current transmitting mode Remarks: currently only support EXECUTE command, use SET command to return OK
	< ESN >: directly return the terminal's ESN	
Parameters	AT＋GCAP	+CIS707, +MS, +ES, +DS, +FCLASS OK //Return +CIS707, indicating the module currently supports TIA-EIA-IS-707F protocol. +FCLASS is in FAX mode.
Example		

2.1.10 I: inquire the device's information

Description	The ATI command is used to inquire the module's relevant information: manufacturer's information (+CGMI), product name (+CGMM), software version (+CGMR), ESN(+GSN), capability list (+GCAP).	
Syntax	I[value]	Return all modules' ID information
	< value >: <value>=0, check the above modules' relevant ID information: <value> is equal to <value>=0	
Parameters	ATI	Manufacturer: +CGMI: XXX CO.,LTD Model: XXXX Revision: 11.005.00.00.000 ESN: +GSN +GCAP: +CIS707-A, CIS-856, +MS, +ES, +DS, +FCLASS OK
Example		

2.2 Call Control Commands

2.2.1 D: dial command

Description	The product only supports dial using data service in CDMA system.	
Syntax	D[digits]	<CR><LF>OK<CR><LF> When failed: <CR><LF>ERROR<CR><LF>
Parameters	< digits >：called phone number, ASCII character, the legal characters only include:‘0’-‘9’,‘*’,‘#’ Remarks: ATDP，ATDT，AT*D will all be used as ATD. ATD#777 is exclusively used for packet data dialling.	
Example	ATD44345678 //data call	.... CONNECT //enter online data status

2.2.2 H: hang up command

Description	This command is used to disconnect from remote subscribers. Upon a conference call, the each connected subscribers will be disconnected.	
Syntax	H<value>	<CR><LF>OK<CR><LF> When failed: <CR><LF>ERROR<CR><LF>
Parameters	< value >: integral type value. As the value is 0, disconnect and return OK (for any other value, return error). If the command doesn’t have <value>, it functions the same as ATH0 (ATH is equal to ATH0).	
Example		

2.2.3 A: answer command

Description	This command is used to answer the incoming call. Upon an incoming call, TE will inform T to answer the call. If there is another third-party call, you can still use this command to answer it.	
Syntax	A	<CR><LF>OK<CR><LF>
Parameters		
Example		

2.2.4 +CHV hang up voice call command

Description	This interface is used to hang up a voice call in CDMA system.	
Syntax	+CHV	<CR><LF>OK<CR><LF> Upon an error: <CR><LF>+CME ERROR: <err><CR><LF>
Parameters		
Example		

2.2.5 +CDV dial command

Description	This interface is used to originate a voice call to from the network side.	
Syntax	+CDV[digits]	<CR><LF>OK<CR><LF> if these is any error regarding MT; <CR><LF>+CDV ERROR: <err><CR><LF>
Parameters	<digits> called phone number, ASCII code, the legal characters include: '0'—'9', '*', '#', '+'. '+' can only appear at the front of the number and the maximum length of the number can not exceed 24 (not including '+').	
Example	AT+CDV02158756348	<CR><LF>OK<CR><LF>

2.2.6 RING

Description	Upon an incoming call, MT will report it to TE within a period of time (T=5s).	
Syntax	Unsolicited message	RING
Parameters		
Example		

2.2.7 +CRING: expand incoming call and set command

Description	This command is used to control if the incoming call adopts expand mode or not. The expansion command provides more detailed information about incoming call type (including voice, fax, data, etc.) as a mobile terminal has a incoming call, MT will report it to TE within a period of time (T=5s).	
Syntax **Parameters**	+CRING=[<n>]	<CR><LF>OK<CR><LF>
	+CRING?	<CR><LF>+CRING: <n><CR><LF> <CR><LF>OK<CR><LF>
	+CRING=?	+CRING:(supported <n> list)
Description	<n>: 0: disable expand mode; 1: enable expand mode, default: 0	

Syntax	<type>： +CRING: VOICE all common voice calls +CRING: DATA all data calls +CRING: FAX all fax calls +CRING: UNKNOWN unknown calls	
Parameters	AT+CRING?	<CR><LF>+CRING: 0<CR><LF> <CR><LF>OK<CR><LF>
	AT+CRING＝?	<CR><LF>+CRING: (0-1)<CR><LF> <CR><LF>OK<CR><LF>

2.2.8 ^PREFMODE: select network mode

Description	This command is used for users to set mandatory priority network mode.	
Syntax	^PREFMODE =<pref_mode>	<CR><LF>OK<CR><LF> Upon an error <CR><LF>ERROR<CR><LF>
	^PREFMODE?	<CR><LF>^PREFMODE: <pref_mode><CR><LF> <CR><LF>OK<CR><LF>
	^PREFMODE =?	^PREFMODE:(<pref_mode> supported range) <CR><LF>OK<CR><LF>
Parameters	< pref_mode >： 2 CDMA mode 4 HDR mode 8 CDMA/HDR HYBRID mode Remarks: for those modules supporting CDMA 1x only, this command might not realize.	
Example		

2.2.9 ^FIC incoming calls filtering command (optional)

Description	This command is used to inquire and set incoming call filtered parameters. After the setting of this command, only allow the incoming call from certain phonebook. The emergency number and special number are not restricted by this command. After the module is restarted, the command value will be saved.	
Syntax	^FIC=<state>[,<pb>]	<CR><LF>OK<CR><LF> Or: <CR><LF>＋CME ERROR: <err><CR><LF>
	^FIC?	^FIC =<state>[,<pb>] <CR><LF>OK<CR><LF>
	^FIC =?	^FIC :(supported <state> list),(supported <pb> list) <CR><LF>OK<CR><LF> or <CR><LF>＋CME ERROR: <err><CR><LF>

Parameters	<pb>: set filtered phonebook: RM, ME, MT	
	<state>: represents the function's status 0 Enable filtering function 1 Disable filtering function (default)	
Example	AT^FIC=?	^FIC: (0-1),("RM","ME","MT") <CR><LF>OK<CR><LF>
	AT^FIC =0,"RM" // enable filtering R-UIM phonebook	<CR><LF>OK<CR><LF>
	AT^FIC?	^FIC: 0,"RM" // read ^FIC parameter <CR><LF>OK<CR><LF>
	AT^FIC =1 // disable ^FIC function	<CR><LF>OK<CR><LF>
	AT^FIC?	^FIC: 1 //read ^FIC parameter <CR><LF>OK<CR><LF>

2.2.10 ^FIC outgoing calls filtering command (optional)

Description	This command is used to inquire and set outgoing call filtered parameters. After the setting of this command, only allow the outgoing call from certain phonebook. The emergency number and special number are not restricted by this command. After the module is restarted, the command value will be saved.	
Syntax	^FOC=<state>[,<pb>]	<CR><LF>OK<CR><LF> or: <CR><LF>+CME ERROR: <err><CR><LF>
	^FOC?	^FOC =<state>[,<pb>] <CR><LF>OK<CR><LF>
	^FOC =?	^FOC :(supported <state> list),(supported <pb> list) <CR><LF>OK<CR><LF> or <CR><LF>+CME ERROR: <err><CR><LF>
Parameters	<pb>: set filtered phonebook: RM, ME, MT	
	<state>: represents the function's status 2 Enable filtering function 3 Disable filtering function (default)	
Example	AT^FOC=?	^FOC: (0-1),("RM","ME","MT") <CR><LF>OK<CR><LF>
	AT^FOC =0,"RM" // enable filtering R-UIM phonebook	<CR><LF>OK<CR><LF>
	AT^FOC?	^FOC: 0,"RM" // read ^FIC parameter <CR><LF>OK<CR><LF>

	AT^FOC =1 // disable ^FOC function.	<CR><LF>OK<CR><LF>
	AT^FOC?	^FOC: 1 //read ^FOC parameter <CR><LF>OK<CR><LF>

2.2.11 ^FLASH: send Flash/Flash with Information

Description	The command is used to realize FLASH function. Firstly check the validity of parameters, including number and length. The validated characters include ASCII number, and the number's length is 0~32. Then send FLASH command. Need report an error when the terminal is not under talk status. When there is a call waiting, send FLASH command without telephone number to answer the second call. During a call, send FLASH command with telephone number to make a second call. Report error in other cases.	
Syntax	^FLASH=<phone number>	<CR><LF>OK<CR><LF> Or: <CR><LF>+CME ERROR: <err><CR><LF>
	^FLASH	<CR><LF>OK<CR><LF> Or: <CR><LF>+CME ERROR: <err><CR><LF>
Parameters	< phone number >: dialled telephone number, the number's length is :0~32. Remarks: It's not guaranteed that Flash message will be sent out 100% for sure, the BS will not return with acknowledgement no matter it succeeds or not.	
Example		

2.2.12 +CLIP: incoming caller ID presentation and set command

Description	As +CLIP command is enabled, the display will be reported to TE periodically (5s) after RING upon an incoming call. Set enable or disable this function.	
Syntax	+CLIP=<n>	<CR><LF>OK<CR><LF> Or: <CR><LF>+CME ERROR: <err><CR><LF>
	+CLIP	<CR><LF>+CLIP: <n><CR><LF> <CR><LF>OK<CR><LF>
	+CLIP=?	<CR><LF>+CLIP: (0,1)<CR><LF>
	Unsolicited message	+CLIP:<number>,<type>,,,,<CLI validity>
Parameters	< number >: incoming call number, ASCII character; The legal characters only include 0 - 9, * , #.	
	<type>: type of number, "145" represents international number.	

	<CLI validity>: 0 CLI valid 1 CLI rejected by call originating party; 2 CLI can't be used due to the network restriction or network problem. Reserve three strings between <type> and <CLI validity>	
	<n>: enable/disable +CLIP 0 disable CLI (default) 1 enable CLI	
Example		+CLIP: 82882690,129,,,,0 //if the number can be displayed, then report.
		+CLIP:,129,,,,1 //if the number can not be displayed because the other party enables CLIR, then report.
		+CLIP:,129,,,,2 //if the number can not be displayed due to the network problems, then report.

2.2.13 +CCWA: call waiting and set command

Description	This indicates that there is another incoming call during a call.	
Syntax	+CCWA = <n>	<CR><LF>OK<CR><LF> If input an invalid value in <n> <CR><LF>+CME ERROR: <err><CR><LF>
	+CCWA?	<CR><LF>+CCWA: <n><CR><LF> <CR><LF>OK<CR><LF>
	+ CCWA=?	<CR><LF>+ CCWA:(supported <n> list)<CR><LF>
	Unsolicited message	+CLIP:<number>,<type>,,,,<CLI validity>
Parameters	< number >: incoming call number, ASCII character; The legal characters only include 0 - 9, * , #.	
	<type>: type of number, "145" represents international number, and 129 represents unknown type.	
	< Class >: 1 – voice call	
	<n>: enable/disable +CLIP 0 enable 1 disable	
	<alpha>: search the corresponding name of the incoming call in phonebook.	
Example	AT+CCWA=1	<CR><LF>OK<CR><LF>
	AT+CCWA=?	+CCWA: (0,1) <CR><LF>OK<CR><LF>
	AT+CCWA?	+CCWA: 1 <CR><LF>OK<CR><LF>

2.2.14 +CLCC: current call list

Description	This command is used to display all the current line formation during the call status (e.g., call waiting, three-way call). Set enable or display the function.	
Syntax	+CLCC=<state>	<CR><LF>OK<CR><LF> Or: <CR><LF>＋CME ERROR: <err><CR><LF>
	+CLCC	[+CLCC:<id1>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<priority>]]] [+CLCC:<id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type>[,<alpha>[,<priority>]]][...]]] <CR><LF>OK<CR><LF>
	CLCC?	+CLCC: <state> <CR><LF>OK<CR><LF> Or: <CR><LF>＋CME ERROR: <err><CR><LF>
	CLCC=?	<CR><LF>OK<CR><LF>
Parameters	<number>: call number, ASCII character, the legal characters only include: ’0’–‘9’,‘*’ ,‘#’,‘+’, and ‘+‘ can only appear in front of the number.	
	<type>: type of call.	
	< state >: 0 disable, 1 enable	
	<dir>: call direction, taking the value below: 0 MO 1 MT	
	<idx>: caller ID	
	<state>: call status, taking the value below: 0（active） 1（held） 2（dialing） 3（alerting） 4（incoming） 5（waiting）	
	<alpha> the corresponding text of the calling number in phonebook (not support temporarily, reserve the string)	
	<priority> Do not support the string temporarily.	
	<mode> call type, taking the value below: 0（voice） 1（data） 2（fax）	
	<mpty> multi-party call, taking the value below: 0 non multi-party call 1 multi-party call	
Example		

2.2.15 ^ORIG: call originating

Description	Indicating MT is originating a call.	
Syntax	Unsolicited message	^ORIG:<call_x>,<call_type>
Parameters	<call_x>: call ID, ranging from 1 to 6;	
	<call_type>: call type, take the value as below: 0 voice call 7 OTA call（standard OTASP number） 8 OTA call（none standard OTASP numbers） 9 emergency call	
Example		

2.2.16 ^CONN: call connected

Description	When the call is connected, MT will report it to TE, indicating the current status has already become to call status.	
Syntax	Unsolicited message	^CONN <call_x>,<call_type>
Parameters	<call_x>: call ID	
	<call_type>: call type, take the value as below: 0 voice call 7 OTA call（standard OTASP number） 8 OTA call（none standard OTASP numbers） 9 emergency call	
Example		

2.2.17 ^CEND: call ended

Description	When the call is ended, MT will report it to TE, informing TE the reason of ending the call and the talk duration.	
Syntax	Unsolicited message	^CEND:<call_x>,<duration>,<end_status>[,<cc_cause>]
Parameters	<call_x>: call ID, ranging from 1 to 6;	
	<duration>: call duration, unit: second	

	<end_status>: call end reason. CM_CALL_END_OFFLINE=0, single board at OFFLINE CM_CALL_END_NO_SRV=21, single board no service CM_CALL_END_FADE=22, ended normally CM_CALL_END_INTERCEPT=23, intercepted by BS during the calling CM_CALL_END_REORDER=24, receive the recorder from BS during the calling CM_CALL_END_REL_NORMAL=25, call released by BS CM_CALL_END_REL_SO_REJ=26, current SO rejected by BS CM_CALL_END_INCOM_CALL=27, receive the call from BS CM_CALL_END_ALERT_STOP=28, receive the signal of stopping ringer upon incoming call CM_CALL_END_CLIENT_END=29, client end ended normally CM_CALL_END_ACTIVATION=30, activation ended upon OTASP call CM_CALL_END_MC_ABORT=31, MC stops originating a call or conversation CM_CALL_END_RUIM_NOT_PRESENT=34, RUIM does not exist CM_CALL_END_NDSS_FAIL=99, NDSS error CM_CALL_END_LL_CAUSE=100, release from bottom layer, need inquire cc_cause for further information CM_CALL_END_CONF_FAILED=101, network response failed after call originating. CM_CALL_END_INCOM_REJ=102, rejected as called. CM_CALL_END_SETUP_REJ=103, rejected during the call connecting. CM_CALL_END_NETWORK_END=104, release due to network, need inquire cc_cause for further information. CM_CALL_END_NO_FUNDS=105, No funds CM_CALL_END_NO_GW_SRV=106, Not in service area <cc_cause>: call control information. UNASSIGNED_CAUSE 1 NO_ROUTE_TO_DEST 3 CHANNEL_UNACCEPTABLE 6 OPERATOR_DETERMINED_BARRING 8 NORMAL_CALL_CLEARING 16 USER_BUSY 17 NO_USER_RESPONDING 18 USER_ALERTING_NO_ANSWER 19 CALL_REJECTED 21 NUMBER_CHANGED 22 NON_SELECTED_USER_CLEARING 26 DESTINATION_OUT_OF_ORDER 27 INVALID_NUMBER_SYNTAX 28 FACILITY_REJECTED 29 RESPONSE_TO_STATUS_ENQUIRY 30

	NORMAL_UNSPECIFIED 31 NO_CIRCUIT_CHANNEL_AVAILABLE 34 NETWORK_OUT_OF_ORDER 38 TEMPORARY_FAILURE 41 SWITCHING_EQUIPMENT_CONGESTION 42 ACCESS_INFORMATION_DISCARDED 43 REQUESTED_CIRCUIT_CHANNEL_NOT_AVAILABLE 44 RESOURCES_UNAVAILABLE_UNSPECIFIED 47 QUALITY_OF_SERVICE_UNAVAILABLE 49 REQUESTED_FACILITY_NOT_SUBSCRIBED 50 INCOMING_CALL_BARRED_WITHIN_CUG 55 BEARER_CAPABILITY_NOT_AUTHORISED 57 BEARER_CAPABILITY_NOT_PRESENTLY_AVAILABLE 58 SERVICE_OR_OPTION_NOT_AVAILABLE 63 BEARER_SERVICE_NOT_IMPLEMENTED 65 ACM_GEQ_ACMMAX 68 REQUESTED_FACILITY_NOT_IMPLEMENTED 69 ONLY_RESTRICTED_DIGITAL_INFO_BC_AVAILABLE 70 SERVICE_OR_OPTION_NOT_IMPLEMENTED 79 INVALID_TRANSACTION_ID_VALUE 81 USER_NOT_MEMBER_OF_CUG 87 INCOMPATIBLE_DESTINATION 88 INVALID_TRANSIT_NETWORK_SELECTION 91 SEMANTICALLY_INCORRECT_MESSAGE 95 INVALID_MANDATORY_INFORMATION 96 MESSAGE_TYPE_NON_EXISTENT 97 MESSAGE_TYPE_NOT_COMPATIBLE_WITH_PROT_STATE 98 IE_NON_EXISTENT_OR_NOT_IMPLEMENTED 99 CONDITIONAL_IE_ERROR 100 MESSAGE_NOT_COMPATIBLE_WITH_PROTOCOL_STATE 101 RECOVERY_ON_TIMER_EXPIRY 102 PROTOCOL_ERROR_UNSPECIFIED 111 INTERWORKING_UNSPECIFIED 127 REJ_UNSPECIFIED 160 AS_REJ_RR_REL_IND 161 AS_REJ_RR_RANDOM_ACCESS_FAILURE 162 AS_REJ_RRC_REL_IND 163 AS_REJ_RRC_CLOSE_SESSION_IND 164 AS_REJ_RRC_OPEN_SESSION_FAILURE 165 AS_REJ_LOW_LEVEL_FAIL 166 AS_REJ_LOW_LEVEL_FAIL_REDIAL_NOT_ALLOWED 167 MM_REJ_INVALID_SIM 168 MM_REJ_NO_SERVICE 169 MM_REJ_TIMER_T3230_EXP 170 MM_REJ_NO_CELL_AVAILABLE 171

	MM_REJ_WRONG_STATE 172 MM_REJ_ACCESS_CLASS_BLOCKED 173 ABORT_MSG_RECEIVED 174 OTHER_CAUSE 175 CNM_REJ_TIMER_T303_EXP 176 CNM_REJ_NO_RESOURCES 177 CNM_MM_REL_PENDING 178 CNM_INVALID_USER_DATA 179	
Example		

Note: if call is ended due to network side, the string <cc_cause> will be reported; if the local call is ended before responded by the network side, the string <cc_cause> will not be reported;

2.3 SMS Commands

2.3.1 +CPMS: set prior storage location

Description	The SET command is used to set the corresponding SMS storage media and return the current using information of selected storage media. READ command is used to return the name and using information of current selected storage media. The TEST command is used to return all types of storage media supported by MT.	
Syntax	+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS:<used1>,<total1>,<used2>,<total2>,<used3>,<total3> <CR><LF>OK<CR><LF> if there is any error regarding SMS: <CR><LF> +CMS ERROR: <err><CR><LF>
	+CPMS?	+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> <CR><LF>OK<CR><LF> if there is any error regarding SMS: <CR><LF> +CMS ERROR: <err><CR><LF>
	+CPMS=?	+CPMS: (supported <mem1> list),(supported <mem2> list),(supported <mem3> list) <CR><LF>OK<CR><LF>
Parameters	< mem1>：the value of character string, indicating the storage media for reading/deleting SMS; the optional value can be: “SM”, representing UIM card “ME”, representing NV	
	<mem2>: the value of character string, indicating the storage media for writing/sending SMS; the optional value is the same as <mem1>	
	<mem3>: the value of character string, indicating the storage media for receiving SMS; the optional value is the same as <mem1>.	
	<total1>: the value of integral number, indicating the total number of messages saved in <mem1>.	
	<total2>: the value of integral number, indicating the total number of messages saved in <mem2>.	
	<total3>: the value of integral number, indicating the total number of messages saved in <mem3>.	
	<used1>: the value of integral number, indicating the current number of messages in <mem1>;	
	<used2>: the value of integral number, indicating the current number of messages in <mem2>;	
	<used3>: the value of integral number, indicating the current number of messages in <mem3>;	
Example		

Remarks:

The default value for <mem1>, <mem2> and <mem3> is “ME”.

2.3.2 ^HSMSSS: select SMS parameter

Description	The SET command is used to set the parameters upon sending SMS, including ack, priority, coding method, confidentiality level.	
Syntax	^HSMSSS=<ack>,<prt>,<fmt>,<prv>	<CR><LF>OK<CR><LF> if there is any error regarding SMS: <CR><LF> ERROR<CR><LF>
	^HSMSSS?	^HSMSSS: <ack>, <prt>,<fmt>,<prv> <CR><LF>OK<CR><LF>
	^HSMSSS =?	^HSMSSS: (supported <ack>,<prt>,<fmt>,<prv> list) <CR><LF>OK<CR><LF>
Parameters	**<ack>:** whether or not need SMS status report, take the value as below: **0:** do not need SMS status report; **1**: need SMS status report	
	<prt>: message priority level, refer to ^HCMGW to take the value:	
	<fmt>: coding method, refer to ^HCMGW to take the value:	
	<Prv>: Privacy level, refer to ^HCMGR to take the value:	
Example		

2.3.3 +CNMI: set new message alert

Description	The Set command is used to set the procedure that new messages are reported to TE.	
Syntax	+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	<CR><LF>OK<CR><LF> if there is any error regarding SMS: <CR><LF> +CMS ERROR: <err><CR><LF>
	+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> <CR><LF>OK<CR><LF>
	+CNMI=?	+CNMI: (supported <mode> list),(supported<mt> list),(supported <bm> list),(supported <ds> list),(supported <bfr> list) <CR><LF>OK<CR><LF>
Parameters	**<mode>:** set the message notice method (currently support mode=1). **0:** cache the message notice in ME. If ME's cache memory is full, new notice will cover the older one. **1:** directly send the message notice to TE. When it is unable to send, give up the notice. (default) **2:** directly send the message notice and message status report to TE. When it is unable to send, cache the message notice into ME, and send to TE at a time. **Note:** Message notice will be cached in volatile memory. If MT is powered off before sending, the message could lose. Therefore, as <mode>=0 or 2, can't use the message to directly forward (<mt>=2 and 3).	

	<mt>: is used to set the message storage and notice rules. There are three ways for new message's storage and notice: 1. Save SMS-DELIVER into MT, and send to TE a notice about storage location. (default) +CMTI: <mem>,<index> 2. Do not save SMS-DELIVER into MT, and send SMS-DELIVERS directly to TE. ^HCMT:<callerID>,<year>,<month>,<day>,<hour>,<minute>,<second>,<lang>,<format>, <length>, <prt>, <prv>,<type>,<tag><CR><LF><msg> <CTRL+Z> 3. Save SMS-DELIVER into MT, and do not send SMS-DELIVER notice to TE.	
	<bm>: used to set cell broadcast information, do not temporarily support.(default: 1)	
	<ds>: used to set the message receipt. **0:** do not send the message receipt to TE. **1:** do not save the message receipt to MT, but send to TE. ^HCDS: <callerID>,<year>,<month>, <day>, <hour>, <minute>,<second>, <lang>, <format>, <length>, <prt>, <prv>,<type>,<tag><CR><LF><msg> <CTRL+Z> **2:** save the message receipt to MT, and send a notice to TE through +CDSI to show the storage location. **+CDSI:** <mem>,<index>	
	<bfr>: used to set the cache processing from <mode>=0 to <mode>=1, 2. **0:** after entering <mode>1-2, send unsolicited result code to TE at a time. **1:** after entering <mode>1-2, clear unsolicited result code.	
Example	CNMI=1,1,0,1,0	For new class1 message, save the message into MT and report the storage location (+CMTI: ME,1)； For message status report, do not save but directly report (^HCDS:). If the messages notices with report failure (under online data status), give up the message notice.

Remarks:

The default settings <mode>=1,<mt>=1,<bm>=0,<ds>=2,<bfr>=0.

See the table below for the relationship between <mt> value and the message's storage and alert method (the table is only for EW).

<mt	No class or class 1	Class 0 or message waiting indication group(discard	Class 2 or message waiting indication group(store)	Class 3
0				
1	+CMTI	[+CMTI	+CMTI	+CMTI
2	^HCMT & +CNMA	^HCMT [&+CNMA	+CMTI	^HCMT & +CNMA
3	+CMTI	[+CMTI]	+CMTI	^HCMT & +CNMA

Note:

^HCMT & +CNMA indicates requiring TE to send acknowledgement (+CNMA).

2.3.4 ^HCMT: new SMS direct report

Description	Do not save newly received messages, and directly report to TE.	
Syntax	Unsolicited message	^HCMT: <callerID>,<year>,<month>,<day>,<hour>,<minute>, <second><lang>,<format>,<length>,<prt>,<prv>,<type>,<tag>[,<UDH>]<CR><LF><msg><CTRL+Z>
Parameters	<callerID>: number of message sender	
	<year, month, day, hour, minute, second>: year, month, day, hour, minute, second when received SMS.	
	<lang>:language, refer to ^HCMGW to take the value:	
	<format>:indicating the coding format of the message, refer to ^HCMGW to take the value	
	<Length>: the length of received message.	
	<prt>:message priority level, refer to ^HCMGW to take the value:	
	<Prv>:Privacy level, refer to ^HCMGR to take the value:	
	<type>:type of message, refer to ^HCMGR to take the value:	
	<tag>:value of integral number, SMS status, refer to ^HCMGR to take the value:	
	<UDH>:user data header, please refer to ^HCMGR.	
	<Msg>: received SMS. Control characters:	
	<ctrl-Z>:indicating the ending of one message, character: '0x1A'(Unicode: '0x001A')	
	<ESC>:cancel the sending of the message, character: '0x1B'(Unicode: '0x001B')	
Example		

2.3.5 ^CMTI: message arriving indication

Description	Indicates new messages are received (or new message report).	
Syntax	Unsolicited message	+CMTI: <mem>,<index>
Parameters	<index>: the value of integral type, the location in memory.	
	<mem>: type of memory, currently support "SM" and "ME", other memory optional. **"BM":** broadcast message memory. **"ME":** ME message memory **"MT"**: memory relating to ME **"SM":** UIM message memory **"TA":** TA message memory **"SR":** status report memory	
Example	AT+CNMI=3,1	<CR><LF>OK<CR><LF>
	AT+CMGS=”13391170278”,3, 0 //send to yourself >TEST	+CMGS: 75 OK +CMTI: "SM",251

2.3.6 ^HCDS: new SMS status direct report

Description	Do not save the newly received message and directly report to TE.	
Syntax	Unsolicited message	^HCDS: <callerID>,<year>,<month>,<day>,<hour>,<minute>, <second><lang>,<format>,<length>,<prt>,<prv>,<type>,<tag><CR><LF><msg><CTRL+Z>
Parameters	<callerID>: number of message sender	
	<year, month, day, hour, minute, second>: year, month, day, hour, minute, second when received SMS.	
	<lang>:language, refer to ^HCMGW to take the value:	
	<format>:indicating the coding format of the message, refer to ^HCMGW to take the value.	
	<Length>: the length of received message.	
	<prt>:message priority level, refer to ^HCMGW to take the value:	
	<Prv>:Privacy level, refer to ^HCMGR to take the value	
	<type>:type of message, refer to ^HCMGR to take the value:	
	<tag>:value of integral number, SMS status, refer to ^HCMGR to take the value:	
	<Msg>: received SMS. Control characters:	
	<ctrl-Z>:indicating the ending of one message, character: '0x1A'(Unicode: '0x001A')	
	<ESC>:cancel the sending of the message, character: '0x1B'(Unicode: '0x001B')	
Example		

2.3.7 +CDSI : new message status report indication

Description	Indicates new message status report is received and show the storage location.	
Syntax	Unsolicited message	+CDSI: <mem>,<index>
Parameters	**<mem>:** message memory **"SM":** UIM message memory **"ME":**ROMSIM message memory	
	<**index>:** the value of integral type, location in memory	
Example		

2.3.8 +CNMA: acknowledge new messages

Description	This command is used for the terminal to reply after receiving the message from the module by ^HCDS and ^HCMT. The Execution command is used to acknowledge the receipt of new message directly sent to TE. For the use of this command, please refer to the descriptions of +CNMI command. Before the acknowledgement of previous message, MT would not sent TE another ^HCDS or ^HCMT indication. If MT doesn't obtain the acknowledgement in specified period of time (network timeout), MT would send RP-ERROR to network and automatically set the parameter <mt> and <ds> of +CNMI command as 0. It would forbid sending message notice to TE. If it requires MT to report the message notice again, you need set <mt> & <ds> again. If the command is executed, but the message is not acknowledged, return with +CMS ERROR: <err> The Test command is used to <n> value supported by the command. If it supports 0 only, it means the command doesn't support send by TPDU.	
Syntax	+CNMA	<CR><LF>OK<CR><LF> if there is any error regarding SMS: <CR><LF>+CME ERROR: <err><CR><LF>
	+CNMA?	<CR><LF>OK<CR><LF>
Parameters		
Example		

2.3.9 ^HCMGL: SMS list

Description	The EXECUTION command is used to return all SMS index designated by <stat> from mem1>. The SMS status report will be processed as a common received message. The TEST command is used to return all stat values.	
Syntax	^HCMGL[=<stat>]	Under text mode, the command is successfully executed: ^HCMGL: <index1>, <tag1> ^HCMGL: <index2>, <tag2> …… OK Otherwise: +CMS ERROR: <err>
	^HCMGL =?	^HCMGL: (supported <stat> list) OK
Parameters		

	<stat>: type of message, the default value is 0: **0:** received unread message **1:** received read message **2:** saved unsent message **3:** saved messages in Sent Messages 4 **<index>:** value of integral type, location in memory	
	<tag>: value of integral number, SMS status, please refer to ^HCMGR to take the value	
Example		

2.3.10 MGR: read a message

Description	The EXECUTION command is used to return the message saved at index from <mem1>. The SMS status will be revised by single board or back end according to the value of <mode>. The TEST command is used to return OK.	
Syntax	^HCMGR=<index>[,<mode>]	Under text mode, the command is successfully executed: ^HCMGR: <callerID>, <year>, <month>, <day>,<hour>,<minute>, <second>, <lang>, <format>,<length>, <prt>,<prv>,<type>,<stat>[,<UDH>]<CR><LF><msg> <CTRL+Z> OK Otherwise: +CMS ERROR: <err>
	^HCMGR=?	OK
Parameters	<callerID>: number of message sender.	
	<parameter>：<index>: value of integral type, location in memory	
	<mode>: SMS status modifying mode: 0: change to READ status 1: Do not change the status	
	<year, month, day, hour, minute, second>: year, month, day, hour, minute, second when received SMS.	
	<lang>: language, refer to ^HCMGW to take the value	
	<format>: indicating the coding format of the message, refer to ^HCMGW to take the value;	
	<Length>: the length of received message.	
	<prt>: message priority level, refer to ^HCMGW to take the value:	
	<Prv>: privacy level 0 Normal 1 Restricted 2 Confidential 3 Secret	

	<type>: type of message 0 Normal 1 CPT 2 Voice Mail 3 SMS Report 4 PUSH SMS	
	<stat>: type of message, refer to ^HCMGW to take the value:	
	<UDH>: user data header, a hex character string. Generally long message and PUSH SMS has UDH, e.g., “050003640201”, among which 05 is UDHL.	
	<Msg>: received messages.	
	<ctrl-Z>: '0x001A' indicating the ending of one message. Under non-UNICOD: '0x1A'; under UNICOD:'0x001A'	
Example		

2.3.11 ^HCMGW: save SMS

Description	Save one message into <mem2> through +CPMS command. You could save it into SM or ME. It takes two steps to save a message. Firstly send: ^HCMGW=<oa/da>[,<tooa/toda>],<stat>,<ptr>,<type>,<format>,<lang>[,<year>,<month>,<day>,<hour>,<minute>,<second>] End with(CR) After waiting for the reply from MS <CR><LF><greater_than><space>(IRA 13, 10, 62, 32),TE send the message text, and end with <ctrl-Z>(IRA 26)	
Syntax	^HCMGW=<oa/da>[,<tooa/toda>],<stat>,<ptr>,<type>,<format>,<lang>[,[<year>],[<month>],[<day>],[<hour>],[<minute>],[<second>][,<UDH]]<CR><text><ctrl-Z/ESC>	^HCMGW:<index>
	^HCMGW=?	OK
Parameters	<oa/da>: number of message sender/recipient. Take the value from 0~9,*, #, up to 20 digits.	
	< tooa/toda>: address coding method. The number of one byte, this parameters works as the address coding is 8bit. Now 4bit coding is used, therefore this parameter doesn’t work. The value is fixed to be 0. The higher four digits: number type: **0:** UNKNOWN **1:** INTERNATIONAL The lower four digits: number plan: **0:** UNKNOWN **1:** TELEPHONY	

	<stat>: value of integral type, indicating the storage status of SMS, take the value as below: **0:** received unread messages **1:** received read messages **2:** saved unsent messages **3:** saved sent messages **4:** all messages (the value is only applicable for +CMGL command)
	<lang>: language, take the value as below: 0 UNSPECIFIED; 1 ENGLISH; 2 FRENCH; 3 SPANISH; 4 JAPANESE; 5 KOREAN; 6 CHINESE; 7 HEBREW。
	<ptr>: value of integral type, indicating the priority level of the message, take the value as below: 0:Normal 1:Interactive 2:Urgent 3:Emergency
	<year>,<month>,<day>,<hour>,<minute>,<second>: year, month, day, hour, minute, second when received SMS.
	<UDH>: user data header, a hex character string. Generally long message and PUSH SMS has UDH, e.g., “050003640201”, among which 05 is UDHL.
	<index>:the location number in memory, take a decimal from 0~9, and the value ranges from 0 to the max. capacity of the memory.
	format>: indicating the coding method of the message, take the value as below: **0:** GSM 7 BIT **1:** ASCII code (coding range <=7F). Send the original characters in ASCII coding, for example, the ASCII code for the letter A is 0x41, then the character to be transmitted is “A”. 2: IA5 (optional) **3:** OCTET (optional) **4:** LATIN (optional) **5:** LATIN_HEBREW (optional) **6:** UNICODE (coding range >7F). Send the original value in UNICODE coding. For example, the UNICODE for the Chinese character “一” is 0x4E00, then the character to be transmitted is ‘0x4E00‘. **7:** Other coding method

	<type>: type of message 0 Normal 1 CPT 2 Voice Mail 3 SMS Report 4 PUSH SMS	
	<text>:message text	
	<UDH>: user data header, a hex character string. Generally long message and PUSH SMS has UDH, e.g., “050003640201”, among which 05 is UDHL.	
	<ESC>: cancel the sending of the message. Under non-UNICOD: '0x1B', under UNICOD:'0x001B'	
	<ctrl-Z>: indicating the ending of one message. Under non-UNICOD: '0x1A'; under UNICOD:'0x001A'	
Example		

2.3.12 +CMSS: send saved message to network (optional)

Description	This command is used to send the saved messages to the network. The parameters <da>, <toda>, <priority>,<privacy>, <cbn> are optional. Edit the saved message and send according to the new parameters if the parameters have new values; otherwise, send according to the original parameters. After the saved message is edited and sent, the message status will change to “STO SENT”. Follow the conventions below when sending the received message: Message type set as SMS-SUBMIT Message validity type <tvp> set as the relative valid date <rpl> & <udh> follows the parameters of originally received message <vp> set as 167 <ts>,<scts>,<tosca>, <lang> & <dcs> follows the parameters of originally received message If <da> and <toda> doesn’t have new value, replace with <oa> & <tooa>. If <priority>,<privacy> & <cbn> doesn’t have new value, follow the parameters of originally received message	
Syntax	+CMSS=<index>[,<da>[,<toda>][,<priority>][,<privacy>][,<cbn>]]	+SMSS: <mr> OK or +CMS ERROR: <err>
Parameters	<index>: message storage index	
	<da>: message destination address	
	<toda>: type of destination address 129 domestic number 145 international number	

	<priority>: priority level: 1 Common（default） 2 interaction 3 Urgent 4 Emergent	
	<privacy>: privacy level 1 not restricted 2 restricted 3 privacy 4 confidential	
	<cbn>: call back number	
	<mr>: message mark: 0－65535	
Example	AT+CMSS=7	+CMSS: 2531 OK
	AT+CMSS=7, "13391170278",129,3,0,"13391170278"	+CMSS: 2532 OK

Remarks:

If no character is received after the module sends the message and before the module returns the result, the operation will be interrupted. If the message is sent to the network successfully, +CMSS:<mr> will be sent to the terminal no matter if the operation is interrupted or not.

2.3.13 +CMGD: delete messages

Description	The Execution command is used to delete the messages at <index> in <mem1>. Please refer to +CPMS for details on the settings and descriptions about <mem1>. If the second parameter is given and the value is not “0”, MT would omit the parameter <index> and follow the parameter <delflag> to execute. For detailed rules, please refer to the value descriptions. If the deletion fails, return with +CMS ERROR: <err>. The Test command is used to return the storage location for current existed messages and supported <delflag> value.	
Syntax	+CMGD=<index>[,<delflag>]	OK Or +CMS ERROR: <err>
	+CMGD=?	+CMGD: (supported <index> list)[,(supported <delflag> list)] OK
Parameters	<index>: the message storage location.	

	<delflag>: 0 (or default) delete the messages designated by <index>. **1:** delete all read messages in first prior memory, save unread messages, sent messages and unsent messages. **2:** delete all read and sent messages in first prior memory, save unread messages and unsent messages. **3:** delete all read, sent and unsent messages in first prior memory, save unread messages. **4:** delete all messages including unread messages in first prior memory.	
Example	AT+CMGD=256	OK
	AT+CMGD=1，4	OK

2.3.14 ^HCMGS: send messages

Description	Send a message to network side. It takes two steps to save a message. Firstly send ^HCMGS=<da>[,<toda>] End with（CR）, after waiting for the reply from MS <CR><LF><greater_than><space>(IRA 13, 10, 62, 32)，TE send the message text, and end with <ctrl-Z>（IRA 26）	
Syntax	^HCMGS=<da>[[,<toda>][,<UDH>]]<CR> text is entered<ctrl-Z/ESC>>	^HCMGS: <mr> OK or +CMS ERROR: <err>
	^HCMGS=?	OK
Parameters	<da>: number of message recipient. Take the value from 0~9,*, #, up to 20 digits.	
	<toda>: address coding method. The number of one byte, this parameters works as the address coding is 8bit. Now 4bit coding is used, therefore this parameter doesn't work. The default value is 0. The higher four digits: number type: **0:** UNKNOWN **1:** INTERNATIONAL The lower four digits: number plan: **0:** UNKNOWN **1:** TELEPHONY	
	<UDH>: user data header, a hex character string. Generally long message and PUSH SMS has UDH, e.g., "050003640201", among which 05 is UDHL.	
	<mr>: the message's mark, a decimal from 0~9, take the value from 0~65535	
	<ctrl-Z>: indicating the ending of one message. Under non-UNICOD: '0x1A'; under UNICOD:'0x001A'.	
	<ESC>: Cancel the sending of the message. Under non-UNICOD: '0x1B', under UNICOD:'0x001B'.	
Example		

Remarks:

TEXT mode: when encoding with GSM 7 BIT or UNICODE, the text character will be given in local form. For example, The value of "会" in UCS2 code is 4E1A, then the text in the package should be'0x4E1A' rather than the character string 4E1A".

2.3.15 ^HCMGSS: message sent report

Description	If the message is sent successfully, report to TE through this command.	
Syntax	Unsolicited message	^HCMGSS: <mr>
Parameters	<mrx>: the message's mark, take a decimal from 0~9, and the value ranges from 0～65535.	
Example		

2.3.16 ^HCMGSF: message unsent report

Description	If the message is unsent, report to TE through this command.	
Syntax	Unsolicited message	^HCMGSF: <err_code>

Parameters	< err_code >: take the value of the error code as below as the message is unsent: 0WMS_ADDRESS_VACANT_S; 1 WMS_ADDRESS_TRANSLATION_FAILURE_S; 2 WMS_NETWORK_RESOURCE_SHORTAGE_S; 3 WMS_NETWORK_FAILURE_S; 4 WMS_INVALID_TELESERVICE_ID_S; 5 WMS_OTHER_NETWORK_PROBLEM_S; 6 WMS_OTHER_NETWORK_PROBLEM_MORE_FIRST_S; 31 WMS_OTHER_NETWORK_PROBLEM_MORE_LAST_S; 32 WMS_NO_PAGE_RESPONSE_S; 33 WMS_DESTINATION_BUSY_S; 34 WMS_NO_ACK_S; 35 WMS_DESTINATION_RESOURCE_SHORTAGE_S; 36 WMS_SMS_DELIVERY_POSTPONED_S; 37 WMS_DESTINATION_OUT_OF_SERVICE_S; 38 WMS_DESTINATION_NO_LONGER_AT_THIS_ADDRESS_S; 39 WMS_OTHER_TERMINAL_PROBLEM_S; 40 WMS_OTHER_TERMINAL_PROBLEM_MORE_FIRST_S; 47 WMS_OTHER_TERMINAL_PROBLEM_MORE_LAST_S; 48 WMS_SMS_DELIVERY_POSTPONED_MORE_FIRST_S; 49 WMS_SMS_DELIVERY_POSTPONED_MORE_LAST_S; 64 WMS_RADIO_IF_RESOURCE_SHORTAGE_S; 65 WMS_RADIO_IF_INCOMPATIBLE_S; 66 WMS_OTHER_RADIO_IF_PROBLEM_S; 67 WMS_OTHER_RADIO_IF_PROBLEM_MORE_FIRST_S; 95 WMS_OTHER_RADIO_IF_PROBLEM_MORE_LAST_S; 96 WMS_UNEXPECTED_PARM_SIZE_S; 97 WMS_SMS_ORIGINATION_DENIED_S; 98 WMS_SMS_TERMINATION_DENIED_S; 99 WMS_SUPPL_SERVICE_NOT_SUPPORTED; 100 WMS_SMS_NOT_SUPPORTED_S; 101 WMS_RESERVED_101_S; 102 WMS_MISSING_EXPECTED_PARM_S; 103 WMS_MISSING_MANDATORY_PARM_S; 104 WMS_UNRECOGNIZED_PARM_VALUE_S; 105 WMS_UNEXPECTED_PARM_VALUE_S; 106 WMS_USER_DATA_SIZE_ERROR_S; 107 WMS_OTHER_GENERAL_PROBLEMS_S; 108 WMS_OTHER_GENERAL_PROBLEMS_MORE_FIRST_S; 109 WMS_OTHER_GENERAL_PROBLEMS_MORE_LAST_S;	
Example		

2.3.17 ^SMMEMFULL: storage media full

Description	When the message storage media is full, report it.	
Syntax	Unsolicited message	^SMMEMFULL:<mem_type>
Parameters	**<mem_type>**: value of character string, indicating the type of full storage media. **"SM":** indicating UIM card **"ME":** indicating NV	
Example		

2.4 Network Service Commands

2.4.1 +CREG: network registration and roaming

Description	This command is used to check the module's registration and roaming status.	
Syntax	AT+CREG=<n>	OK Or +CME ERROR: <err >
	AT+CREG?	+CREG: <n><SID>,<NID>,<stat> OK
	AT+CREG=?	+CREG: (list all supported <n>)
Parameters	<n>: 0- forbid network registration to provide result code 1- allow network registration to provide result code +CREG:<system ID>,<network ID><status>	
	<SID>: 0-32767	
	<NID>: 0-65535	
	<Stat>：0-not registered, the terminal currently doesn't search new operators 1-already registered local network 2-not registered, but the terminal is searching the network 3-registration rejected 4-registered, under roaming status	
Example	AT+CREG=?	+CREG: (0-1) OK
	AT+CREG?	+CREG: 8465,65535,1 OK
	AT+CREG=1	OK +CREG: 8465,65535,1

2.4.2 ^MODE: system mode change

Description	As the system mode changes, MS will report it to TE.	
Syntax	Unsolicited message	^MODE:<sys_mode>
Parameters	**<sys_mode>:** system mode, take the value as below: **0:** no service **2:** CDMA mode **4:** HDR mode (don't support) **8:** CDMA/HDR HYBRID (don't support)	
Example		

2.4.3 +CSQ check CDMA RSSI and BER

Description	This command is used to check RSSI and BER.	
Syntax	+CSQ	+CSQ: <rssi>,<ber> OK
	+CSQ=?	+CSQ: (supported <rssi> list),(supported <ber> list) OK
Parameters	<rssi >: receiving signal strength indication 0 ≤-125 dBm 1...30 take the integral number from (31×（125－|rssi|）/ 50) dBm 31 ≥ -75 dBm 99 unknown or unpredicted	
	<ber>: (Bit error rate): don't temporarily support BER query. Return with 99 upon Execution and Test command.	
Example	AT+CSQ	+CSQ: 31,99 OK

2.4.4 +NETPAR: check network parameters

Description	This command is used to display activated/optional/adjacent pilot channel's network parameters	
Syntax	AT+NETPAR=<mode>	If mode =0 +NETPAR: <BS_ID>,<BS_P_Rev>,<P_Rev_in_use>,<channel>,<PN>,<SID>,<NID>,<slot cycle index>,<rssi>,<Ec/Io>,<Tx power>,<Tx Adj> OK If mode =1 + NETPAR: < candidate PN>,< Candidate Ec/Io> OK if mode =2 + NETPAR: <channel>,<PN>,<SID>,<NID>,<slot cycle index>,<rssi>,<Ec/Io>,<Tx power>,<Tx Adj> <CR><LF> [< neighbour 1 PN>,< neighbour 1 Ec/Io><CR><LF> [< neighbour 2 PN>,< neighbour 2 Ec/Io><CR><LF> ……. < neighbour 6 PN>,< neighbour 6 Ec/Io>] OK or: +CME ERROR: <err>
	AT+NETPAR=?	+NETPAR: (list all supported <mode>)

Parameters	<mode >: 0-pilot activated set 1-pilot optional set 2-pilot adjacent set
	<BS_ID>: Base station identification
	<BS_P_Rev>：Base Station P Rev 1 the representation protocol is P_REV_JSTD008 3 the representation protocol is P_REV_IS95A 4 the representation protocol is P_REV_IS95B 6 the representation protocol is P_REV_IS2000 7 the representation protocol is P_REV_IS2000_REL_A
	<P_Rev_in_use>: currently used P Rev 1 the representation protocol is P_REV_JSTD008 3 the representation protocol is P_REV_IS95A 4 the representation protocol is P_REV_IS95B 6 the representation protocol is P_REV_IS2000 7 the representation protocol is P_REV_IS2000_REL_A
	<channel>: 0-2047
	<PN>: 0－512
	<SID>: system ID 0-32767
	<NID>: network ID 0-65535
	<slot cycle index>: 0~7 slot cycle index
	<RSSI>: signal strength, unit: dBm, e.g.:-52dbm
	<Ec/Io>: SNR unit: (-1/2)dbm, e.g.,: return 60, -30dbm
	<Tx power>: average transmitting power
	<Tx Adjust>: adjust the transmitting power b1/2dbm , e.g.,: return 60, -30dbm
Example	

2.4.5 ^DSDORMANT: enter dormant

Description	If there is no uplink or downlink data transmission in specified period of time after the data service is established, the network or MS will originate to enter dormant. Inquire the setting time at MS side through AT+CTA?. When the time is 0, MS side will turn off the origination and enter dormant function.	
Syntax	Unsolicited message	^DSDORMANT : <dormant_state>
	^DORMANT	OK Or +CME ERROR: <err>
Parameters	<dormant_state >:dormant state : **0:** non Dormant state **1:**Dormant state **2-255:** reserved	
Example		

2.5 Module Access Control Commands

2.5.1 AT: check AT communication command

Description	Return OK after executing the command.	
Syntax	AT	OK
Parameters		
Example	AT	OK

2.5.2 +CPIN: unlock RUIM

Description	The READ command is used to indicate whether or not require the password. The SET command is used to verify, unlock PIN and PIN 2. If the currently required password is PIN or PIN2, input +CPIN=<pin> to verify. If the currently required password is PUK or PUK2, then input +CPIN=<pin>, <newpin> to unlock. The first parameter is UIM PUK or UIM PUK2, the second parameter, <newpin>，is new PIN or PIN2. When using SET command, if PIN input is not required, return with an error: +CME ERROR。 **Note:** upon emergency call, verifying PIN or PUK might cause the emergency call to end.	
Syntax	+CPIN=<pin>[,<newpin>]	OK if there is any error regarding MT: +CME ERROR: <err>
	+CPIN?	+CPIN:<code> OK
	+CPIN=?	OK
Parameters	<pin>,<newpin>: character string, must add the quotation mark. The characters in the string must take from ‘0’~‘9’, otherwise, it will directly return with error.	
	<code>: character string (no quotation mark.） **READY:** no password request for MT, don’t provide due to the function of protected by PIN2, but there is still verification request. So there do not return READY. **UIM PIN:** UICC/SIM PIN password request **UIM PUK**: UICC/SIM PUK password request, used to unlock SIM PIN blocked **UIM PIN2**: PIN2 password request（the version doesn’t temporarily provide the function.） **UIM PUK2**: PUK2 password request, used to unlock SIM PIN2 blocked	
Example		

Remark: *Considering the future function expansion, we don’t disable UIM PIN2 verification function.*

2.5.3 ^CPIN: PIN management

Description	This command is used to return the verification times for PIN and PUK. The READ command is used to indicate whether or not the password request existed. And the remaining verification times are displayed. The SET command is used to verify, unlock PIN and PIN2. If the current password request is PIN or PIN2, then input +CPIN=<pin> to verify. If the current password request is PUK or PUK2, then input +CPIN=<pin>,<newpin> to unlock. The first parameter is UIM PUK or UIM PUK2, and the second parameter <newpin>, is new PIN or PIN2. When using SET command, if PIN input is not required, return with an error: +CME ERROR。 ***Note:*** *upon emergency call, verifying PIN or PUK might cause the emergency call to end*.	
Syntax	^CPIN=<pin>[,<newpin>]	OK if there is any error regarding MT: +CME ERROR: <err>
	^CPIN?	^CPIN:<code>,[<times>],<puk_times>,<pin_times>,<puk2_times>,<pin2_times> OK if there is any error regarding MT: +CME ERROR: <err>OK
	^CPIN=?	OK
Parameters	<pin>,<newpin>: character string, must add the quotation mark. The characters in the string must take from '0'~'9', otherwise, it will directly return with error.	
	<code>: character string (no quotation mark.） **READY:** no password request for MT, **UIM PIN:** UICC/SIM PIN password request **UIM PUK:** UICC/SIM PUK password request, used to unlock SIM PIN blocked **UIM PIN2**: PIN2 password request（the version doesn't temporarily provide the function.） **UIM PUK2:** PUK2 password request, used to unlock SIM PIN2 blocked	
	<times>: remaining input times, for PIN and PIN2, the max. number of input times is 3, for PUK and PUK2, the max. number of input times is 10. Note: if there exists password request, <times> shall show the remaining verification times; if there doesn't exist password request, the string shall be null.	
	<puk_times>: remaining PUK input times, max. input times: 10	
	<puk2_times>: remaining PIN input times, max. input times: 3	
	<pin_times>: remaining PUK2 input times, max. input times: 10	
	<pin2_times>: remaining PIN2 input times, max. input times: 3	
Example		

2.5.4 +CPWD PIN change

Description	This command is used to change PIN1 and PIN2. PIN should be enabled before changing.	
Syntax	+CPWD=<fac>,<oldpwd>,<newpwd>	OK if there is any error regarding MT: +CME ERROR: <err>
	+CPWD=?	+CPWD: list of supported (<fac>,<pwdlength>)s OK if there is any error regarding MT: +CME ERROR: <err>
Parameters	<oldpwd>,<newpwd>: old password, new password, type of character string, the max. length is decided by <pwdlength>. The characters in the string must take from '0'~'9', otherwise, it will directly return with error.	
	<fac>: designate the object for the command (only support SIM card, take the value "SC"). "SC" UIM card PIN "P2" UIM card PIN2 "AB" do not support temporarily	
	<pwdlength>: the max. length of device lock password.	
Example		

2.5.5 +CLCK: lock

Description	This command is used to enable and disable all kinds of function locks of MT. Except for inquiry, enabling/disabling operation requires the password.	
Syntax	+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	As <mode>=2, and the command is successfully executed: +CLCK: <status> OK As <mode>≠2, and the command is successfully executed: OK if there is any error regarding MT: +CME ERROR: <err>
	+CLCK=?	+CLCK: (supported <fac> list) OK

Parameters	<fac>: designate the object for the command (only support UIM card, take the value “SC”). "SC": UIM card (if this command is set, MT requires the password when powered on) "AB": Barring all calls "AI": Barring all incoming calls "AO": Barring all outgoing calls "IR": Barring international roaming incoming calls "OI": Barring international outgoing calls "OX": Barring international outgoing calls except home country ***Note:*** *the passwords for "SC" & "P2" are saved in UIM card, and other password will be set at network side.*	
	<mode >: 0: Unlock 1: Lock 2: Query Status	
	<status>： 0: deactivated 1: activated	
	<passwd>: type of character string, must add the quotation mark. The password is the same as one for the command +CPWD. As mode is set as “0” and “1”, this option is a must. The characters in the string must take from ‘0’~‘9’, otherwise, it will directly return with error.	
	<classx>: (Default as 7) currently don’t support. 1: voice call 2: data 4: fax 8: message	
Example		

2.5.6 ^RRU: restricted R-UIM access command (optional)

Description	This command is used to provide limited access to the source files in RUIM card.	
Syntax	AT^RRU=<command>,[<file_id>[,<P1>,<P2>,<P3>]]	^RRU: <sw1>,<sw2>[,<response>] OK Or: +CME ERROR: <err>

	AT^RRU=?	^RRU: (supported <command> list), (possible <file_id> range), (possible <P1> range), (possible <P2> range), (possible <P3> range), OK Or: +CME ERROR: <err>
Parameters	<command>: number type. Indicating ME's executed commands in R-UIM card. 176 Read BINARY 178 Read RECORD 192 Get RESPONSE 242 STATUS	
	<field_id>: number type. Used to designate accessed source files. Except for STATUS command, the parameter should be optional.	
	<P1>,<P2>,<P3>: number type. Indicating ME's passing R-UIM parameters. Except for GET RESPONSE and STATUS, these three parameters should be optional. READ BINARY <P1> (0...255) <P2> (0...255) <P3> length (0...255) READ RECORD <P1> record No. (0...255) <P2> Mode "02" = next record "03" = last record "04" = relevant/absolute mode, P1 is set as 00, which indicates the current record. <P3> length (0...255) GET RESPONSE <P1> "00" <P2> "00" <P3> length (0...255) STATUS <P1> "00" <P2> "00" <P3> length (0...255)	

<sw1><sw2>: number type. Indicating the execution results returned from R-UIM. Return to TE no matter the execution succeeds or fails.

Return after the command is executed successfully:

<sw1>	<sw2>	Descriptions
144	0	End the command normally
145	Xx	End the command normally, and return the data with the length of "XX"
158	Xx	R-UIM data download error and return the data with the length of "XX"
159	Xx	Return the data with the length of "XX"

Return after the execution of command is delayed:

<sw1>	<sw2>	Descriptions
147	0	R-UIM Application Toolkit is busy now. The command can't be executed now.
146	0x	The command is successfully executed, but the execution will be repeated for '0X' times during the process.
146	64	Memory problem
148	0	Not select EF
148	2	Exceed the range (invalid address)
148	4	• File ID not found
		• Format not found
148	8	Files not consistent
152	2	Not initialize CHV
152	4	• Not meet the access conditions
		• Not successful CHV authentication, remaining attempts more than 1
		• Not successful CHV unlock, remaining attempts more than 1
		• authentication failed
152	8	• conflict with CHV status
152	16	• 与无效状态冲突
152	64	• 不成功的 CHV 鉴权，无剩余尝试

	<response>: response after the previous command is executed successfully (hex character in uppercase). Return data from STATUS & GETRESPONSE, including the file type and size; or request data from READ BINARY or READ RECORD.	
Example	AT^RRU=178,28474,1,4,26 //READ RECORD, I file(6F3A) data, 1, current, 26 bytes	^RRU: 144,0,72656EFFFFFFFFFFFFFFFFFF06818984143243FFFFFFFFFFFFF //execute command successfully and mark 26 bytes data of the 1st record OK
	AT^RRU=? //Test Command	^RRU=(176,178,192, 242),(12037-28599),(0-255),(0-255),(0-255) //possibly returned value

2.6 Phonebook Commands

2.6.1 +CPBS: select phonebook memory (optional)

Description	This command is used to select the phonebook read/write memory. The SET command is used to select a kind of phonebook memory. The reset settings will be “SM” after MT is restarted. The corresponding command of other phonebook shall use the phonebook memory selected by this command. The READ command is used to return the current selected phonebook memory. It might return the number of entries which have been used and the maximum number of entries. The TEST command is used to return the type of phonebook memory supported by the command.	
Syntax	+CPBS=<storage>[,<reserved>]	OK if there is any error regarding MT: +CME ERROR: <err>
	+CPBS?	+CPBS: <storage>[,<used>,<total>] OK if there is any error regarding MT: +CME ERROR: <err>
	+CPBS=?	+CPBS: (supported <storage> list) OK
Parameters	<storage>: type of phonebook memory. "SM": UIM card phonebook "ME": NV phonebook	
	<reserved>: reserved	
	<used>: value of integral type, indicating the number of entries which have been used in the selected memory.	
	<total>: value of integral type, indicating the max. number of entries in currently selected memory.	
Example		

2.6.2 ^CPBR: read phonebook (optional)

Description	The command is used to return the selected phonebook entries between index1 and index2. If there are no entries between index1 and index2, it will return: +CME ERROR: not found. You could only input index1, and it will return the phonebook entries at index1. The Test command is used to return the selected phonebook memory’s location, and the max. length of <number>, <text>.

Syntax	^CPBR=<index1>[,<index2>]	[^CPBR: index1>,<number>,<type>,<text>,<coding> [[...]^CPBR:<index2>,<number>,<type>,<text>],<coding>]] OK if there is any error regarding MT: +CME ERROR: <err>
	^CPBR=?	^CPBR: (supported <index> list), [<nlength>],[<tlength>] OK if there is any error regarding MT: +CME ERROR: <err>
Parameters	<index1><index2>: value of integral value, location in phonebook memory. The value of index1,index2 ≤ +CPBS?, return total.	
	<number>: type of character string, telephone number;	
	<type>: type of number 129 local number 145 international number (start with ”+”) 128 unknown number	
	<text>**:** type of character string, the encoding method is set by +CSCS command	
	<coding>: coding plan, indicates the character coding of <text>and designates the language; **1:** RAW mode (upload <text> in the format of original data) **2:** ASCII (upload <text> in the format of ASCII)	
	<nlength>: value of integral type, indicating the max. length of telephone number;	
	<tlength>: value of integral type, indicating the max. length of name.	
Example	AT+CPBS="ME"	OK
	AT^CPBR=?	^CPBR: (1-500),40,24 OK
	AT^CPBR=1	OK
	AT^CPBR=1,3 // the previous three records are null	OK

2.6.3 +CPBF: search phonebook (optional)

Description	This command is used to search the phonebook entries by name. If no matching records are found, return OK; otherwise return the matched records. The matching starts with the first location of the character string, for example, if you want search “jo”, then the entries with "John Smith" and "Mike Jones" will be found. It doesn’t support partial matching, for example, if you search “jo”, the entry with “Maryjo” can not be found.

Syntax	+CPBF=<findtext>	[+CPBF: <index1>,<number>,<type>,<text>[[...]<CR><LF> +CBPF: <index2>,<number>,<type>,<text>]] OK or: +CME ERROR: <err>
	AT+CPBF=?	+CPBF: [<nlength>],[<tlength>] OK
Parameters	<ifindtext>: searching character is case sensitive (even if only one character), the encoding method is set by +CSCS command.	
	<index1><index2>: current phonebook index	
	<number>: phone number	
	<type>: type of phone number 129 local number 145 international number (start with “+”) 128 unknown number	
	<text>: type of character string, the encoding method is set by +CSCS command	
Example	AT+CPBS="MT"//select phonebook	OK
	AT^CPBF=“K”//search the entries matching with “K”, return empty.	OK
	AT+CPBF="Voice" //search the text matching with “Voice”	+CPBF: 101,"+97252999080",145,"Voice Mail" OK
	AT+CPBF="" //search all entries	+CPBF: 2,"8475767800",129,"Moto Voicemail" +CPBF: 101,"+97252999080",145,"Voice Mail" OK
	AT+CPBF="Moto"	+CPBF: 2,"8475767800",129,"Moto Voicemail" OK

2.6.4 ^CPBW: write phonebook (optional)

Description	The command is used to write the phonebook entries into the location by designated index in selected phonebook memory. If the command parameter only contains index, then the corresponding phonebook entries at index will be erased. If index is omitted, but the parameter contains number string, then the phonebook entry will be written into an empty position. If there is no empty position, then report: +CME ERROR: memory full The Test command is used to return the selected phonebook memory’s location, and the max. length of <number>, <text>. When saving phonebook, make sure that all input length should be in the range of max. length.	
Syntax	^CPBW=[<index>][,<number>[,<type>[,<text>,<coding>]]]	OK if there is any error regarding MT: +CME ERROR: <err>

	^CPBW=?	^CPBW: (supported <index> list),[<nlength>],(supported <type> list),[<tlength>] OK if there is any error regarding MT: +CME ERROR: <err>
Parameters	<index >: value of integral type, location in phonebook memory	
	<number>: telephone number, type of character string (legal characters include: '0-9','#','*','+','(',')','-')。'(',')','-', No matter where any of these three characters '(， ')'，'-' appears, the processing program will ignore it, and not report error as illegal character.	
	<type>: number type, '145' represents international number.	
	<text>: type of character string, represents name (do not support Enter, Quotation mark). the encoding method is set by +CSCS command.	
	<coding>: coding plan, represents the character code of <text>and designates the language: 1 RAW mode（upload <text> in the format of original data） 2 ASCII（upload <text> in the format of ASCII.	
	<nlength>: value of integral type, indicating the max. length of telephone number	
	<tlength> : value of integral type, indicating the max. length of name	
Example	AT+CBPS="ME"	OK
	AT^CPBW=?	^CPBW: (1-500),40,(129,145),24 OK
	AT^CPBW=1,"0546123456",129,"AAA"	OK
	AT^CPBR=1	^CPBR: 1,"0546123456",129,"AAA"
	AT^CPBW=1,"0546123456",129,"BBB"	OK
	AT^CPBR=1	^CPBR: 1,"0546123456",129,"BBB"

2.7 Hardware Information Commands

2.7.1 +CIEV: event report indication and set

Description	This command is used to turn on or off the event report indication.	
Syntax	AT+CIEV=<n>	<CR><LF>OK<CR><LF> or +CME ERROR：<err>
	AT+ CIEV?	<CR><LF>+CIEV:<n><CR><LF> <CR><LF>OK<CR><LF>
	Unsolicited message	<CR><LF>+CIEV:<ind>,<value><CR><LF>
Parameters	<n>: control the designated report result code 0- turn off event report 1-turn on event report The default value is 0 <ind>: the indicator's No. (among them, 3, 4, 6, 7 are optional) <value>: new indication value	
Example		

2.7.2 +MMR: restore factory settings

Description	This command is used to restore the device's factory settings.	
Syntax	AT+MMR	<CR><LF>OK<CR><LF> or +CME ERROR：<err>
Parameters		
Example		

2.7.3 ^SYSINFO: check system information

Description	The command is used to inquire current system information.	
Syntax	AT^SYSINFO	<CR><LF>^SYSINFO:<srv_status>,<srv_domain>,<roam_status>,<sys_mode>,<uim_state> <CR><LF> <CR><LF>OK<CR><LF>

Parameters	**<srv_status>:** system service status, take the value as below: 0: no service 1: restricted service 2: valid service 3: service in restricted area 4: power saving and sleep status <srv_domain>: system service domain, take the value as below: **0:** no service **1:** only CS service **2:** only PS service **3:** PS+CS service **4:** CS, PS unregistered, under search status **255:** CDMA does not support **<roam_status>:** roaming status, take the value as blow: **0:** non roaming status 1: roaming status <sys_mode>: System mode, take the value as below: 0: no service **1:** AMPS mode (do not use temporarily) **2:** CDMA mode **3:** GSM/GPRS mode **4:** HDR mode **5:** WCDMA mode **6:** GPS mode **7:** GSM/WCDMA **8:** CDMA/HDR HYBRID **<uim_state>:** UIM card status, take the value as below: **1:** UIM card status valid **240:** ROMSIM version **255:** UIM card does not exist **<lock_state>:** CDMA product do not use the parameter **<sys_submode>:** CDMA do not use the parameter
Example	

2.7.4 ^SIMST: UIM status change

Description	As the UIM card status changes, MT will actively report new status to TE.	
Syntax	Unsolicited message	<CR><LF>^SIMST:<uim_state><CR><LF>
Parameters	**<uim_state>:** UIM card status, take the value as below: **1:** UIM card status valid **240:** ROMSIM version **255:** UIM card does not exist	
Example		

2.7.5 +CCLK: check current date and time zone

Description	This command is used to check current date and time zone.	
Syntax	AT+CCLK?	<CR><LF>+CCLK: <time><CR><LF> <CR><LF>OK<CR><LF> or +CME ERROR：<err>
	AT+ CCLK=?	<CR><LF>+CCLK(l return supported <time>s)<CR><LF> <CR><LF>OK<CR><LF> or +CME ERROR：<err>
	AT+CCLK	<CR><LF>OK<CR><LF> or +CME ERROR：<err>
Parameters	<time>: ASCII character string format yy/MM/dd,hh:mm:ss±zz Or yy/MM/dd,hh:mm:ss yy -year [2000-2069] MM -Month month [01-12] dd - Day [00-31] hh –Hour [00-23] mm – Minute [00-59] ss – second [00-59] zz - (optional) time zone deflection (GMT, unit: a quarter) [-47...+48]. If omitted, the time deflection value is 0.	
Example	AT+CCLK=?	+CCLK: "88/12/31, 23:59:59, (-47-+48)" OK
	AT+CCLK?	+CCLK: "05/10/27,16:52:31+08"

2.7.6 +CSCS: select character set

Description	This command is used to select the character set used by the device.	
Syntax	AT+ +CSCS=[<ccur>]	<CR><LF>OK<CR><LF> or +CME ERROR：<err>
	AT +CSCS?	<CR><LF>+CSCS: <selected character set><CR><LF>
	AT+ CSCS=?	<CR><LF> +CSCS: (<supported character sets>) <CR> <LF>
Parameters	<ccur>：“ASCII” ASCII (0x00 – 0x7F) “GSM” GSM default character table (GSM 03.38 subclause 6.2.1) "UCS2" Unicode (ISO/IEC 10646 [32]) "UTF8" 8-bit Unicode (ISO 10646 transformation format) "8859-1" LATIN (ISO 8859-1)	

Example	AT+CSCS=? +CSCS: ("8859-1","ASCII","GSM","UCS2","UTF8") OK AT+CSCS? +CSCS: "ASCII" OK AT+CPBS = "ME" AT+CPBW=1,"8475763000",129,"Lin Zhao" OK AT+CSCS="UCS2" OK AT+CPBR=1 +CPBR: 1,"8475763000",129,”004C006E006E0020005A00680061006F” OK AT+CSCS="ASCII" OK AT+CPBR=1 +CPBR: 1,"8475763000",129,"Lin Zhao" OK

2.7.7 &C：DCD: set data carrier wave signal

Description	This command is used to check and set DCD. Once setting, it will take effect immediately.	
Syntax	AT&C<param>	OK If there is no parameter, then the value of &C will be set as default.
	AT&C?	&C:<param>
	AT&C=?	&C:(supported <param> list)
Parameters	<parameter>:0: DCD required to set ON all the time 1: DCD required to set ON in the following cases: A: In CSD Call ODM mode (on-line DATA mode) B: PPP call (ATD#777) set up already C: In ^IPCALL Transfer mode DCD required to set OFF in the following cases: A: In CSD Call (on-line command mode) or CSD call disconnected B: PPP call (ATD#777) disconnected or enter (pseudo command mode) C: Enter ^IPCALL (pseudo command mode) 2: In CSD and PPP call, DCD required to set OFF all the time. As MIPCALL is connecting (obtain IP address from the network), DCD required to set ON; As MIPCALL is disconnecting (IP address is cancelled), DCD required to set OFF. The default value is 1.	

Example	AT&C? &C: 1 OK AT&C0 OK

2.7.8 &D: set how the module responds DTR (optional)

Description	This command is used to check and set how the module responds to DTR signal in online mode (from ON to OFF).	
Syntax	AT&D<param>	OK If there is no parameter, then the value of &D will be set as default.
	AT&D?	&C:<param>
	AT&D=?	&C:(supported <param> list)
Parameters	<parameter>: as the DTR signal changes (from ON to OFF), the module responds: Dial in CSD mode 0,4 omit the change 1 the module needs to change to ASNY command mode (dialing or connecting status) 2,3 disconnect and return to command mode Dial in HSPD（High Speed Packet Data）mode: 0,4 omit the change 1 the module needs to change to pseudo command mode（dialing or connecting status） 2,3 disconnect and return to command mode The default value is 2.	
Example	AT&D? &D: 2 OK AT&D1 OK	

2.7.9 ^VOLT: check voltage

Description	^VOLT command is used to check the current voltage.	
Syntax	^VOLT	^VOLT :<voltage> OK Upon an error: ERROR
Parameters	<voltage>: unit: millivoltage	
Example		

2.7.10 +IPR: set and save port's baud rate

Description	This command is used to check, set and save the port's baud rate. The baud rate will be changed after the module returns "OK". After the module is restarted, the saved baud rate will be used as default value.	
Syntax	AT+IPR=<rate>[,<uart>] AT+IPR=<n>[,<uart>]	OK or :ERROR If the parameter <uart> is not set, the default value will be the current port's baud rate.
	AT+IPR?	+IPR: <rate> Return the current port's baud rate.
	AT+IPR=?	+IPR: (supported <n> list, supported <rate> list)
Parameters	<n> <rate>：0 not used 1 600 2 1200 3 2400 4 4800 5 9600 6 19200 7 38400 8 57600 9 not used 10 115200 11 300 12 230400 (only use for UART1) The default value is 10. <uart>: 1 UART1 2 UART2	
Example	AT+IPR=6 OK AT+IPR? +IPR: 19200 OK AT+IPR=? +IPR: (0-12,300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400) OK	

2.7.11 +IFC: set port's flow control

Description	This command is used to set the port's flow control method between MT and TE.	
Syntax	AT+IFC=[[<MT_by_TE>,[TE_by_MT>]]]	OK or: +CME ERROR: <err>
	AT+IFC?	+IFC: <MT_by_TE>,<TE_by_MT>

	AT+IFC =?	+IFC: (supported <MT_by_TE> list, supported <TE_by_MT> list)
Parameters	<MT_by_TE>: 0 no flow control 1 XON/XOFF control, and remove XON/XOFF from data flow; 2 hardware flow control 3 XON/XOFF control, and do not remove XON/XOFF from data flow; The default value is 2. <TE_by_MT> 0 No flow control 1 XON/XOFF control, remove XON/XOFF from data flow; 2 Hardware control The default value is 2.	
Example	AT+IFC=? +IFC: (0-3),(0-2) OK AT+IFC? +IFC: 2,2 OK AT+IFC=2,2 OK	

2.7.12+ CFUN: set operation mode

Description	This command is used to set MT's mode or restart MT.	
Syntax	+CFUN=[<fun>[,<rst>]]	OK Upon an error: +CME ERROR: <err>
	+CFUN?	+CFUN: <fun> OK if there is any error regarding MT: +CME ERROR: <err>
	+CFUN=?	+CFUN: (supported <fun> list), (supported <rst> list) OK
Parameters	<fun>: **0:** set as LPM（low power）mode（MT previous setting must be under non offline mode） **1:** set as online mode（default value）（MT previous setting must be under non offline mode） **4:** set as offline mode（MT previous setting must be under non FTM mode） **5:** set as FTM mode（MT previous setting must be under online mode） **6:** Restart MT （MT previous setting must be under offline mode **<rst>:** whether or not restart MT before the settings (do not temporarily support)	
Example		

2.7.13 ^RESET: reset

Description	This command is used to restart the module.	
Syntax	AT^reset	OK
Parameters		
Example	AT^reset OK	

2.7.14 ^PWROFF: power off the module

Description	This command is used to power off the module.	
Syntax	AT^PWROFF	OK
Parameters		
Example	AT^PWROFF OK	

2.7.15 ^IOC: configure general I/O output level

Description	This command is used to define the values of the device's 8 GPIO Pins.	
Syntax	AT^IOC=<Pin selection>,<Datavector>	OK or: +CME ERROR: <err>
	AT^IOC?	^IOC: <Data vector> OK
	AT^IOC=?	^IOC: (supported <Pin selection> list),(supported <Data vector>list) OK or: +CME ERROR: <err>
Parameters	<pin selection >： The value marks which I/O port are selected This value is a 8-bit character string only including '0' and '1', each bit corresponds to one physical I/O. 0 do not operate this PIN. 1 operate this PIN(default) <data vector>： This value marks the output level of each I/O port. Only the value of I/O port selected by <pin selection> is valid. This value is a 8-bit character string only including '0' and '1', each bit corresponds to one physical I/O. 0 physical low level. 1 physical high level (default). The 8 I/O ports are input I/O by default.	

Example	AT^IOC=? ^IOC: (00000000-11111111),(00000000-11111111) OK The operation method of single PIN AT^IOD=00010000,0 // configure the 5th I/O as output. OK AT^IOD? //read current I/O configuration ^IOD: 11101111// PIN1-4 6-8 for input, PIN5 for output. OK AT^IOC=00010000, 00010000 //configure PIN5 output high level OK AT^IOC? // read PIN's current level. ^IOC: 00010000// PIN5 for high level OK AT^IOD=00010000,0, 00010000 // configure PIN5 as output, and output high level. OK AT^IOC=00010000,00000000 // configure PIN5 and output low level OK AT^IOC?//read PIN's current level. ^IOC: 00000000 // PIN5 for low level OK Operation of multiple PINs. AT^IOD=00001111,0 // configure PIN1-4 as output. OK AT^IOD=11110000,1 //configure PIN5-8 as input. OK AT^IOD? // read PIN's current configuration. ^IOD: 11110000// PIN1-4 for output, PIN5-8 for input OK AT^IOC=00001111,00000011// configure PIN1-2 output high level, PIN3-4 output low level. OK AT^IOC?//read PIN's current level ^IOC: 01000011 //. PIN1-2 at high level, PIN7 at high level, other at low level OK AT^IOC=00001111,00000000 // configure PIN1-4 output low level . OK AT^IOC? // / read PIN's current level. ^IOC: 01110000 // PIN1-4 at low level, PIN5-7 at high level, PIN8 at low level. OK

2.7.16 ^IOD: define general I/O port's functions

Description	This command is used to configure general I/O functions, or configured as input or output, or configured as high level output or low level output.	
Syntax	AT^IOD=<Pin selection>,<Mode> [,<Data vector>]	OK:+CME ERROR: <err>
	AT^IOD?	^IOD: <Mode vector> OK
	AT^IOD=?	^IOD: (supported <Pin selection> list),(supported <Mode> list),(supported <Data vector> list) OK Or: +CME ERROR: <err>
Parameters	<pin selection>: The value marks which I/O port are selected This value is a 8-bit character string only including '0' and '1', each bit corresponds to one physical I/O. 0 do not operate this PIN. 1 operate this PIN(default) <mode>: Select PIN mode 0 output (level only) 1 input (level mode) <mode vector>: This value marks the input/output status of each I/O port. Only the value of I/O port selected by <pin selection> is valid. This value is a 8-bit character string only including '0' and '1', each bit corresponds to one physical I/O. 0 output (level only) 1 input (level mode) The 8 I/O ports are input I/O by default. <data vector>: This value marks the output level of each I/O port. Only the value of I/O port selected by <pin selection> is valid. This value is a 8-bit character string only including '0' and '1', each bit corresponds to one physical I/O. 0 physical low level. 1 physical high level (default). The 8 I/O ports are input I/O by default.	

Example	AT^IOD=? ^IOD: (00000000-11111111),(0,1),(00000000-11111111) OK AT^IOD=00010000,0 //configure PIN5 as output OK AT^IOD? ^IOD: 111011111 // PIN5 for output, other for input OK AT^IOD=00001111,0 // configure PIN1-4 as output. OK AT^IOD=11110000,1 //configure PIN5-8 as input OK AT^IOD? ^IOD: 11110000 // PIN1-4 for output, PIN5-8 for input. OK

2.8 TCP/IP Commands

2.8.1 ^IPCALL: set up wireless connection

Description	This command is used to set up a PPP connection with the base station and obtain a valid IP address.	
Syntax	AT^IPCALL=<Operation>[,<User name>,<Password>]	OK ^IPCALL: <IP address> or: +CME ERROR: <err> ^IPCALL: 0
	AT^IPCALL?	^IPCALL: <status>[,<IP>]
	AT^IPCALL=?	^IPCALL: (list of supported<operation>s)
Parameters	<status>: 0 disconnect 1 connect <User name>: If SIP is used, need use a designated username and password. One MIP data connection doesn't require the username and password. <Password>: if SIP is used, need use a designated username and password. One MIP data connection doesn't require the username and password. <IP-address>: IP address provided by the server.	
Example	AT^IPCALL=1,"User1","Pswd" //set up connection and obtain IP. OK ^IPCALL: 123.145.167.230 AT^IPCALL=0 //disconnect OK ^IPCALL: 0	

2.8.2 ^ IPOPEN: open Socket（UPD or TCP）

Description	This command is used to enable the module to initialize a new socket and set up a common connection with the remote end.	
Syntax	AT^IPOPEN=<Socket ID>,<Source Port>,<Remote IP>,<Remote Port>,<Protocol>	OK or: ^IPSTAT: <Socket ID>,<Status> or: +CME ERROR: <err>
	AT^IPOPEN?	^IPOPEN:<SocketID>,< Protocol >,<Remote IP>,<RemotePort> Already set up connected Socket information or: ^IPOPEN 0 If there is no idle socket

	AT^IPOPEN=?	^IPOPEN: (supported <socket ID> list),((supported <source port> list),((supported <"Destination IP"> list), ((supported <destination port> list),((supported <protocol> list)
Parameters	< Socket ID >： 0 invalid socket ID 1,2,3,4 valid socket ID < Source Port >: Local port No., range: 1-65535 < Remote IP >：IP: remote IP address Host name: destination address's host name, the host name should be consistent to the one specified in section 2.3 in RFC-1035. < Remote Port>: remote port No., range: 1-65535; port 0 used for imported connection <Protocol>: protocol stack type 0 TCP 1 UDP <State>: Socket's status or wrong prompt 0 active 1 inactive	
Example	AT^IPOPEN=1,1200,"123.245.213.012",1234,0//use port 1200, socket 1 open TCP connection, the destination is IP123.245.213.12 1234 port AT^IPOPEN=2,1300,"123.133.074.192",1242,1//use port1300, socket2 open UDP connection, the destination is IP"123.133.074.192" 1242 port. AT^IPOPEN: //invalid command ERROR AT^IPOPEN? //check which sockets are being used already ^IPOPEN: 1,0,133.254.52.44,2214 // socket 1 connect with port 2214 133.254.52.44 in TCP method ^IPOPEN: 2,1,133.244.55.232,2012 //socket 2 connect with port 2012 133.244.55.232 in UDP method OK AT^IPOPEN=1,0,"WWW.GOOGLE.COM",80,0//TCP OK ^IPOPEN: 1,1 AT^IPOPEN=1,0,"www.google.com",80,0//TCP OK ^IPOPEN: 1,1 AT^IPOPEN=2,0,"www.google.com",80,1//UDP OK ^IPOPEN: 2,1	

2.8.3 ^ IPLISTEN: open listen Socket（UPD or TCP）

Description	This command is used to enable the module to initialize a new socket and wait for a connection from remote end.	
Syntax	AT^IPLISTEN=<Socket ID>,<Source Port>,<Protocol>	OK or: ^IPLISTEN: <Socket ID>,<State>[,<Remote IP>,<Remote Port>] as the remote end connects with this socket, report or: ^IPSTAT: <Socket ID>,<Status> or: +CME ERROR: <err>
	AT^IPLISTEN?	^IPLISTEN:<SocketID> the socket in listening status, or: ^IPLISTEN:<SocketID>,< Protocol >,<Remote IP>,<RemotePort> in listening status, and Socket information connected with the remote end or: ^IPLISTEN 0 the socket not in listening status
	AT^IPLISTEN=?	^IPLISTEN: (supported <socket ID> list),(supported <source port> list),(supported <"Destination IP"> list), (supported <destination port> list),(supported <protocol> list)
Parameters	< Socket ID >: 0 invalid socket ID 1,2,3,4 invalid socket ID < Source Port >: Local port no., range: 1-65535 < Remote IP >: IP: remote IP address Host name: destination address's host name, the host name should be consistent to the one specified in section 2.3 in RFC-1035. < Remote Port>: remote port No., range: 1-65535; port 0 used for imported connection <Protocol>: protocol stack type 0 TCP 1 UDP <State>: Socket's status or wrong prompt 0 active 1 inactive	
Example	AT^IPLISTEN=1,1100,0 // designated socket 1, 1100 port in listening status OK ^ IPLISTEN: 1,1,122.221.32.64,1200// remote end connected this listening port.	

2.8.4 ^ IPCLOSE: close Socket command

Description	This command is used to close a socket.	
Syntax	AT ^IPCLOSE =<Socket ID>	OK ^IPCLOSE: <Socket ID>,<close_type> or: ERROR

	AT ^IPCLOSE?	^IPCLOSE: [<socket ID>] OK or: ^IPCLOSE: 0 OK
	AT ^IPCLOSE=?	^IPCLOSE: (1-4) OK
Parameters	<Socket_ID>: valid socket ID. 1, 2, 3, 4 <close_type>: Close type 0 – Connection closed correctly. 1 – no response from remote end, connection timeout 2 – Other (send a RST flag from remote end, or resending timeout)	
Example	AT^IPCLOSE=1 //the terminal close one opened socket OK ^IPCLOSE: 1,0 // Socket1 closed, the remote end responds a FIN flag AT^IPCLOSE=1 //the terminal closed one opened socket OK ^IPCLOSE: 1,1 //close Socket1, close timeout because there is no response from the remote end AT^IPCLOSE=3 // the terminal closed one opened socket OK AT^IPCLOSE=2 //try to close a socket which is not open ERROR AT^IPCLOSE? //check deactivated socket ^IPCLOSE: 3,4 OK AT^IPCLOSE? //no deactivated socket ^IPCLOSE: 0 OK	

2.8.5 ^IPSEND: send data

Description	This command is used to send the data provided by the terminal.	
Syntax	AT^IPSEND =<Socket ID>,<Data>	ERROR or: ^IPSEND: <Socket ID>,<Size> The max. sending length is 1024bytes（2048 after encoding, e.g.,”41424344” represents ”ABCD”）
	AT^IPSEND?	^IPSEND <Socket ID>,<Size> [<Socket ID>,<Size>]<CR><LF> used to all activated socket
	AT^IPSEND=?	ERROR
Parameters	<Socket_ID>: valid socket ID. 1, 2, 3, 4 <Size>: bytes sent successfully 0 < Size < 1024 <Data>: user’s data string, hex data, ended with <CR>.	

Example	AT^IPSEND=4,"4444"(Socket 4 not opened) ERROR AT^IPSEND=1,"4444" ^IPSEND: 1,2 //send 2 'DD' successfully OK AT^IPSEND=? ERROR AT^IPSEND? (Sockets 1 and 2 opened by ^IPOPEN command) ^IPSEND: 1,2 //Socket 1 sent 2 bytes successfully last time ^IPSEND: 2,522 // Socket 2 sent 522 bytes successfully last time OK

2.8.6 ^IPRECV: report received data

Description	When the module receives data, it will report the message and send it to the terminal. The reported data size every time will be limited within 1024 bytes.	
Syntax		^IPRECV: <socket ID>,<Source IP>,<Source Port>,<Left>,<Data>
Parameters	<Socket_ID>: valid socket ID 1, 2, 3, 4 <Source IP >: source address's IP <Source Port >: source address's port <Left >: unreported data still left in the protocol stack <Data>: hex data, ended with <CR>.	
Example	^IPRUDP: 2,172.16.3.135,222 ,0,44444444	

2.8.7 ^IPSTAT: status report

Description	As the status changes, the module will report the message and send it to the terminal. There are two possible causes, one is damaged logic connection, another is damaged physical connection.	
Syntax		^IPSTAT: <socket_ID>,< ErrorType >
Parameters	<Socket_ID>: valid socket ID 1, 2, 3, 4 <ErrorType >: 0 – Reserved 1 – Disconnected 2 – Reserved	
Example	^IPSTAT: 1,1 //disconnected because the remote end closes socket.	

2.8.8 ^IPCFF: set filter list

Description	The filtering function is used to prevent the module from connecting to the unknown client ends, and it exerts when the module is in listening mode.

Syntax	AT^IPCFF =<CmdType>,["<IP>"]	IP use IP CIDR to input OK or: +CME ERROR: <err >
	AT^IPCFF?	^IPCFF: <STATUS>,<IP1.1>,<IP1.2….<IP1.n>
	AT^IPCFF=?	^IPCFF=(0-4),("IP in CIDR notation") OK or: +CME ERROR: <err >
Parameters	<CmdType>: 0 – close filtering function 1 – open filtering function 2 – add IP address to the white list. 3 – Remove IP address from the white list. 4 – clear the white list <IP>: allowed accessed IP address For the format of IP address, please refer to the relevant specifications in RFC. Additional bit A: 1 or two integral numbers, range 1 - 32. <Status>: indicating the filtering status of socket 0 – OFF 1 – ON	
Example	AT^IPCFF=? ^IPCFF: (0-4),("<IP CIDR>") OK AT^IPCFF=2,"10.170.255.255/16"//allowed the connection of IP address started with 10.170.*.* OK AT^IPCFF=2 // invalid command +CME ERROR: operation not allowed AT^IPCFF=1 // open filtering function OK AT^IPCFF=1,"1.2.3.4/5" // invalid command +CME ERROR: operation not allowed AT^IPCFF=1 //null white list, this command can’t open the white list +CME ERROR: operation not allowed AT^IPCFF? //check the configurations of white list ^IPCFF: 1,10.170.255.255/16 AT^IPCFF=3,"10.170.0.0/16" //Remove IP CIDR "10.170.0.0/16" from the white list +CME ERROR: not found AT^IPCFF=0 //close filtering function OK AT^IPCFF=3,"10.170.255.255/16"// Remove IP CIDR from the white list 10.170.255.255/16" OK AT^IPCFF? ^IPCFF: 0	

2.8.9 ^ IPENTRS: enable certain socket to enter Transfer mode

Description	This command is used to designate the module's certain activated socket to send/receive data in Transfer mode.	
Syntax	AT^IPENTRS=<Socket ID>	OK or: +CME ERROR: <err>
	AT^ IPENTRS?	^ IPENTRS:<SocketID> Socket in listening and Transfer mode or: ^IPENTRS 0 Socket not in listening, but in transfer mode
	AT^ IPENTRS =?	^ IPENTRS: (supported <socket ID> list)
Parameters	<Socket_ID>: Used to differentiate with connected numbers, provided by the terminal's applications 0 invalid socket ID 1,2,3,4 valid socket ID	
Example	AT^ IPOPEN =3,1104,"172.90.237.221",1124,0 OK ^ IPOPEN: 3,1 AT^ IPENTRS=3//enable Socket3 to enter Transfer mode. Invalid command: AT^ IPENTRS ERROR Listen: AT^ IPLISTEN =1,1100, 0 // listen any port of any IP. OK AT^ IPENTRS=1//Set Socket1 as Transfer AT^ IPENTRS? ^IPENTRS: 1 OK ^ IPLISTEN: 1,1,122.221.32.64,1200 // this listening port is connected to the remote end and enters Transfer mode.	

2.9 Module Configuration Commands

2.9.1 V : set response syntax

<table>
<tr><td>Description</td><td colspan="2">This command is used to set the syntax of AT command’s result code and information response, including the header, footer and the format of result code content. The result code content is composed in two formats, digits and character strings. The table below describes the influence of the settings on the syntax of result code and information response. <cr> represents S3 character, and <lf> represents S4 character.
<table>
<tr><td></td><td>V0</td><td>V1</td></tr>
<tr><td>Information responses</td><td><text><CR><LF></td><td><CR><LF><text><CR><LF></td></tr>
<tr><td>Result codes</td><td><numeric code><CR></td><td><CR><LF><verbose code><CR><LF></td></tr>
</table></td></tr>
<tr><td>Syntax</td><td>V[<value>]</td><td>OK</td></tr>
<tr><td>Parameters</td><td colspan="2"><value >:
0 MT send abbreviated header and footer and adopt the result code in digit format.
1 MT send complete header and footer and adopt the result code in character string format. (default)
The empty <value> is equal to <value>=0.</td></tr>
<tr><td>Example</td><td></td><td></td></tr>
</table>

2.9.2 E: echo display

<table>
<tr><td>Description</td><td colspan="2">This command is mainly used to set whether MT displays the characters received from TE.
Note: The dialing network, especially auto processing software will automatically send ATE0 command to disable echo display.</td></tr>
<tr><td>Syntax</td><td>E[<value>]</td><td>OK</td></tr>
<tr><td>Parameters</td><td colspan="2"><value >：
0 MT do not display the characters received from TE.
1 MT display the characters received from TE. (default).
The empty <value> is equal to <value>=0.</td></tr>
<tr><td>Example</td><td>ATE?</td><td>E: 1
OK</td></tr>
</table>

2.9.3 S S-register command

<table>
<tr><td>Description</td><td>All commands started with the letter “S” are called S-register command. This command is used to set and read S-register value.
The name of S-register command is composed of the letter “S” and a decimal number, and this decimal number is called the register’s parameter number. If this number is not recognized, it means that the command does not exist and COMMAND NOT SUPPORT shall return. Each S-register saves one character.</td></tr>
</table>

Syntax	ATSn=<value>	OK Or: +CME ERROR: <err>
	ATSn?	Sn: <value> OK Or: +CME ERROR: <err>
Parameters		
Example		

See the description of different S-register in the table below:

Sn	Description	Min.	Max.	Default
S0	Auto answer, the modem automatically answers the call after the module rings for designated times.	0	255	0
S3	Command line end character represents the ASCII value of command line end, which is carriage return.	0	127	13
S4	Command line feed, designating the modem to send the line feed character to the PC.	0	127	10
S5	Command line editing character, designating to edit the ASCII value of command line character, which is Backspace.	0	127	8
S8	Timeout for comma dial modifier, indicating the timeout as the modem reads the comma in dial command string.	0	255	2

Remarks: S0（auto answer）ignore DTR status.

2.9.4 &F: restore factory default value

Description	This command is used to restore the factory default Profile value.	
Syntax	AT&F<value>	OK Or: +CME ERROR: <err>
	AT&F?	Sn: <value> OK Or: +CME ERROR: <err>
Parameters	<value >: 0 factory default Profile	
Example	AT&F?	&F: 0 OK

2.9.5 Z: restore default settings

Description	This command is used to end the current call and restore the default settings.	
Syntax	ATZ[<value>]	OK Or: +CME ERROR: <err>
Parameters	<value >: 0 factory default Profile	
Example	ATZ0	OK

2.9.6 &W: save user configured Profile

Description	This command is used to save the current user configured Profile.	
Syntax	&W[<n>]	OK Or: +CME ERROR: <err>
Parameters	<n >: user configured Profile name: user configured Profile 0 user configured Profile 1 （optionally supports the second Profile）	
Example	AT&W0 //current configuration saved in Profile 0	OK
	AT&W1 // current configuration saved in Profile 1.	OK

Profile parameters:

Profile parameters	Description	Range	Default	Length (Bits)
E	command response	0－1	1	1
Q	Result code mode（delete）	0－1	0	1
V	Display Result code	0－1	1	
X	Select Result code（delete）	0－4	0	3
&C	DCD carrier wave setting	0－2	1	2
&D	DTR carrier wave setting	0－4	2	3
&K	Flow control setting	0，3－6	3	3
&Y	Power-on Profile setting (delete)	0－1	0	1
S0	Auto answer	0－255	0	8
S3	Carriage return	0－127	13	7
S4	Line feed character	0－127	10	7
S5	Backspace	0－32	8	6
S8	Timeout for comma dial modifier	0－255	2	8

2.9.7 S24: set the delay time for MT to enter dormant mode (recommended)

Description	This command is used to enable/disable sleep mode. For example, as the terminal sends ATS24=5 to MT, DCE will enter dormant mode if there is no data transmitting within 5 seconds.	
Syntax	ATS24=[<value>]	OK
	ATS24?	<value> OK

Parameters	<value >: time, unit: S value range（0—255） As the parameter is 0, MT is forbidden to enter dormant mode. As the parameter is larger than 0, allowed to enter dormant mode and set the delay time. The default value is 0.	
Example	ATS24? <enter>	000 OK
	ATS24=5 <enter>	OK
	ATS24? <enter>	005 OK （MT will enter dormant mode if there is no data transmitting within 5 seconds.）

2.9.8 S102: set the delay value before MT transmits data (the terminal in dormant mode now) (recommended)

Description	This command is used to set the delay value before sending data to the terminal. If the terminal has already entered the dormant mode, it will receive the following signals before receiving data: Terminal awaking signals (in this case the awaking signal is valid at low level) Wait for a while (equal to the delay value) Finally receive data（HSPD, CD, report message, AT command reply value）	
Syntax	ATS102 = <value>	OK
	ATS102?	<value> OK
Parameters	<value >: range （0—255）, unit: ms The default value is 30ms.	
Example	ATS102? <enter>	030 OK
	ATS102=100 <enter>	OK
	ATS102? <enter>	100 OK (It means that if there is data sent to the terminal and the terminal is in dormant mode, MT will pull down TE awaking signals and wait for 100ms and then transmit the data to the terminal.)

2.9.9 S100: set the minimum limited time as the terminal enters dormant mode（recommended）

Description	This command is used to set the minimum limited time as the terminal enters dormant mode. (if there is no data transmitting between the two parties within the period of time, MT would think that the terminal has entered the dormant mode) In order to reduce the attempts that TE responds the terminal and the delay value before MT transmits the data, MT will only think that the awaking operation is executed only if TE enters dormant mode (pull down awaking signals and wait for relay time)	
Syntax	ATS100=<delta>	OK or +CME ERROR: <err>
	ATS100?	<delta> OK
Parameters	<delta>: this parameter is used to set he minimum limited time as the terminal enters dormant mode. (no data transmitting within the period of time) Range:（0—255）unit: s If the parameter is 0, don't support the awaking function（default） If the parameter is larger than 0, set the time	
Example	ATS100?	001 OK
	ATS100=0	OK
	ATS100?	000 OK

2.9.10 +CMEE: set module error

Description	This command is mainly used to set whether or not use result code：+CME ERROR: <err> to indicate the error regarding MT. when set as "Use", MT corresponding error will generate result code: +CMEERROR:<err>，to replace the common ERROR result code. If the error has nothing to do with MT, still return the common ERROR.	
Syntax	+CMEE=<n>	OK
	+CMEE?	+CMEE: <n> OK
	+CMEE=?	+CMEE: (supported <n> list) OK
Parameters	<n>: **0:** do not use +CME ERROR:<err>result code，return with ERROR only. **1:** Use +CME ERROR: <err>result code, <err> adopts wrong number value. **2:** Use +CME ERROR: <err>result code, <err> adopts wrong detailed character string.(default)	
	<err >: refer to CME ERROR list in the appendix to take the value.	

Example	AT+CMEE=0 // do not use +CME ERROR	OK
	AT+VTD	ERROR
	AT+CMEE=1 //use digit format <err>	OK
	AT+VTD	+CME ERROR: 1
	AT+CMEE=2 //use detailed information format <err>	OK
	AT+VTD	+CME ERROR: operation not supported

2.9.11 +CEER: check extended error report

Description	This command is used to return the extended error report in single line or multiple lines. The following errors will depend on the manufacturer: . Setup of the last failed call (originating or terminating) or change during the conversation . End of the last call Normally, the message report is composed of error caused by CDMA network in a single line.	
Syntax	AT+CEER=[<n>]	OK
	AT+CEER	+CEER: <report> OK
	AT+CEER?	+CEER: <n> OK
	AT+CEER=?	+CEER: (supported <n> list) OK
Parameters	<n>: 1 return digit information 2 return detailed information The default value is 2	

	<mt>: . The detailed report should depend on the CDMA network error event. . The overall number of text characters and limited number of overall lines (up to 2041) . The text is not allowed to contain 0<CR> or OK<CR> The following lists the detailed information format and corresponding digit information format. 0 CEER No information available 1 CEER Phone is offline 21 CEER Phone is CDMA locked until power cycle 22 CEER Phone has no service 23 CEER Call has ended abnormally 24 CEER Received intercept from BS 25 CEER Received reorder from BS 26 CEER Received release from BS - no reason given 27 CEER Received release from BS - SO reject 28 CEER Received incoming call from BS 29 CEER Received alert stop from BS 30 CEER Client ended the call 31 CEER Received end activation 32 CEER MC aborts the origination/conversation 33 CEER Max access probes transmitted 34 CEER Persistence test failure 35 CEER RUIM is not present 36 CEER Access attempt already in progress 37 CEER Access failure 38 CEER Received retry order 39 CEER Concurrent service is not supported by base station 40 CEER No response received from base station 41 CEER Call rejected by the base station 42 CEER Concurrent services requested were not compatible 43 CEER Access is blocked by base station 44 CEER Corresponds to CM_CALL_ORIG_ERR_ALREADY_IN_TC 45 CEER Call is ended due to Emergency call is flashed over this call 46 CEER CM is ending a GPS call in favor of a user call 47 CEER CM is ending a SMS call in favor of a user call 48 CEER CM is ending a DATA call in favor of an emergency call 49 CEER Call rejected because of redirection or handoff 50 CEER Access is blocked by base station for all mobiles 51 CEER OTASP SPC Error	
Example		

2.10 Data Performance Commands

2.10.1 +CTA: set the time for entering dormant mode

Description	This command is used to set/read/test the time for entering dormant mode.	
Syntax	AT+CTA=<n>	OK Or: +CME ERROR: <err>
	AT+CTA?	+CTA: <n> Or +CME ERROR <err>
	AT+CTA	OK Set as default value (default value: 0)
	AT+CTA=?	+CTA: (supported <n> list)
Parameters	<n >: 0 – when there is no data transmission, do not release the traffic channel (default value) 1 - 255 – when the RLP data frame is not received from Um interface within <value> seconds, release the traffic channel.	
Example	AT+MODE=0	OK
	AT+CTA?	+CTA: 0 OK
	AT+CTA=?	+CTA: (0-255) OK
	AT+CTA=59	OK
	AT+CTA?	+CTA: 59 OK

2.10.2 +CAD: check if analogue network or data network

Description	This command is used to check the network status (in analogue network or data network).	
Syntax	AT+CAD?	+CAD: <value> or +CME ERROR <err>
Parameters	<value >: 0 – No service obtained 1 – Obtain CDMA data service 2 –Obtain TDMA data service 3 –Obtain analogue service (4 to 255 reserved)	
Example	AT+CAD?	+CAD: 1 OK

2.10.3+CRM: set RM interface protocol

Description	This command is used to set the communication protocol for RM interface.	
Syntax	AT+CRM=<n>	OK Or: ERROR: <err>
	AT+CRM?	+CRM: =<n> Or: +CME ERROR <err>
	AT+CRM=?	+CRM: (supported <n > list)
Parameters	<n >: 0 – Async data or Fax 1 - packet data, Rm interface adopts Relay mode 2 - packet data, Rm interface adopts Network mode based on PPP 3 - packet data, Rm interface adopts Network mode based on SLIP 4 - STU-III service 5 to 127 – reserved 128 to 255 – reserved factory self-defined value Note: If MT2 supports 0, the default value is 0. If it doesn't support 0, the default value will be defined by the factory.	
Example		

2.11 Audio Commands

2.11.1+CRSL: set incoming call ringer volume

Description	This command is used to set the call ringer and message alert volume. After the module is restarted, the command's value will be the final setting before the restart.	
Syntax	+CRSL=<level>	OK +CME ERROR: <err>
	+CRSL?	+CRSL: <level> +CME ERROR: <err>
	+CRSL=?	+CRSL: (supported <level> list) +CME ERROR: <err>
Parameters	<level>: 0 Mute 1-7 volume level（1 : minimum value, 7: default value）	
Example	AT+CRSL?	+CRSL: 7 OK
	AT+CRSL=?	+CRSL: (0-7) OK
	AT+CRSL=5	OK

2.11.2+CLVL: set call volume level

Description	This command is used set the call volume. After the module is restarted, the command's value will be the final setting before the restart. The READ command is used to read the current earpiece volume, and the TEST command is used to return the range of volume values. The SET command can be used no matter if the call is activated or not.	
Syntax	+CLVL=<level>	OK +CME ERROR: <err>
	+CLVL?	+CLVL: <level> +CME ERROR: <err>
	+CLVL=?	+CLVL: (list of supported <level>s) +CME ERROR: <err>
Parameters	<level>: 0-4 volume level（0 : mute, 3: default value）	
Example	AT+CLVL?	+CLVL: 3 OK
	AT+CLVL=?	+CLVL: (0-4) OK
	AT+CLVL=2	OK

2.11.3+CMUT: set current MIC's Mute status

Description	This command is used to set current MIC's mute status (Mute/unmute). Once the voice call is disconnected, it will return to the unmute status.	
Syntax	+CMUT=<state>	OK or +CME ERROR: <err>
	+CMUT?	+CMUT: <state> OK
	+CMUT=?	+CMUT: (supported <state> list) OK
Parameters	<statel>: 0 Unmute (default) 1 Mute	
Example	AT+CMUT=?	+CMUT:(0-1) OK
	AT+CMUT? // set up voice call	+CMUT: 0 // MIC unmute OK
	AT+CMUT=1 //MIC mute	OK
	AT+CMUT?	+CMUT: 1 OK
	AT+CMUT? // call disconnected	+CMUT: 0 OK
	AT+CMUT =2	+CME ERROR: <err>

2.11.4S94: control side volume effect (recommended)

Description	This command is used to enable or disable the module's side volume effect.	
Syntax	ATS94=<n>	OK or +CME ERROR: <err>
	ATS94?	<000-disabled,001-enabled> OK or: +CME ERROR: <err>
	ATS94=?	ATS94 :(supported <n>list) OK
Parameters	<n>: 0 enable 1 disable The side volume effect is enabled by default upon power-on.	
Example	ATS94=0 // Enable side volume effect	OK

	ATS94=2	+CME ERROR: <err>
	ATS94?	000 // disable side volume effect OK

2.11.5 S96: enable or disable echo elimination (optional)

Description	This command is used to eliminate the echo. This command is used to enable/disable the echo elimination. The setting will be saved, and the saved value will be used as the default after the module is restarted.	
Syntax	ATS96=<n>	OK or +CME ERROR: <err>
	ATS96?	<000-disabled,001-enabled> OK or: +CME ERROR: <err>
	ATS96=?	ATS96 :(supported <n> list) OK
Parameters	<n>: 0 disable echo elimination and noise control 1 enable echo elimination and noise control	
Example	ATS96=1	OK
	ATS96=4	+CME ERROR: <err>
	ATS96?	001 OK

2.11.6 +MICG: select MIC gain

Description	This command is used to set the MIC's gain. The setting will be saved, and the saved value will be used as the default after the module is restarted.	
Syntax	+MICG=<gain>	OK +CME ERROR: <err>
	+MICG?	+MICG: <gain> +CME ERROR: <err>
	+MICG=?	+MICG (supported <gain> list) +CME ERROR: <err>
Parameters	<gain>: MIC's gain: 0-7 0 is the minimum value but not Mute; 4dB for each level, and the default value is 4x4 =16dB	
Example	AT+MICG=?	+MICG: (0-31) OK

	AT+MICG?	+MICG: 16 OK
	AT+MICG=30	OK

2.11.7^DTMF: redial command

Description	Under the talk status, send DTMF value to network side through the signal, and at the same time play DTMF tone at the single board side. The back-end software notifies the single board to press down and release the keys through AT command.	
Syntax	^DTMF=<call_x>,<dtmf_digit> ,<on_length>[,<off_length>]]	OK if there is any error regarding MT: +CME ERROR: <err>
	+MICG?	+MICG: <gain> +CME ERROR: <err>
	+MICG=?	+MICG (supported <gain> list) +CME ERROR: <err>
Parameters	<call_x>: call ID.	
	DTMF value, ASCII code, the legal characters only include: ’0’ ~ ‘9’, ‘*’ , ‘#	
	<on_length>: 1 key pressed down 0 key released up 95,150,200,250,300,350 DTMF time length, unit: ms.	
	<off_length>: under burst, DTMF interval, unit: ms, reserved temporarily.	
Example		

2.11.8^CVOICE: switch voice call mode (optional)

Description	The SET command is used to set the voice call mode. The READ command is used to read the current voice call mode. The data frame of PC audio adopts PCM encoding and returns the sampling rate, data bit and frame period of PCM data frame (It must support PCM frame format with 8000Hz sampling rate, 16-bit data and 20ms frame period by default）. The TEST command is used to return the value range for voice call mode.	
Syntax	^CVOICE=<mode>	OK
	^CVOICE?	^CVOICE: <mode >[,<sampling_rate>,<data_bit>,<frame_period >] OK
	^CVOICE =?	^CVOICE: (supported <mode> list) OK
Parameters	<mode>: voice call mode 0 PC voice call 1 earpiece mode	

	<sampling _rate>: sampling rate	
	<<data_bit>>: data bit	
	<frame_period>: frame period, unit: ms	
Example		

2.11.9^DDSETEX: set voice output port (optional)

Description	The SET command is used to inform the device's voice output port, and TE will send the device the acknowledgement to start PC voice service after opening the port. The TEST command is used to return the value range for voice output port.	
Syntax	^DDSETEX=<port>	OK if there is any error regarding MT: +CME ERROR: <err>
	^DDSETEX=?	^DDSETEX: (supported <port >list) OK
Parameters	<port >: voice output port. If it does not support the port switching, it must support voice transmission through DIAG port. 1 MODEM port 2 DIAG port 3 PCUI port 4 PCVOICE port	
Example		

3 Description of Returned Parameters

3.1 Command Operation Result Report Code

Detailed report code	Digit code（as V0 is setting）	Description
+CME ERROR：<err>	same code	Caused by GSM 07.05 command
+CMS ERROR：<err>	same code	Caused by GSM 07.05 command
BUSY	7	Detected busy signals
ERROR	4	Command not accepted
NO ANSWER	8	Connection timeout
NO CARRIER	3	Connection ended
OK	0	One command executed properly
RING	2	Ringing signal from network
CONNET	1	Set up network link

3.2 Module Error Result Report: +CME ERROR: <error>

<error>	Meaning	The command causing the error
3	Operation not allowed	All commands
4	Operation not allowed	All commands
5	Need input PH-UIM PIN	+CPIN
10	UIM card can's be used	+CLCK
12	Need input UIM PUK1	+CPIN、+CLCK、+CPWD
13	UIM card failure	+ZGSN、+CPIN、+CLCK、+CPWD
14-15	Reserve	
16	Incorrect PIN	+CPIN
17	Need input UIM PIN2	+CPIN
18	Need input UIM PUK2	+CPIN
20	Phonebook full	+CPBW
21	Phonebook index not existed	+CPBR
22	No result after searching phonebook	+CPBF, +CPBP
24	Phonebook content length error	+CPBW
26	Phonebook number length error	+CPBW
41	Software resources not activated	All commands
42	Parameter error	All commands
43	nonvolatile memory failure	^PREFMODE
47	No registered operator	+ZCOPS

3.3 Text Message Service Failure Result Code: +CMS ERROR: <error>

<error>	Meaning	The command causing the error
1 to 127	Reserved	
202	Null text message	^HCMGR, ^H CMGL, +CMGD
203	Text message status error	^H CMSS, ^H CMGW
204	Text message encoding error	^H CMSS, ^H CMGS, ^HCMGW
205	Text message decoding error	^HCMSS, ^HCMGS, ^HCMGR, ^HCMGL, ^H CMGW
206	Text message sending mode error	^H CMSS, ^H CMGS
207	Text message writing mode error	^H CMGW
215	Wring text message error in UIM card	^H CMSS, ^H CMGW
216	Reading text message error in	^H CMSS, ^H CMGR、^H CMGL

	UIM card	
217	Deleting text message error in UIM card	+CMGD
302	Full memory	^H CMGW
303	Operation not support	^H CMGS
305	Text message number null	^H CMGW, ^H CMGS
309	Text message header length error	
321	Index error	^H CMSS, ^H CMGR, ^HCMGL, ^HCMGW, +CMGD
341	Memory error	^H CMSS, ^H CMGR, ^HCMGL, ^HCMGW, +CMGD

3.4 Text Message Status Report Code（^HCMGR）

<st>	Description
Network problem（IS-41D）	
0	no number
1	sending number failed
2	not enough network resources
3	Network failure
4	Sending ID failed
5	Other network problems
7	Sending timeout
Terminal problems	
32	No response page
33	Object busy
34	No confirmation information
35	Not enough object resources
36	Text message delivery delayed
37	Object exceeding service range
38	Object is not this number any longer
39	Other terminal problems
Wireless interface problems（IS-41D）	
64	Not enough wireless receiving resources
65	wireless receiving resources not assorted
66	Other wireless problems
Common errors（IS-41D）	
96	Accidental Parameter
97	Text message rejected
98	Text message rejected
99	Not support VAS
100	Not support text message

101	Reserve
102	Lose expected Parameter
103	Lack command Parameter
104	Unrecognizable Parameter
105	Unexpected Parameter
106	User data length error
107	Other cause
Common codes（not belong to IS-41D）	
32768	Text message sent to BS successfully
32769	Wait for the transportation layer to confirm
32770	Resources overflow (not enough memory cache)
32771	Overlong text message through access channel
32772	Overlong text message through data channel
32773	Network not ready
32774	Terminal not ready
32775	Can’t send text message in simulate mode
32776	Can’t send broadcast message
32777	ID processing Error

4 Application Cases and Precautions

4.1 Module’s First Power-on

If there is development board, please note if the development board’s LED blinks or not; if there is no development board, please detect if there is any level change on each relevant XX pin. Please refer the relevant documents about the PIN definitions for more information on the pin definitions. If the documents are not available, please contact our engineers.

Use AT+CSQ to check the signal strength and then use AT+CDV command to dial the telephone number, and check if the call can get through. Please note that semicolon should be kept. If the call is connected, it indicates that the hardware works normally.

Set the module according to your own requirements.

——input at+csq? Don’t display the input command because the function is disabled.

+CSQ: 31,99 ——Signal strength

OK

——input ate1, to set the echo display

OK ——setting succeeded

ate1 ——input ate1 again to set the echo display; at this moment, you could see the input command;

OK

at+csq? ——Input at+csq? Again to see the input command.
+CSQ: 23, 99 ——Signal strength
OK

4.2 Module's Power-off and Reset

Note: we strongly recommend to power off the module, instead of directly cut the power off. Upon saving data to write flash, exceptional power cut-off would bring irreversible damage to the module and UIM card, and sometimes the modules might even be returned to the factory for repairing.
Please refer to the module's hardware design manual for the methods on how to power off the module and reset.
Note: if there is input voltage at VCHG, the module would still power on after power-off. You could use the command AT＋CFUN=0.

4.3 Module's Call Origination

At+cdv=13766661111; ——call origination, note: there is English semicolon ";" followed by the number
OK
^ORIG: 13766661111 ——responded that the module starts to call a number
^CONN: 0,3 ——Responded that the call is originated by the module successfully, and the called party rings.

^CEND:25 ——call terminated

4.4 Module's Call Termination

+CLIP:"075586360XXXX",129 ——Caller ID display, 129 indicates that it is a domestic call.
RING ——module rings
RING
RING

Ata ——Answer the incoming call
OK
^CONN:0,3 ——connected

ath ——hang up
OK

^CEND:29 ——29 indicates that the call is terminated by the module.

4.5 Call Forward Settings

The call forwarding number is provided by the operator. For details, please consult the local operator.

4.6 Module's Parameters

Command buffer (TBD)
Data buffer (TBD)

4.7 Module's Factory Settings

Refer to AT commands for details on the module's factory settings.
Important factory settings——COM port settings:
8-digit data bit
1-digit stop bit
No parity bit
Hardware flow control (CTS/RTS）
Data rate 115200bps