AT Commands for STYX MG8224 module rev.1.0

introduction:

The MG8224 provides LTE, HSPA+, HSDPA, HSUPA, WCDMA, EVDO, GSM, GPRS, and GPS(GPL series) connectivity for portable and handheld computers, point-of-sale devices, routers and other machine-to-machine and vertical applications over several radio frequency bands. Syte: **embedded.mti-group.ru**

Supported RF bands

The modem, based on Qualcomm's MDM9600 baseband processor, supports data operation on LTE, HSDPA, UMTS, HSPA+, GPRS, and GSM networks.

Physical features

• Small form factor—conforms to F1 as specified in PCI Express Mini Card Electromechanical Specification Revision 1.2

• Operating temperature range: -30 °C to +60 °C (75 EE series)

Support RF bands

Technology	Bands	Diversity
LTE	• Band 1 (2100 MHz) • Band 3 (1800 MHz) • Band 7 (2600 MHz) • Band 20 (DD800 MHz	YES (MIMO)
UMTS HSDPA HSUPA HSPA+	• Band 1 (2100 MHz) • Band 8 (900 MHz)	YES
GSM GPRS	• GSM 900 (900 MHz) • DCS 1800 (1800 MHz)	NO

Directory

1. Business Process

1.1 Initialization procedure

AT //Make sure serial port normal

OK

ATE1 //Open ECHO

OK

AT+CLIP=1 //Open caller id

OK

AT+CREG=2

OK

AT+CGREG=2 //Enable network registration report, set as 2. Report when network registration changed // register networking information

OK

AT+CEREG=2 // Must use AT+CEREG command under LTE condition

OK

AT+CPIN? //UIM ready and checking PIN1 status, R-UIM use AT+QCPIN ? replace

+CPIN: READY

OK

AT+QCPIN? // In network C, checking PIN 1 and Ruim ready or not

+CPIN: READY

OK

AT+CSQ // Check signal strength

+CSQ: 99,-125,99

OK

AT+CIMI //Check IMSI number, if network C, pls replace to +QCIMI

250110101811810

OK

AT+CMGF=0 //Choose SMS service,set to PDU code

OK

1.2 Voice dial up procedure

1.2.1 GWL module as caller

```
AT+CGREG?
+CGREG: 2,2
OK
AT+COPS?
+COPS: 0,0,"CMCC",0
OK
ATD186******;   // Launch calling, the command is for voice dial up, only for GWL of network C
OK                    // there is difference
AT+ CLCC
+CLCC: 1,0,2,0,0," 186******",129
OK
^ORIG:3,0                  // means MT is launching calling
^CONF:3,0                  // means calling from MT received by network
AT+CLCC
+CLCC: 1,0,3,0,0," 186******",129
OK
^CONN:3,0                  //Means MT calling answered by the other device
AT+CLCC
+CLCC: 1,0,0,0,0," 186******",129
OK
AT+CHUP                    //Hang up the call initiative
OK
```

1.2.2 GWL module as called

```
+CLIP: "186*** ***",161,,,,      //Caller terminal launch voice dial up request
RING
+CLIP: "186******",161,,,,0      //Receive 186***** after the called search the caller, report to AP
“+CLIP:
AT+CPAS                          // module in ringing condition
```

+CPAS: 4

OK

ATA // answer

OK

AT+CPAS // connection

4

OK

AT+CHUP // hang up

OK

AT+CPAS instruction this is calling command of checking module: 3 current is ringing condition 4 current is connecting

1.2.3 CDMA module as caller

AT^SYSINFO

^SYSINFO:2,3,0,2,1

OK

AT+CDV18629089783; // voice dial up

Ok

^ORIG:0,0 //MT launch calling

^CONN:0,0 // If MT is caller. send calling request to network and receive network response, MT report to TE even if no answer

AT+CHV //hang up

OK

1.2.4 CDMA module as called

AT+CLIP=1 // open incoming call reminder

RING

+CLIP: “18629463427”,2,,,,0

RING

+CLIP: “18629463427”,2,,,,0

AT$QCCAV // Answer

OK

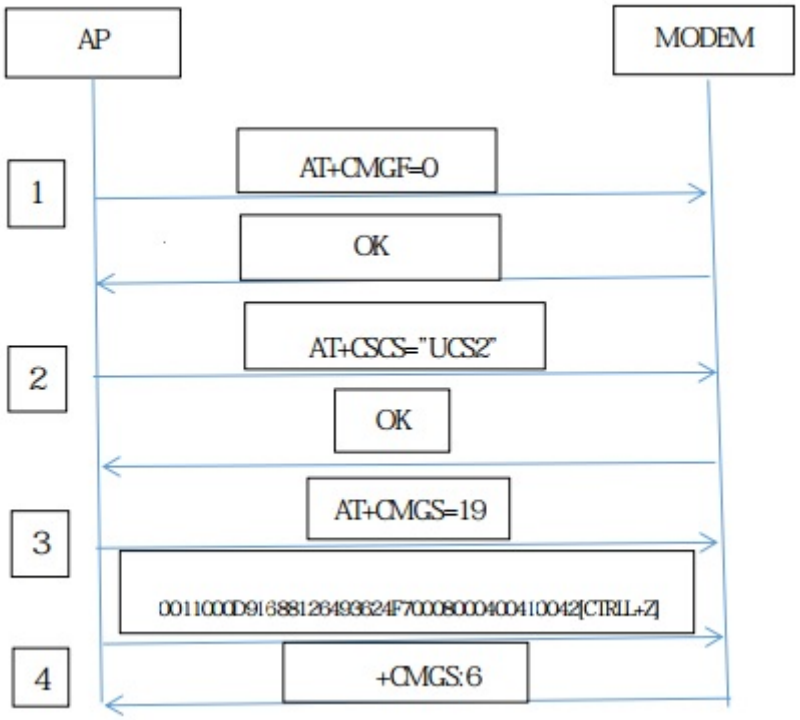
^CONN:1,0 // If MT is called, MT report to TE when answer the call

$QCCHV // hang up

OK

1.3 SMS sending&receiving procedure

1.3.1 sending SMS in PDU format



1 Input AT+CMGF=0 to AP, set SMS format (0: PDU format 1:TEXT format)

2 Input AT+CSCS="UCS2", set TE charset as UCS2м

3 Input AT+CMGS=19 to AP, sending SMS and writing command, Under PDU format, 19 represent length of SMS content.

4 +CMGS:15. AP receive report from module, SMS sending successful.

Declaration: execute command AT+CMGS or AT+CMGW, await ">" appearance, then input text or PDU information.

PDU SMS package instruction:

[CTRL+Z]: sending SMS,input SMS content, then click

[CTRL+Z] by keyboard to send

Remark: For HEX is 0x1a

19 : the length of "11000D91688126493624F70008000400410042" do not include the SMS center number length

00 Service Center Address (SCA) omitted

11 basal parameter 00010001B (RP UDHI SRR VPF RD MTI(01 mo SMS)

10 benchmark value of message(TP-MR) 0D the length of destination number 91 the type of destination number

688126493624 F7 Destination Address (DA) +8618629463427

00 Protocol Identifier (PID)

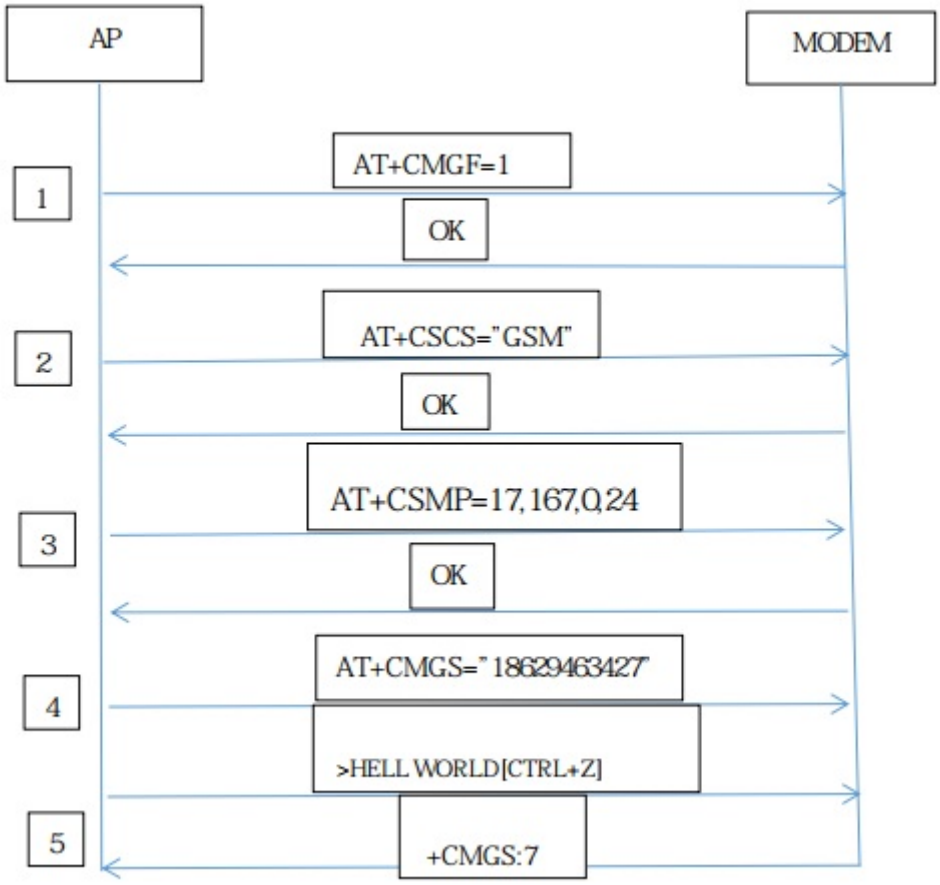
08 Data coding scheme (DCS)

00 Valid Period (VP)

04 User data length

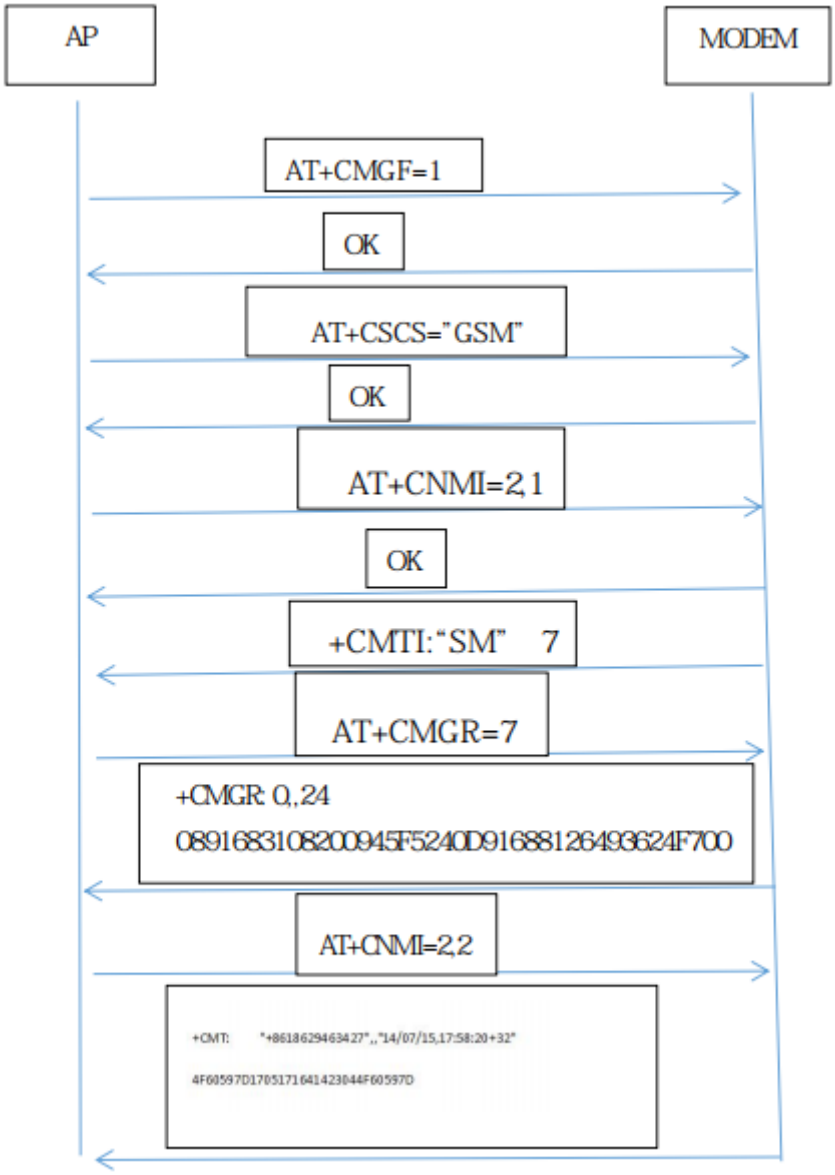
00410042 Unicode coding of data content

1.3.2 Sending SMS in text



1. Input AT+CMGF=1 to AP set SMS format. (0:PDU format 1:text format)
2. Input AT+CSCS=”GSM” to AP, set TE charset as GSM
3. Input AT+CSMP=17,167,0,24, set text format parameters
4. AT+CMGS=”18629463427” the command is for sending and writing, 18629463427 is the sending number in text format.
5. Sending successful

1.3.3 Receiving SMS



1. Input "AT+CMGF=1" to AP, the command to set SMS format (parameter 0: PDU; 1: TEXT)
2. Input "AT+CSCS="GSM"", the command to set TE charset as GSM
3. Input "AT+CNMI=2,1" to APP, the command is for message receiving and reading. The second parameter is to set report format for message and if save or not, detail pls refer to below +CNMI
   1- If SMS-DELIVER storage in ME/TA,storage location indicate to TE by +CMTI,
   2- Use command like below +CMT([],(Start PDU mode) or +CMT ,[], [,,,,,,,] (start text mode)
4. AP receive module reported SMS +CMTI:"SM",7, save location is SM, index is 7
5. AP read SMS
   AT+CMGR=7
   +CMGR:"REC
   READ","+8618629463427",,"14/07/15,17:43:48+32"
   4F60597D
   OK
6. AP to set AT+CNMI=2,2 the setting is for reading SMS directly after receiving, non saving. SMS reported format is: +CMT([],(enable PDU mode) or +CMT ,[], [,,,,,,,] (enable text format)

1.3.4 CDMA SMS procedure

CDMA did not support sending PDU format SMS currently

AT$QCPMS=”ME”,”ME”,”ME” //Set saving location, similar to AT+CPMS

OK

at^hcmgs="18629089783">hello world

^HCMGS: 10

0K

^HCMGSS: 10 // means sending successfu

+QCMTI:"ME",2 // receive SMS

AT^HCMGR=2 // read SMS

^HCMGR: 18629089783,2014,07,16,14,29,29,0,1,4,0,0,0,0

4222_

OK

To be added.....

1.4 AT command for dial up connection

1.4.1 GWL PPP Dial up

AT+PLMSYSCFG=1,1 //AUTO mode LTE->WCDMA->TDS->GSM->HDR->GSM

OK

AT+COPS

+COPS: 0,0,"CMCC",7 // LTE

OK

AT+PLMNWTYPE? // check registration RAT

+PLMNWTYPE: LTE TDD //LTE

OK

AT+CGDCONT=1,"IPV4V6","CMNET" // APN setting

OK

use external modem, dial tool for dial up ATD*99#

hang up ATH

1.4.2 CDMA PPP dial up

User name and password setting

AT+PLMCDMACFG=”CARD”,”CARD”

Ok

Use modem RAS or external PPP dial up tool to

dial ATD#777

hang up ATH

2. AT command detail annotation

2.1 Command to read product information

2.1.1 read manufacture information

Name: AT+GMI/ AT+CGMI

Description: read manufacture information

Format

INPUT	AT+GMI/AT+CGMI
OUTPUT	Success: manufacture information OK Failure: ERROR Example:+GMI:manufacturer OK

2.1.2 Read product version internal & external

Name AT+PLMSWV

Description: read product version internal & external

Format:

INPUT	AT+ PLMSWV?
OUTPUT	Success: AT+PLMSWV? AT+GMI:STYX Communication ERROR AT+PLMSWV? +PLMSWV: PLM Software Information GMM Info: MG-8224 GMI Info: STYX Communication Client Ver: Project Name: LM101A Project Number: FWST80 HW Ver: mikrotik-fwbuild1 2017/07/07 SW Ver(O): 1.0 SW Ver(I): 4035_0.0.5_LM101A_0419 EFS Ver: 1.1 OK Failure: ERROR
INPUT	AT+PLMSWV
OUTPUT	Success: AT+PLMSWV? +PLMSWV: PLM Software Information GMM Info: MG-8224 GMI Info: STYX Communication Client Ver: Project Name: LM101A Project Number: FWST80 HW Ver: mikrotik-fwbuild1 2017/07/07 SW Ver(O): 1.0 SW Ver(I): 4035_0.0.5_LM101A_0419 EFS Ver: 1.1 OK Failure: ERROR

2.1.3 Read & write SN IMEI MEID information

Name AT+PLMINF

Description:Read&write SN IMEI MEID information

Format

INPUT	AT+PLMINF=< option >,<type>,<info>
OUTPUT	Success : + PLMINF: —— OK Failure ERROR

Parameter	Value	Mark
Option	0: read the setting value 1 write the setting value to model	--
Type	9:SN 10: IMEI 11: MEID	--
Infor	The information should be written to model.	

Example:

Execute command	Return response	Instruction
AT+PLMINF=1,9 “SN”	OK	SN info
AT+PLMINF=1,10 “IMEI”	OK	IMEI Info
AT+PLMINF=1,11 “MEID”	OK	MEID Info
AT+PLMINF=0,9	+PLMINF “SN” OK	Check SN info
AT+PLMINF=0,10	+PLMINF “IMEI” OK	Check IMEI info
AT+PLMINF=0,11	+PLMINF “MEID” OK	Check MEID info

2.1.4 Search operator name of SIM card

Name AT^SPN

Description: Search operator name of SIM card

Format

INPUT	AT^SPN?
OUTPUT	Success +SPN:”<operator information>” OK Failure ERROR Example +SPN: OK

2.1.5 Check SIM card

Name AT+CIMI

Description Read IMSI from USIM/SIM

Format

INPUT	AT+CIMI
OUTPUT	Success <SIM information> OK Failure ERROR Example +CIMI 250110101811810 OK

2.1.6 Check software external version

Name AT+CGMR

Description Check software external version

Format

INPUT	AT+CGMR
OUTPUT	Success:[software external version] OK Failure ERROR Remark: [software external version] Example:qual_PLM_X.X OK

2.1.7 Check PIN and PUK rest number of times

Name AT+ PLMSIMINF

Description Check PIN and PUK rest number of times

Format

INPUT	AT+PLMSIMINF
OUTPUT	Success: AT +PLMSIMINF? +PLMSIMINF: PIN1=3; PUK1=10; PIN2=3; PUK2=10 OK Failure ERROR ParameterDescription PIN1=3 PIN rest times is 3 PUK1=10 PUK rest times is 10 PIN2 and PUK2 no need consider currently

2.2 Register network status and operation command

2.2.1 Register network information

Name +CREG parameter command syntax

Description: Set command to control show unsolicited result code,check current value of return command .

Set different CREG for different unsolicited result code.

AT+CREG operation command syntax

Type	Command	Possibly return result	Description
Setting command	AT+CREG=[<n>]	OK	Success
	AT+CREG=[<n>]	ERROR/ +CMEERROR:<error>	Failure
Checking command	AT+CREG?	+CREG: <n>,<stat>	-
Test command	AT+CREG=?	+CREG:(<n>Value list)	-

Parameter	Value	Description
<n>	[0]	Forbid unsolicited result code of network registration
	1	Start network registration unsolicited code +CREG:<stat>

	2	Start network registration and location unsolicited code +CREG:<stat>[,<lac>,<ci>]
<stat>	0	Non registration,ME did notsearch new registered operator currently
	1	Registration, local network
	2	Non registration, but ME is searching new registered operator now
	3	Refuse to registration
	4	unknown
	5	Registration, roaming
<lac>		Location area ID
<ci>		Serving cell ID

Example

Command	Response	Description
AT+CREG=2	OK	
AT+CREG?	+CREG:2,1,9191,2E50 OK	Band location area id and serving cell id
	+CREG: 0,1 OK	
	+CREG: 1,1 OK	
AT+CREG=	+CREG:(0-2) OK	

2.2.2 LTE network register status

Set command control on LTE registration status codes show some intermediate results

1. When <n>=1 and LTE registration status of MT changed, the command set control unsolicited result codes +CEREG, then there is indicate +CEREG:<stat>
2. When <n>=2 and registration serving cell changed, there is indicate +CEREG: <stat>[,<tac>,<ci>]

Checking command return result code indicate status and one can show the current network

Whether indicate MT registered quantity <stat>. Only when <n>=2 and MT was registered in network

It will return location information elements <tac> and <ci>

Type	Command	Possibly return result	Instruction
Setting command	AT+CEREG=[<n>]	Ok	-
		ERROR/+CME ERROR:	Failure
Checking command	AT+CEREG?	+CEREG: <n>,<stat>[,<tac>,<ci>] OK	-
Testing command	AT+CEREG=?	+CEREG: _(<n> Value list) OK	-

Form 4-35 Parameter detail instruction

Parameter	Value	Description
<n>	[0]	Forbid unsolicited result code of network registration +CEREG:
	1	Start network registration unsolicited code
	2	Start network registration and location unsolicited code +CREG:<stat>[,<lac>,<ci>]
<stat>	0	Non registration,ME did notsearch new registered operator currently
	1	Registration, local network
	2	Non registration, but ME is searching new registered operator now
	3	Refuse to registration
	4	unknown
	5	Registration, roaming
<lac>		Character; two hex location area codes (for example: 00C3 equivalent of 195 in decimal)
<ci>		Character;four hex cell number

Example

Command	Response	Description
AT+CREG=1	OK	-
AT+CREG	+CEREG:1,1 OK	-
AT+CREG=	+CREG:(0-2) OK	-

2.2.3 ^SYSINFO

Name AT^SYSINFO

Description Obtain current System network status

INPUT	AT^ SYSINFO
OUTPUT	Success ^SYSINFO: <srv_status>, <srv_domain>, <roam_status>, <sys_mode>, <sim_stat> OK Failure ERROR Example: AT^SYSINFO ^SYSINFO: 2,3,0,5,1 OK

Parameter Instruction

Parameter	Value	Instruction
<srv_status>	0	No service
	1	Limited service
	2	Service available
	3	Limited area service
	4	powersaving and dormancy status
<srv_domain>	0	No service
	1	Only CS service
	2	Only PS service
	3	PS+CS service

	4	CS and PS don't register and are in the status ofsearching
	255	CDMA does not support
<roam_status>	0	Non roaming status
<roam_status>	1	Roaming status
<sys_mode>	0	No service
	1	AMPS mode (not use provisionally)
	2	CDMA mode
	3	GSM/GPRS mode
	4	HDR mode
	5	WCDMA mode
	6	GPS mode
	7	GSM/WCDMA
	8	CDMA/HDR HYBRID
	9	LTE mode
	11	TDS mode
<sim_stat>	1	UIM card status available
	240	ROMSIM version
	255	UIM card doesn't exist

2.2.4 Check and set searching network mode

Name AT+MODODR

Description Check and set searching network mode

Format:

INPUT	AT+ MODODR: < Sys_mode >
OUTPUT	Success OK Failure: ERROR Example: AT+MODODR? +MODODR:2 OK

Parameter Description:

Sys_mode	Description
1	3G ONLY mode(HDR+WCDMA
2	AUTO mode(1X+HDR+GSM+WCDMA+LTE)
3	GSM ONLY mode
4	1XDO HYBRID mode(1X+HDR)
5	4G LTEONLY mode
6	1X ONLY mode
7	HDR ONLY mode
8	WCDMA ONLY mode

2.2.5 Choose operator +COPS

Set command to force to choose and register GSM network operator <mode> setting ME choose operator automatically <oper>? Or use the command to forced choose <oper> If the selected operator cannot be used, it cannot choose other operators, but <mode>=4 is exception.

When it is <mode>=2 it means forced log out from the network. The registration mode will impact all future registration.

For example,when it is <mode>=2 ME does not register until <mode>=0 or 1, ME will register

AT+COPS operation command syntax

Type	Command	Possibly return result	Instruction
Setting command	AT+COPS=[<mode>[,<format>[,<oper>[,<AcT>]]]]	OK ERROR/+CME ERROR:	-
Checking command	AT+COPS?	+COPS: <mode>[,<format>,<oper>] OK	-
Checking command	AT+COPS=?	+COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<AcT>])s][,,(list of supported <mode>s),(list ofsupported <format>s)] OK	

Parameter detail description

Parameter	Value	Description
<mode>	0	Search network automatically, in setting command,when mode is 0, the back parameter format,oper are invalid.
	1	Search network manually
	2	To register network
	3	Only +COPS? Read command, set return format <format>
	4	Manual and automatic combined, if searching network failed by manual,it will change to automatic searching mode automatically.
<format>	0	long alphanumeric operator <oper>
	1	short alphanumeric operator <oper>
	2	Numeric <oper>
<oper>	-	Operator information
<stat>	0	Unknown
	1	Available
	2	current registration
	3	Forbidden
<Act>	0	GSM/GPRS system
	2	TDS/UMTS
	7	LTE

Example

Command	Response	Instruction
AT+COPS=0,0	OK	-
AT+COPS? Set different<format> corresponding<oper>	+COPS: 0,0,"CHINA MOBILE",0 OK	long alphanumeric operator <oper>
	+COPS: 0,1,"CMCC",0 OK	short alphanumeric operator <oper>
	+COPS: 0,2,"46000",0 OK	numeric <oper>
AT+COPS=?	+COPS: (2,"CHINA MOBILE","CMCC","46000",0), (3,"CHN-CUGSM","CU-GSM","46001 ",2), (3,"CHN-CUGSM","CU-GSM","46001 ",0),, (0,1,2,3,4),(0,1,2)	List current all network operators

2.2.6 Check registration information

Name：AT+PLMNWTYPE

Description：Obtain current SYSTEM network status

INPUT	AT+PLMNWTYPE?
OUTPUT	Success +PLMNWTYPE: <RAT> OK Failure ERROR Example： AT+ PLMNWTYPE? +PLMNWTYPE: CDMA OK

Return

RAT	GSM GPRS EDGE UMTS HSDPA HSUPA HSPA+ CDMA HDR 1XEVDO TDSCDMA LTE TDD LTE FDD NONE

2.2.7 Existing network signal check

Name：AT+CSQ

Description：Execute command return corresponding network mode signal strength indicator

Format：

INPUT	AT+CSQ
OUTPUT	+CSQ：XX Success：OK Failure：ERROR

Return value instruction

Network Mode	Return value parameters
GSM	RSSI, RSCP
WCDMA	RSSI, ECIO
TDSCDMA	RSCP, RSSI
CDMA，HDR	RSSI, ECIO
1XEVDO	RSSI，ECIO，SINR
LTE	RSRP, RSSI, SNR

Example

Network mode	Return response	Instruction
GSM	+CSQ: -78,-127 OK	RSSI，RSCP
WCDMA	+CSQ：-77,-15 OK	RSSI，ECIO
TDSCDMA	+CSQ: -60,-55 OK	RSCP, RSSI
CDMA，HDR	+CSQ: -73,-8 OK	RSSI，ECIO
1XEVDO	+CSQ: -65,-4,2 OK	RSSI，ECIO，SINR
LTE	+CSQ: -95,-71, 13.4 OK	RSRP, RSSI, SNR

2.2.8 Obtain serving cell information

Name：AT+PLMCELLINFO

Description：Obtain serving cell information

Format

INPUT	AT+PLMCELLINF?
OUTPUT	*** serving cell Success OK Example： AT+PLMCELLINF?

	MCC:460 MNC:001 CELL ID:2c84 LAC ID:20da BAND:44 CHANNEL:660 RSSI:88 RSCP:-125

Return value description:value is valid after registration successful

Network type	Return Value
GSM	Mcc, mnc, cellid, locid, band, channel, rssi, ecio
WCDMA	Mcc, mnc, cellid, psc, locid, band, dl _channel, ul_channel , rssi, ecio
TDSCDMA	Mcc, mnc, cellid, locid, band, channel, rscp
CDMA 1X	Mcc, mnc, sid, nid, basic_id, band, channel, rssi, ecio
HDR	Mcc, mnc, sectorid, colorcode, band, channel, rssi, ecio, sinr, io

2.2.9 Band and channel search

Name：+ PLMBCCFG

Description：Obtain serving cell band and channel information

Format：

INPUT	AT++PLMBCCFG?
OUTPUT	Success +PLMBCCFG:<band>,<channel>,<boolurc> OK Failure:ERROR

Set to make report initiative

INPUT	AT+PLMBCCFG=<Boolurc>
OUTPUT	Success OK Failure ERROR
	Set to start report initiative AT+PLMBCCFG=1 Reportstring +BandChannel:<band>,<channel> Close Report: AT+PLMBCCFG=0

Parameter	Instruction
Band	Frequency
Channel	Channel
boolurc	0 - Close band channel report initiative
	1 - Start band channel report initiative

2.3 CDMA related AT command

2.3.1 CDMA EVDO user name and password setting

Name：AT+PLMCDMACFG

Description: EVDO CDMA network, user name, password setting

Format：

Setting user name and password

INPUT	AT+ PLMCDMACFG=”USRID”,”PASSWORD”
OUTPUT	Success: OK Failure： ERROR
INPUT	AT+PLMCDMACFG?
OUTPUT	Success： +PLMCDMACFG: Username:CARD Passwd:CARD OK Failure： ERROR

2.3.2 +QCPIN

Name：AT+QCPIN?

This is similar to +CPIN command in 3GPP2 mode.

Example：

AT+QCPIN?

+QCPIN: READY

OK

2.3.3 +QCLCK

This is similar to +CLCK command in3GPP2 mode. Supported facilities are “SC” and “FD”.

Example: SIM card locked or unlocked

AT+QCLCK="SC",1,"1234" //Setting locked
OK

AT+QCPIN? //Check SIM card status
+QCPIN: SIM PIN
OK

AT+QCPIN=1234 //PIN code unlocked
OK

AT+QCLCK="SC",0,"1234" //unlocked
OK

AT+QCPIN? //Unlock finished
+QCPIN: READY
OK

2.3.4 +QCPWD

This is similar to +CPWD command in and “P2”.

3GPP2 mode. Supported facilities are “SC” and “P2”.

Command to change device lock command+ QCLCK defined device locked password
Example:

AT+QCPWD="SC","1234","4321"
OK

Set new PIN code 4321, worked after reboot or re-activation SIM card

2.3.5 +QCIMI

This is similar to +CIMI command in 3GPP2 mode.<NA> Name only supported.

Example：

AT+QCIMI

460031549261823
OK

2.3.6 +CDV Voice call

Dial command for voice calls The format of <dial string> is identical to that for the ATD command. This command

Does not cause the MT2 to change to the online state.

AT+CDV18629463427；
OK

2.3.7 +CHV Voice hang up

AT+CHV
OK

2.3.8 $QCCAV

Answer incoming voice call

AT$QCCAV
OK

2.3.9 $QCCHV

Hang up incoming voice call

AT$QCCHV
OK

2.4 Report command initiative

2.4.1 Start calling command^ORIG

Description:MT is starting calling

^ORIG	Possibly return result
	^ORIG:<call_x>,<call_type>

Parameter instruction：

<call_x>：Call ID, the only marked calling ID, value range1-9

<call_type>：Call type, below value:

0 - voice calling

2 - Packet domain data call

3 - CDMA CDMA SMS calling (not support currently)

7 - OTA calling （standard OTASP numbers）

8 - OTA calling （none standard OTASP numbers）

9 - Emergency calling

2.4.2 Call through indicator ^CONN

Description: regarding CDMA,if MT is caller,calling request send to network successfully and respond by network. MT report command to TE even if no answer.If MT is called,answer the call,MT report command to TE,to UMTS,it means the opposite answer call and in call status.

Format:

Command	Possibly return result
	CONN:<call_x>,<call_type>

Parameter instruction：

<call_x>：Call ID, the only marked calling ID, value range1-9

<call_type>：Call type, below value:

0 - voice calling

2 - Packet domain data call

3 - CDMA CDMA SMS calling (not support currently)

7 - OTA calling （standard OTASP numbers）

8 - OTA calling （none standard OTASP numbers）

9 - Emergency calling

2.4.3 Calling received by network ^CONF

Description:only for UMTS,not support CDMA

Calling received by network

Format :

Command	Possibly return result
	^ CONF:<call_x>,<call_type>

Parameter instruction：

<call_x>： Call ID.The only marked ID, Value range

1~9

<call_type>： call type, as below value

0 - Voice call

2 - Packet domain data call (not support)

3 - CDMA SMS call(not support)

7 - OTA call （standard OTASP numbers）

8 - OTA call （none standard OTASP numbers）

9 - Emergency call

2.4.4 Calling end ^CEND

Description:calling end,MT report the command to TE,report TE calling end reason and call duration

Command	Possibly return result
	^CEND:<call_x>,<duration>,<end_status>[,<cc_cause>]

Parameter instruction

<call_x>： Call ID, the only marked calling id,value range 1-9

<duration>： Calling duration, second as unit,start timing from

report ^CONN until to end.

<end_status>：Calling end reason.

<cc_cause>：Call control information, not support temporary, -1

2.4.5 System mode change indicate^MODE

Description: When system mode change,MT report the command to TE initiative.

Format:

Command	Possibly return result
	^ MODE:<sys_mode>

Parameter Description：

<sys_mode>:

0：NO SERVICE

2：CDMA

3：GSM

4：HDR.

5：WCDMA

8：1XEVDO

9：LTE

11：TDS

Setting report initiative function, already check current network type

AT+PLMSYSMODE

INPUT	AT+PLMSYSMODE=<boolurc>
OUTPUT	Success: OK Failure: ERROR

Parameter	Description
boolurc	0 - Close ^MODE report initiative
	1 - Start ^MODE report initiative

INPUT	AT+PLMSYSMODE?
OUTPUT	Success: +PLMSYSMODE: <sysmode>, <boolurc> OK Failure: ERROR

Parameter	Description
sysmode	0：NO SERVICE 2：CDMA 3：GSM 4：HDR. 5：WCDMA

	8：1XEVDO 9：LTE 11：TDS
boolurc	0 - Non start report initiative function
	1 - Open initiative function

2.4.6 Device+OPERATEMODE report

Description: when system operation mode change, MT report the command to TE initiative

Command	Possibly return result
	+OPERATEMODE:< operatemode >

Parameter instruction：

< operatemode >:

0: 3Gpp AT command

1:3Gpp2 AT command

Setting report initiative function,already check current network type

AT+OPERATEMODE

INPUT	AT+ OPERATEMODE =<boolurc>
OUTPUT	Success: OK Failure: ERROR

Parameter	Instruction
boolurc	0 - Close +OPERATEMODE report initiative
	1 - Start +OPERATEMODE report initiative

INPUT	AT+ OPERATEMODE?
OUTPUT	Success: + OPERATEMODE: < operatemode >,<boolurc> OK Failure: ERROR

Parameter	Instruction
operatemode	0: 3GPP AT command pro 1: 3Gpp2 AT command pro

boolurc	0 - Non start report initiative function
	1 - Start report initiative function

2.4.7 Network type change report

Name：AT+ PLMNWURC

Description：Setting initialization report switch

Format：

INPUT	AT+ PLMNWURC =<boolurc>
OUTPUT	success：OK failure：ERROR Parameter instruction： boolurc： 1 Start report function boolurc： 0 Close report function

Report data instruction:

If setting enable,value and network type is:

+ +PLMNWURC:<value>

Value：

0 - No Service

1 - GSM

2 - GPRS

3 - EDGE

4 - WCDMA

5 - HSDPA

6 - HSUPA

7 - HSDPA_PLUS

8 - DC_HSDPA_PLUS

9 - TDSCDMA

10 - CDMA

11 - HDR

12 - 1XEVDO

13 - LTE_FDD

14 - LTE_TDD

2.4.8 Signal change report

Name：AT+PLMSIGURC

Description： Setting signal change report switch

Format

INPUT	AT+ PLMSIGURC =<boolurc>
OUTPUT	Success:OK Failure:ERROR
	Parameter instruction： boolurc： 1 Start signal change report boolurc： 0 Close signal change report

Report data instruction：

+PLMSIGURC：<level>,<rssi_value>

Level :Signal strength

Rssi_value :Indicator for network signal strength

LTE	Rsrp
TDSCDMA	RSCP
WCDMA, GSM	RSSI
CDMA, EVDO, 1XEVDO	RSSI