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G5/G6-Family AT Commands User Manual

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Applicability Table

No.	Type	Note
1	G510	
2	G510S	
3	G520	
4	G610-A20-xx	
5	G620-A20-xx	

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1 Preface

1.1 Manual Scope

This manual introduces the AT command set, and describes how software developers can use these commands to communicate with the device, and to create software applications that communicate with the module using these commands.

Note: The integrator should read the corresponding SW release notes for the module version he is using to get information about differences from this manual.

1.2 Target Audience

This manual is intended for software developers who communicate with the module using the AT commands, and create applications to communicate with the module using the AT commands.

2 Introduction to AT Commands

2.1 AT Commands Overview

AT commands are sets of commands used for communication with the cellular modem. AT commands are comprised of assemblies of ASCII characters which start with the "AT" prefix (except the commands A/ and +++). The AT prefix is derived from the word Attention, which asks the modem to pay attention to the current request (command).

AT commands are used to request services from the cellular modem, such as:

- Call services: dial, answer and hang up
- Cellular utilities: send/receive SMS
- Modem profiles: Auto Answer
- Cellular Network queries: GSM signal quality

2.2 General System Abbreviations

The basic system configuration contains a modem and a terminal.

The G5xx/G6xx is the modem and may be referred to as the DCE or TA, such as the phone, the mobile or the radio.

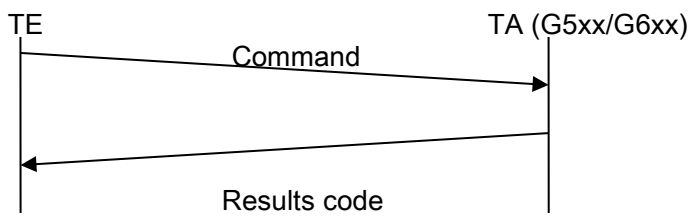
The terminal (PC or MCU) may be referred to as the DTE or the TE.

2.3 AT Commands Protocol

The AT commands interface is basically a Modem Services upon Request.Communication (almost) always begins from the TE side. This means that any service should be requested from the TE. Thus a request is called a "Command".

Each command must be answered by a "Results code" from the TA. The results code reports the command status to the TE. Some commands may include several "Results code" to send data back to the TE. Some commands may initiate a mode in which, when specified events are generated in the G5xx/G6xx, "Indicator" messages are sent data asynchronously. The “indicators” can be called “Unsolicited results code”.

The G5xx/G6xx can echo characters received from the TE (commands) back to the TE.



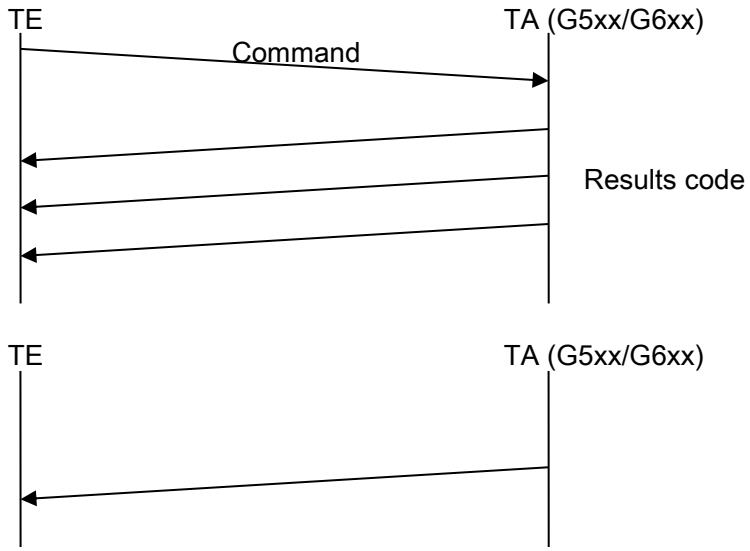


Figure 2-1 Unsolicited results code

2.4 AT Commands Structure

2.4.1 General Symbols Used in AT Commands Description 错误！未找到引用源。

The following syntax definitions apply in this chapter:

Syntax	Definition
<CR>	Carriage returns character, specified by the value of the S3-register.
<LF>	Line-feed character, specified by the value of the S4-register.
<…>	Name enclosed in angle brackets is a syntax element. The brackets themselves do not appear in the command line.
[...]	Optional sub-parameter of a command or an optional part of terminal information response, enclosed in square brackets. The brackets themselves do not appear in the command line. When the sub-parameter is not provided in the parameter type commands, the new value equals its previous value. In action type commands, the action should be performed on the basis of the recommended default setting of the sub-parameter.
//	Denotes a comment, and should not be included in the command.

2.4.2 Command Structure

Each AT command has the "AT" or “at” prefix string (except the commands A/ and +++).

Each AT command has the suffix <CR> (except the commands A/ and +++).

Example:

AT+CSQ<CR>

ATS24?<CR>

An AT command line may contain one or more commands. Delimiters are used to separate the commands from each other. The delimiter is either a semicolon ";" or none, meaning space (basic commands).

Example:

ATS0=1V1Q0E0<CR>

AT+IFC=0,0;+ICF=3,4;+CNMI

=2,1,0,0,0<CR>

2.4.3 Results Code Structure

By default, the module responds with verbose response codes. The results code prefix is <CR><LF>. The results code suffix is <CR><LF>.

Example:

<CR><LF>+CSQ: 99,99<CR><LF>

<CR><LF>OK<CR><LF>

The Unsolicited results code is same as the Results code.

2.5 Command Syntax

Execute command syntax	AT+xxx ATxxx ATxxx;
Parameter set command syntax	AT+xxx=<Value> ATxxx=<Value>
Parameter read Command syntax	AT+xxx? ATxxx?
Parameter test Command syntax	AT+ xxx =? ATxxx?

<Value> consists of either a numeric constant or a string constant. <compound_value> consist of several

<value> parameters separated by commas.

Example of compound_value: <value1>,<value2>,…,<valueN>

- Numeric Constants

Numeric constants are expressed in decimal, hexadecimal, or binary form. In the module, the definition of each command specifies which form is used for values associated with that command.

- String Constants

String constants consist of a sequence of characters, bounded at the beginning and end by the double-quote character (").

3 Modem ID

These commands allow the user to query the type of the device that is attached, the technology used in the device, as well as basic operating information about the module.

3.1 +CGMI, +GMI, +FMI, Request Manufacturer ID

These commands display manufacturer identification. The module outputs a string containing manufacturer identification information.

Command	Response/Action
AT+CGMI AT+CGMI?	+CGMI: <manufacturer_ID> OK
AT+GMI AT+GMI?	+GMI: <manufacturer_ID> OK
AT+FMI AT+FMI?	+FMI: <manufacturer_ID> OK

Example:

AT+CGMI
+CGMI: " Fibocom "
OK

3.2 +CGMM, +GMM, +FMM, Request Model ID

These commands request the model identification. The module outputs a string containing information about the specific model, including a list of the supported technology used, and the particular model number.

Command	Response/Action
AT+CGMM AT+CGMM?	+CGMM: <list of supported technologies>,<model> OK
AT+GMM AT+GMM?	+GMM: <list of supported technologies>,<model> OK
AT+FMM AT+FMM?	+FMM: <list of supported technologies>,<model> OK

Example:

AT+CGMM?
+CGMM: "GSM900/1800”,”G510"
OK

The following table shows the +CGMM string parameters.

String	Description
"GSM900"	EGSM at 900 MHz
"GSM1800"	DCS at 1800 MHz

3.3 +CGMR, +GMR, +FMR, Request Revision

These commands request the revision identification. The module outputs a string containing the revision identification information of the software version contained within the device.

Command	Response/Action
AT+CGMR AT+CGMR?	+CGMR: <revision> OK
AT+GMR AT+GMR?	+GMR: <revision> OK
AT+FMR AT+FMR?	+FMR: <revision> OK

Example:

AT+CGMR
+CGMR: "G510_V0D.00.16"
OK

3.4 +CGSN, +GSN, Request Product Serial Number Identification

This command displays the product serial number identification IMEI (International Mobile Equipment Identification). It can be used even when the SIM card is not inserted.

Command	Response/Action
AT+CGSN AT+CGSN?	+CGSN: <imei> OK

AT+GSN AT+GSN?	+GSN: <imei> OK

The following table shows the +CGSN, +GSN parameters.

<Parameter>	Description
<imei>	The IMEI (International Mobile Station Equipment Identity) number is comprised of 15 digits, as specified by GSM 03.03 [3]. IMEI numbers are composed of the following elements, all in decimal digits: Type Approval Code (TAC) - 6 digits Serial Number (SNR) - 6 digits Spare digit - 1 digit The TAC and SNR are protected against unauthorized changes.

Example:

AT+CGSN?
+CGSN: “004400013805666”
OK

3.5 +CSCS, Select Terminal Character Set

This command selects the character set. The module supports the following character sets: "IRA","GSM","UCS2", and “HEX". The default value is “IRA”.

Command	Syntax	Response/Action
Set	+CSCS=[<chset>]	OK or: +CMS ERROR: <err>
Read	+CSCS?	+CSCS: <selected character set> OK
Test	+CSCS=?	+CSCS: (<supported character sets>) OK

The following table shows the +CSCS parameter optional values.

<chset>	Character Set
“IRA”	International Reference Alphabet (ITU-T T.50)

“GSM”	GSM default alphabet (GSM 03.38 subclause 6.2.1)
"UCS2"	2-byte Universal Character Set, Unicode (ISO/IEC 10646 [32])
“HEX”	Character strings consist only of hexadecimal numbers from 00 to FF
“8859-1”	8-bit Character Set

3.6 +CIMI, Request IMSI

This command displays the International Mobile Subscriber Identity number.

Command	Response/Action
AT+CIMI AT+CIMI?	+CIMI: <imsi> OK or: +CME ERROR: <err>

Example:

AT+CIMI
+CIMI: 314566320021400
OK

3.7 +CFSN, Read Factory Serial Number

This command is used to query the factory serial number.

Command	Response/Action
AT+CFSN AT+CFSN?	+CFSN: <fsn> OK

Example:

AT+CFSN
+CFSN: “000000000”
OK

3.8 Request Identification Information

This command displays various module information items.

Command	Response/Action
ATIn	<information item n> or: +CME ERROR: <err>

The following table shows the information items that are supported by the module.

ATIn	Description	Output	Reference
ATI	Reports version build time	“20130620Thu1600”	
ATI0	Reports version build time	“20130620Thu1600”	
ATI1	Reserve		
ATI2	Reserve		
ATI3	Reports product description	“G510 GPRS Module”	
ATI4	Reserve		
ATI5	Reserve		
ATI6	Reserve		
ATI7	Reports product description	"GSM900/1800/850/1900”	
ATI8	Reports software version	“G510_V0D.00.XX”	
ATI9	Reports hardware version	“G510-Q50_V1.0X”	

3.9 +CNUM, Request MSISDN(s)

This command displays up to 2 strings of text information that identify the module. The output string contains double quotes.

On SIM cards that have EFmsisdn file, the string(s) returned are the MSISDN numbers and their associated data.

On SIM cards that don't have EFmsisdn file, the strings returned are the MSISDN numbers and their associated data stored in module NVM.

Command	Response/Action
+CNUM +CNUM? (MSISDN supported)	+CNUM: [<MSISDN1_string>],<MSISDN1>,<MSISDN1_type><CR><LF> [+CNUM: [<MSISDN2_string>],<MSISDN2>,<MSISDN2_type>]<CR><LF> [...] OK
+CNUM +CNUM? (MSISDN not supported)	+CNUM: <phone_number> OK

The following table shows the +CNUM parameters.

<Parameter>	Description
<MSISDN type>	Phone number type 161 Use for local call 145 Use “+” for international access code 129 Unknown

Example:

AT+CNUM?
+CNUM: "VoiceMail","09876543210987654321098765432 1",129
OK

3.10 +CLAC, List of All Available AT Commands

Command	Syntax	Response/Action	Remarks
Execute	+CLAC	List of available AT commands	The Execute command displays a list of all the AT commands supported by the module.

4 Modem Control and Status

4.1 Modem Register Commands

The module holds certain data items in selected memory space, named Software Registers (S-registers) and Modem Registers. Some of these registers are used as bitmaps, where one register holds more than one data item.

All S-registers can be accessed using the S command, described in “S, Bit Map Registers”. Some registers can also be accessed using dedicated commands, detailed below.

4.1.1 V, Module Response Format

This command determines the response format of the data adapter and the contents of the header and trailer transmitted with the result codes and information responses. This command also determines whether the result codes are transmitted in a numeric or an alphabetic ("verbose") form. The text portion of information responses is not affected by this setting.

The following table shows the effect that setting this parameter has on the format of information text and result codes.

V0	V1	Information Responses
<ATV0><cr><lf>	<ATV1><cr><lf>	0 - "OK" 1 - "CONNECT" 2 - "RING" 3 - "NO CARRIER" 4 - "ERROR" 5 - "NO DIALTONE" 6 - "BUSY" 7 - "NO ANSWER" 8 - “NOT SUPPORT” 9 - “INVALLID COMMAND LINE” 10 - “\r\n”
<numeric code><cr>	<verbose code><cr><lf>	

Command	Syntax	Response/Action	Remarks
Set	ATV<value>	OK or: +CME ERROR: <err>	The Set command sets the format of information responses and result codes.

The following table shows the V parameters.

<Parameter>	Description
<value>	0 Transmits limited headers and trailers, and numeric text. 1 Transmits full headers and trailers, and verbose response text. The default value is 1.

Example:

ATV0
0
ATV1
OK

4.1.2 Q, Result Code Suppression

This command determines whether to output the result codes. Information text transmitted in response to commands is not affected by the setting of this parameter.

Command	Syntax	Response/Action	Remarks
Set	ATQ<value>	OK or: +CME ERROR: <err>	The set commands sets whether or not to output result codes.
Read	ATQ?	Q: <value> OK	

The following table shows the parameters.

<Parameter>	Description
<value>	0 Transmit result codes. 1 Suppress result codes. The default value is 0.

Example:

ATQ0

OK

ATQ?

Q: 0

OK

ATQ4

ERROR

ATQ1 //No response , because result codes are suppressed.

ATQ4 //No response , because result codes are suppressed.

4.1.3 E, Command Echo

This command defines whether input characters are echoed to output. If so, these characters are echoed at the same rate, parity and format at which they were received.

Command	Syntax	Response/Action	Remarks
Set	ATE<value>	OK or: +CME ERROR: <err>	The Set command sets whether or not to echo characters.
Read	ATE?	<value> OK	The Test command for E is not defined by ITU, and therefore is not supported by the module. The module returns an error.

The following table shows the E parameters.

<Parameter>	Description
<value>	000 Does not echo characters 001 Echoes characters The default value is 1.

Example:

ATE?

001

OK

4.1.4 S, Bit Map Registers

This command reads/writes values of the S-registers. The module supports this command for various S values, according to official specifications (ITU-I, ETSI, or manufacturer specific).

Command	Syntax	Response/Action	Remarks
Set	ATSn=<value>	OK or: +CME ERROR: <err>	The Set command is allowed for read/write S-registers, and not allowed for read-only S-registers.
Read	ATSn?	<current value of S-register n> OK or: +CME ERROR: <err>	
Test			The Test command for Sn is not defined by ITU, and therefore is not supported by the Module. The G5xx returns an error.

The following table shows the different S-registers and their associated values.

Sn	Description	Min	Max	Default
S0	Sets/gets number of rings before auto answer.	0	255	0
S3	Sets/gets carriage return code character.	0	127	13
S4	Sets/gets line feed code character.	0	127	10
S5	Sets/gets command line editing character(backspace).	0	127	8
S12	Sets/gets guard time (in units of 50 msec) for the escape character during ODM connections	0	255	50

Note: S0 (Auto Answer) should work regardless of the DTR HW line state. This is a deviation from the ITU V. 25-ter standard.

Example:

ATS0?
000
OK
ATS0=3
OK
ATS0?
003
OK

4.1.5 S12

This command handles the selection of the guard time, which is stored in S-Register 12, and specifies the behavior of escape characters during ODM connection.

Note: For a guard time specified by S-Register 12, no character should be entered before or after "+++". The duration between escape codes must be smaller than the guard time.

Command	Syntax	Response/Action	Remarks
Set	S12=<guard_time>	OK +CME ERROR: <err>	The Set command sets the ODM escape character guard time value if all parameters are valid.
Read	S12?	<guard_time> OK	The Read command displays the current ODM escape character guard time.

The following table shows the S12 parameters.

<Parameter>	Description
<guard_time>	ODM escape character guard time (units of 50 msec). Range is 0 to 255. The default value is 50.

4.1.6 &V, View Configuration

This command reports the current S-registers.

Command	Syntax	Response/Action	Remarks
Execute	&V	ACTIVE PROFILE: ... (profile data) STORED PROFILE 0: ... (profile data) OK or +CME ERROR: <err>	The Execute command displays the current active configuration.

Example:

AT&V
ACTIVE PROFILE
&C1, &D1, &K3, E1, Q0, V1, X0, S0:0, S3:13, S4:10, S5:8, +CRC: 0

STORED PROFILE 0:
&C1, &D2, &K3, E1, Q0, V1, X0, S0:0, S3:13, S4:10, S5:8, +CRC:0
OK

4.1.7 &F, Set to Factory Defined Configuration

This command restores the factory default configuration profile. The Module only supports one factory default profile, 0.

Command	Syntax	Response/Action	Remarks
Set	AT&F<value>	OK or: +CMS ERROR: <err>	
Read	AT&F?	<current profile number>	
Test			The Test command for &F is not defined by ITU, and therefore is not supported by the Module. The Module returns an error.

The following table shows the &F parameters.

<Parameter>	Description
<value>	0 Factory default configuration profile. This is the only value supported.

Example:

AT&F?
&F: 0
OK

4.1.8 Z, Reset to Default Configuration

This command drops the current call, and resets the values to default configuration.

Command	Syntax	Response/Action	Remarks
Set	ATZ<value>	OK or: +CMS ERROR: <err>	
Read			The Read command for Z is not defined, and therefore is not supported by the Module. The Module returns an error.
Test			The Test command for Z is not defined, and therefore is not supported by the Module. The Module returns an error.

The following table shows the Z parameters.

<Parameter>	Description
<value>	0 Set to user profile 0 The default value is 0.

Example:

ATZ0
OK

4.1.9 &W, Store User Profile

This command saved the active profile to one of two user profiles.

Note: The user must power off the module in regular process. Otherwise, this command cannot be in effect.

Command	Syntax	Response/Action	Remarks
Set	&W[<n>]	OK or: +CME ERROR: <err>	Set command stores the current active configuration to user profile 0.

The following table shows the &W parameters.

<Parameter>	Description
<n>	profile number:
	0 Store to user's profile 0

Example:

AT&W0
OK

4.1.10+CRSM, Restricted SIM Access

This command provides limited access to the Elementary Files on the SIM. Access to the SIM database is restricted to the commands which are listed at <command>. All parameters of AT+CRSM are used as specified by GSM 11.11 version 8.7.0. As response to the command, the Module sends the actual SIM information parameters and response data. Error result code "+CME ERROR" may be returned if the command cannot be transferred to the SIM, e.g. if the SIM is not inserted, or defected, or PIN1/PUK authentication required, or required input parameters not present. However, failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters.

Some AT+CRSM commands require PIN/PIN2 authentication.

Command	Syntax	Response/Action	Remarks
Set	AT+CRSM=<command>[,<file_id>[,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <sw1>,<sw2>[,<response>] OK or: +CME ERROR: <err>	Set command transmits the SIM <command> and its required parameters to the ME. ME sends the actual SIM information parameters and response data.
Test	AT+CRSM=?	+CRSM: (list of supported<command>s), (possible <file_id>s range value),(possible <P1> range value), (possible	The test command returns the possible ranges of CRSM Parameters.

		<P2> range value),(possible <P3>range value), OK or: +CME ERROR: <err>	

The following table shows the +CRSM parameters.

<Parameter>	Description
<command>	Integer type. Command passed on by the ME to the SIM. 176 Read BINARY 178 Read RECORD 192 Get RESPONSE 214 Update BINARY 220 Update RECORD 242 STATUS
<file_id>	Integer type. This is the identifier of a elementary data file on SIM. Mandatory for every <command> except of STATUS.
<P1>,<P2>,<P3>	Integer type. Parameters passed on by the ME to the SIM. These parameters are man- datory for every command, except GET RESPONSE and STATUS. READ BINARY <P1> Offset high (0...255) <P2> Offset low (0...255) <P3> Length (0...255) READ BINARY <P1> Rec. No. (0...255) <P2> Mode "02" = next record "03" = previous record "04" = absolute mode/current mode, the record number is given in P1 with P1='00' denoting the current record.

<table>
<tr><td></td><td><P3> Length (0...255)

GET RESPONSE

<P1> "00"

<P2> "00"

<P3> Length (0...255)

UPDATE BINARY

<P1> Offset high (0...255)

<P2> Offset low (0...255)

<P3> Length (0...255)

UPDATE RECORD

<P1> Rec. No. (0...255)

<P2> Mode "02" = next record

"03" = previous record

"04" = absolute mode/current mode, the record number is given in P1 with P1='00' denoting the current record.

<P3> Length (0...255)

STATUS

<P1> "00"

<P2> "00"

<P3> Length (0...255)</td></tr>
<tr><td><data></td><td>Information which shall be written to the SIM (hexadecimal character format). Man- datory for UPDATE BINARY and UPDATE RECORD.</td></tr>
<tr><td><sw1> <sw2></td><td>Integer character format. Information, from the SIM, about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.

Responses to commands which are correctly executed:

<table><tr><td><s1></td><td><s2></td><td>Description</td></tr><tr><td>144</td><td>0</td><td>Normal ending of the command</td></tr><tr><td>145</td><td>XX</td><td>Normal ending of the command, with extra information from the proactive SIM, containing a</td></tr></table></td></tr>
</table>

		command for the ME. Length 'XX' of the response data.
158	XX	Length 'XX' of the response data given in case of a SIM data download error.
159	XX	Length 'XX' of the response data.

Responses to commands which are postponed:

<s1>	<sw2>	Error Description
147	0	SIM Application Toolkit is busy. Command cannot be executed at present, further normal commands are allowed.
146	0X	Command successful but after using an internal update retry routine 'X' times.
146	64	Memory problem.
148	0	No EF selected.
148	2	Out of range (invalid address).
148	4	• File ID not found. • Pattern not found.
148	8	File is inconsistent with the command
152	2	No CHV initialized
152	4	• Access condition not fulfilled. • Unsuccessful CHV verification, at least one attempt left. • Unsuccessful UNBLOCK CHV verification, at least one attempt left. • Authentication failed.
152	8	In contradiction with CHV status.
152	16	In contradiction with invalidation status.
152	64	• Unsuccessful CHV verification, no attempt left. • Unsuccessful UNBLOCK CHV verification, no attempt left.

<table>
<tr><td></td><td>
<table>
<tr><td>• CHV blocked.
• UNBLOCK CHV blocked.</td></tr>
</table>
<table>
<tr><th colspan="2"><sw1><sw2></th><th>Error Description</th></tr>
<tr><td>152</td><td>80</td><td>Increase cannot be performed, Max value reached.</td></tr>
<tr><td>103</td><td>XX</td><td>Incorrect parameter P3
(Note: 'XX' gives the correct length or states that no additional information is given ('XX' = '00').</td></tr>
<tr><td>107</td><td>XX</td><td>Incorrect parameter P1 or P2.</td></tr>
<tr><td>109</td><td>XX</td><td>Unknown instruction code given in the command.</td></tr>
<tr><td>110</td><td>XX</td><td>Wrong instruction class given in the command.</td></tr>
<tr><td>111</td><td>XX</td><td>Technical problem with no diagnostic given.</td></tr>
</table>
</td></tr>
<tr><td><response></td><td>Response of a successful completion of the command previously issued (hexadecimal character uppercase format). STATUS and GET RESPONSE return data, which gives information about the current elementary data file_id. This information includes the type of file and its size (refer to GSM 11.11). After READ BINARY or READ RECORD command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.</td></tr>
</table>

Example:

AT+CRSM=176,28478,0,0,20

+CRSM: 103,4,"9F0F00003F00010000009000020000900056341 2"

OK

AT+CRSM=192,12258

+CRSM: 144,0,"0000000A2FE2040004FF4401020000"

OK

AT+CRSM=?

+CRSM: (176,178,192,214,220,242),(12037-28599),(0-255),(0-255),(0-255)

OK

4.1.11 +CCID

This command returns the card identification number in SIM (SIM file EFICCID, see GSM 11.11 Chap.10.1.1) as string type.

Command	Syntax	Response/Action
Set	AT+CCID	+CCID: <ID> OK or: +CME ERROR: <err>
Read	AT+CCID?	Same as above
Test	AT+CCID=?	OK

Example:

AT+CCID
+CCID: 89860018190839008096
OK
AT+CCID=?
OK
AT+CCID?
+CCID: 89860018190839008096
OK

4.2 Sleep Mode Commands

When the Module is connected using UART connection to external device, a sleep mechanism is available. In order to improve the power consumption, the Module supports a low-power consumption mode, called "Sleep mode". The Module has internal decision conditions for entering and exiting sleep mode. As the terminal and the Module operate in a combined system, and as the communication between the Module and the terminal must be reliable, there should be a mechanism agreed upon by both the Module and the terminal to coordinate their separate sleep mode entering and exiting sequences. The Module will not enter sleep mode unless the terminal enables the Module by AT commands.
The following are the Sleep mode AT commands:
ATS24: Activates/deactivates Sleep mode.
The Module receives a request to activate or deactivate Sleep mode.
The Module receives a request to define the behavior of the CTS line when the Module is in Sleep mode. It enables or disables activation of the CTS line after wakeup.

4.2.1 S24, Set Number of Seconds Delay Before Module Enters Sleep Mode

This command activates/disables the Sleep mode. The terminal sends ATS24=5, and if there are no radio and UART activities, the Module enters sleep mode in 5 seconds. it can see.

Command	Syntax	Response/Action	Remarks
Set	ATS24=[<value>]	OK	The Set command sets the amount of time, in seconds; the Module should wait before entering Sleep mode.
Read	ATS24?	<value> OK	The Read command returns the current value.

The following table shows the S24 parameters.

<Parameter>	Description
<value>	Number of seconds (0 <= n <= 255) 0 Disable Sleep mode >0 Enable Sleep mode The default value is 000.

Example:

ATS24?

000

OK

ATS24=5

OK //The Module enter Sleep Mode at once

ATS24?

005

OK

(If there are no radio and UART activities, the Module will enter sleep mode in 5 seconds)

4.3 Error Handling Commands

4.3.1 +CMEE, Report Mobile Equipment Error

The Set command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the Module. When enabled, Module-related errors cause a +CME ERROR: <err> final result code instead of the regular ERROR final result code. Usually, ERROR is returned when the error is related to syntax, invalid parameters or terminal functionality.

For all Accessory AT commands besides SMS commands, the +CMEE set command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the Module. When enabled, Module related errors cause a +CME ERROR: <err> final result code instead of the regular ERROR result code.

For all SMS AT commands that are derived from GSM 07.05, the +CMEE Set command disables or enables the use of result code +CMS ERROR: <err> as an indication of an error relating to the functionality of the Module. When enabled, Module-related errors cause a +CMS ERROR: <err> final result code instead of the regular ERROR final result.

Command	Syntax	Response/Action	Remarks
Set	AT+CMEE=[<n>]	OK or: +CME ERROR: <err>	The Set command enables or disables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the Module.
Read	AT+CMEE?	+CMEE: <n> OK	The Read command returns the current setting format of the result code.
Test	AT+CMEE=?	+CMEE: (list of supported <n>s) OK	The Test command returns values Supported by the terminal as a compound value.

The following table shows the +CMEE parameters.

<Parameter>	Description
<n>	0 Disable the +CME ERROR: <err> result code and use ERROR. 1 Enable the +CME ERROR: <err> or +CMS ERROR: <err> result codes and use numeric <err> values or +STK ERROR: <err> result codes and use numeric <err> values. 2 Enable the +CME ERROR: <err> or +CMS ERROR: <err> result codes and use verbose <err> values or +STK ERROR: <err> result codes and use numeric <err> values. The default value is 0.

Example:

```
AT+CMEE=0     //+CME ERROR is not used
OK
AT+VTD
ERROR
AT+CMEE=1     //Use numeric <err>
OK
AT+VTD
+CME ERROR: 3
AT+CMEE=2     //Use verbose <err>
OK
AT+VTD
+CME ERROR: operation not allowed
```

4.3.2 +CEER, Extended Error Report

This execution command returns an extended error report containing one or more lines of information text <report>, determined by the manufacturer, providing reasons for the following errors:

- Failure in the last unsuccessful call setup (originating or answering) or the in-call modification.
- Last call release.

Typically, the text consists of a single line containing the reason for the error according to information given by GSM network, in textual format.

Command	Syntax	Response/Action
Execute	AT+CEER	+CEER: <report> OK
Test	AT+CEER=?	OK

4.4 +MSTART, Start message notification

This command can Enable/Disable module output start message when power up.

Command	Syntax	Response/Action
Set	+MSTART=<at start>,<sim ready>	OK or: ERROR
Read	+ MSTART?	+MSTART: <at start>,<sim ready> OK
Test	+MSTART=?	+MSTART: (0-1,0-1) OK

The following table shows the +MSTART parameters.

<Parameter>	Description
<at start>	0: Do not output “AT command ready” from UART 1: Output “AT command ready” from UART (default value)
<sim ready>	0: Do not output “+SIM READY” after SIM init OK 1: Output “+SIM READY” after SIM init OK (default value)

Example:

```
AT+MSTART=?
+MSTART: (0,1),(0,1)
OK
AT+MSTART=1,1
OK
AT+MSTART?
+MSTART: 1,1
OK
```

5 Call Control

5.1 Call Control AT Commands

5.1.1 D, Dial Command

This command places a VOICE call on the current network. Call type is a voice call. For more information about call failure, should use the AT+CEER command.

Note: If there is an active voice call and the terminal sends another ATD voice call command to the Module, the active call is put on hold and the new number is called.

Command	Response/Action
ATD<number>[;]	VOICE CALL: 1st response - Voice call place begins OK 2nd response - Voice call connected: OK When MO call fails: 1. Connection Failure - NO CARRIER or BUSY or NO ANSWER 2. General Failure - ERROR 3. Security reason (such as SIM not present) - OPERATION NOT ALLOWED 4. Unknown reason - UNKNOWN CALLING ERROR

The following table shows the D parameters.

<Parameter>	Description
<number>	Valid phone digits are: 0 1 2 3 4 5 6 7 8 9 * # + The following characters are ignored: A B C D - () / and <space>.
semicolon (;)	When given after <number string>, a voice call is originated to the given address, otherwise a data call is originated.

The control of supplementary services through the Dial command is not supported as these are controlled through the specific supplementary service commands (CCFC, CLCK, and so on.)

Initiating a GPRS connection is done through ATD*99#, as described in “D*99.

Example:

atd44345678; //VOICE call (with semicolon)
OK
OK
atd44345678 //VOICE call (with semicolon)
OK
OK

5.1.2 D>, Direct Dialing from Phone Books

This command places a VOICE call on the current network by dialing directly from the Module phone book.

Note:

- "+CME ERROR: not found" is returned when no match is found in an existing phone book.
- FD phone book supports the (?) wild card character. Telephone numbers containing this character cannot be dialed directly from the phone book.
- "+CME ERROR: Invalid index" is returned when entry <n> is out of the requested Phonebook range.
- When SM phonebook is searched and the given entry value is of the ME phonebook, ME phonebook will be searched as well (result code would be the same as if MT phonebook was searched).

The following table shows a detailed description for the D> commands.

Command	Detailed Description
D><alpha>[;]	Originates a call to a phone number with the corresponding alphanumeric field <alpha>. The Current Phone Book (Set by +CPBS) is searched for the entry that begins with the alphanumeric pattern <alpha>.
D>"mem"<n>[;]	Originates a call to a phone number in memory (phone book) mem and stored in entry location <n>.
D><n>[;]	Originates a call to a phone number from entry location <n> in the Current Phone Book (Set by +CPBS).

Note: Current used memory (phone book) set/read is done through the memory command +CPBS=/+CPBS? respectively.

The following table shows the D> parameters.

<Parameter>	Description
<"alpha">	String type value, which should be equal to an alphanumeric field in a phone

	book entry. The used character set should be the one selected with Select Terminal Character Set +CSCS. <alpha> is case-sensitive, and should be placed in quotes ("alpha").
<n>	This parameter is also called "speed dial location". It is an integer type memory location. <n> should be in the range of locations available in the memory used.
<"mem">	This parameter is not case-sensitive.

Example:

```
AT+CPBS="SM"
OK
AT+CSCS="IRA"
OK
AT+CPBW=1,"035659090",129,"VoiceMail"
OK
AT+CPBR=1
+CPBR: 001,"035659090",129,"VoiceMail"
OK
atd>”VoiceMail”;       //Phonebook by name
OK
OK
ath
NO CARRIER
OK
```

5.1.3 DL, Dial Last Number

The DL command places a voice call to the last number dialed. The call progress information (success/failure) is reported in the same way as for the Dial command.

Command	Detailed Description
ATDL[;]	Initial Response - Last Number retrieved: ATDL: <DIAL DIGITS> 1st response - Voice call placement begins OK 2nd response - Voice call connected OK

The following table shows the DL parameters.

Note:

When ATDL is issued after a dialed number with comma digit:

ATDL; dials the exact number that was last dialed, including the DTMF tones sent.

If ATDL is sent before any Dial command was issued (mainly after Power On, when the last number is an empty field), the Module will return NO CARRIER, as mentioned in the ITU V.25-ter standard.

CCFC (*#21#) ,CCWA (*#43#) ,CLIP (*#30#) ,CLIR(*#31#),COLP(*#76#) will be treat as call number and dail it again.

Example:

```
atdl;
ATDL: 035658278;
OK
OK      //VOICE call
```

5.1.4 H, Hang-up Call

This command hangs up a call. The Module terminates the call whether it is a voice call, and whether it is an incoming, originating, waiting, or connected call.

A NO CARRIER message is returned to the terminal before the regular OK approval.

To terminate a held Voice call or to terminate a call out of a MTPY call, refer to “+CHLD, Call Related Supplementary Services Command” .

The following table shows the call states of the H command.

Call State	Response/Action
IDLE	Error ("operation not allowed")
Single Active	Call released
MTPY Active	Call released (all calls)
Incoming call (RING)	Call released
Single Active and Waiting Call	Single Active released (waiting not affected)
MTPY Active and Waiting Call	MTPY Active released (waiting not affected)
Single (or MTPY) Active and Single (or MTPY) Held	Single (or MTPY) Active released
Held (Single or MTPY) and Waiting Call	Waiting call released
Single (or MTPY) Active and Single (or MTPY) Held & Waiting call	Single (or MTPY) Active released

Example:

```
RING       //Incoming call
RING      //Incoming call
ath         //Hang-up incoming call
NO CARRIER
OK //Incoming call has been terminated - user determined user busy
RING
ata
OK       //Voice call connected
ath         //Hang-up connected call
NO CARRIER
OK         //Active call has been hung-up - terminated
(... Active multi party call, with 3 numbers …)
ath
NO CARRIER
NO CARRIER
NO CARRIER
OK
atd035659260;
OK
ath         //Terminate MO voice call while placed
NO CARRIER
OK
```

5.1.5 A, Answer Incoming Call

This command answers an incoming VOICE call after a RING/+CRING indication is sent to the terminal. If the incoming call is answered (connected), the Module sends a CONNECT notification to the terminal. If the MT call fails, the possible notifications are:

- NO CARRIER - Connection Failure
- ERROR - General Failure

Note: A waiting call (an incoming call while a call is in progress) is announced by +CCWA rather than RING. A waiting call can be answered only if it is a voice call. The waiting voice call should be answered using the ATA command, which will put the active call on hold and will connect the waiting call, making it the active call. This ATA action is the same action as AT+CHLD=2.

Example:

Example - Answering a voice call:

AT+CRC=1
OK
+CRING: VOICE
+CRING: VOICE
ata
OK //VOICE call connected - Module is in Command mode
ath
NO CARRIER
OK

5.1.6 +CRC, Cellular Result Codes and RING, +CRING - Incoming Call Indication

This command controls whether or not to present the extended format of an incoming call indication. The RING/+CRING indication is sent from the Module to the terminal when the Module is alerted by an incoming call from the network. Once this indication is sent, information is available on the calling line via +CLIP. When +CRC is disabled, the indication is RING, and when +CRC is enabled, the indication is +CRING.

Command	Syntax	Response/Action	Remarks
Set	+CRC=<n>	OK	The Set command enables/disables the extended format of an incoming call indication. When enabled, an incoming call is indicated to the terminal with an unsolicited result code +CRING: <type> instead of the normal RING.
Read	+CRC?	+CRC: <n> OK	The Read command queries the current settings for the cellular result code.
Test	+CRC=?	+CRC: (list of supported <n>s)	The Test command returns the possible <n> values.

RING/+CRING Indication

+CRING: <type> or:

RING

The following table shows the +CRC parameters.

<Parameter>	Description
<n>	0 Extended format disabled 1 Extended format enabled The default value is 0.
<type> ASYNCCSD REL ASYNCCSD VOICE	Type of incoming call: asynchronous transparent asynchronous non-transparent Normal voice

Example:

```
AT+CRC?
+CRC: 0
OK
AT+CRC=?
+CRC: (0-1)
OK
```

Example - RING/+CRING indication

```
(..Incoming Call..)
RING
RING
RING
AT+CRC=1       //Enable extended ring format
OK
+CRING: VOICE
+CRING: VOICE
ath
```

NO CARRIER

OK

5.1.7 +CLIP, Calling Line Identification

This command controls the Calling Line Identity (CLI) presentation indication to the terminal when an incoming call is detected by the Module. This command allows the user to query the provisioning status of the CLI by the network and by the Module. The command also allows the user to enable/disable the CLI presentation by the Module to the terminal. The +CLIP indication information varies depending on what is provided by the network and what information is stored in the Module phone book.

Command	Syntax	Response/Action	Remarks
Set	AT+CLIP=[<n>]	OK or: +CME ERROR: <err>	The Set command enables or disables the presentation of the CLI indication from the Module to the terminal. Note: The Set command does not address the network.
Read	AT+CLIP?	+CLIP: <n>, <m> OK	The Read command returns the +CLIP enable/disable state in the Module as well as in the network provisioning state of the CLI presentation.
Test			The Test command returns the Set command options (0,1).

5.1.8 +CLIP Indication

When the CLI presentation indication is enabled by the Module (<n>=1), this unsolicited indication is sent to the terminal after the RING indication.

+CLIP: <number>,<type>[,<subaddr>,<satype>[[,<alpha>] [,<CLI validity>]]]

The following table shows the +CLIP parameters.

<Parameter>	Description
<n>	Enables/disables the CLI presentation indication after the ring indication: 0 Disable CLI presentation 1 Enable CLI presentation The default value is 0.
<m>	Shows the subscriber CLIP service status in the network:

	0 CLIP not provisioned 1 CLIP provisioned 2 Unknown (for example, no network and so on)
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format: 145 Default when the dialing string includes the international access code character "+". 161 Default when making a local call. 129 Type of number is unknown (usually the output when the number itself is unknown).
<subaddr>	NULL, field not used (String type subaddress of format specified by <satype>)
<satype>	Field not used. Value is always 128 (unknown) - type of sub address octet in integer format.
<"alpha">	Name of the calling party (if provided by the network or if the number is found in the Module phone books).
<CLI validity>	The Validity of the Calling Line Identity presentation: 0 CLI valid. 1 CLI has been withheld by the originator. 2CLI is not available due to networking problems or limitations of the originating network.

Example:

AT+CLIP=?

+CLIP: (0,1)//CLI presentation is disabled by the G5xx/G6xx (0) and is enabled by the network (1)

OK

AT+CLIP=1

OK

Example +CLIP indication:

(…incoming call…)

RING
+CLIP: "13510503472",161,,,"",0

Example +CLIP indication with restricted CLI:
AT+CRC=1
OK

(…incoming call…, caller restricted the CLI presentation (used AT+CLIR)…)
+CRING: VOICE
+CLIP: "",128,,128,"",1 //longzhongyou?

5.1.9 +CCWA, Call Waiting Command

This command controls the Call Waiting supplementary service, including the settings and the queries of the Module and the network. When the Call Waiting indication is enabled by the Module and there is a waiting call, a +CCWA: indication is sent from the Module to the terminal. The indication will appear one time

Note: The Module supports only one of the services at a time: Voice. Multiparty is a voice-only functionality. A CCWA indication is sent to the terminal only during a voice call-waiting event.

Command	Syntax	Response	Remarks
Set	+CCWA=[<n>[,<mode>[,<class>]]]	OK If <mode>=2 and the command succeeds: +CCWA: <status>,<class1>[<CR><LF> +CCWA: <status>,<class2>[...]] OK	The Set command enables/disables the Call-Waiting indication in the Module and in the network. Activation, deactivation and status query are supported. Note: When the <mode> parameter is set to 2 (network query), the <n> parameter is ignored. This means that no enable/disable action is performed while querying the network.
Read	+CCWA?	+CCWA: <n> OK	The Read command returns the Enable/disable status of the call waiting indication in the Module (<n>).
Test	+CCWA=?	+CCWA: (list of supported <n>s) OK	The Test command returns <n> values supported by the Module as a compound value.

5.1.10+CCWA Indication

When a call-waiting indication is enabled by the Module (<n>=1), the following unsolicited indication is sent to the terminal from the Module:

+CCWA: <number>,<type>,<class>[,<alpha>] [,<CLI validity>]

The following table shows the +CCWA parameters.

<Parameter>	Description
<n>	Enables/disables the call waiting indication to the terminal by the Module. 0 - Disable 1 - Enable The default value is 0.
<mode>	Call waiting service request to the network. When the <mode> parameter is not given, the network is not interrogated. 0 - Disable 1 - Enable 2 - Query status
<class>	Sum of integers each representing a class of information. 1 - Voice (telephony) The default value is 1.
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format: 145 - Default when the dialing string includes the international access code character "+". 161 - Default when making a local call.
	129 - Type of number is unknown (usually the output when the number itself is unknown)
<status>	Call waiting support by the network (output for <mode>=2). 0 - Not active 1 - Active
<"alpha">	Name of the calling party (if provided by the network or if the number is found in the Module phone books).
<CLI validity>	The Validity of the Calling Line Identity presentation: 0 - CLI valid. 1 - CLI has been withheld by the originator. 2 - CLI is not available due to networking problems or limitations of the originating network.

Note: When the parameter <mode> is 2 (Query status), the first parameter is ignored and the third parameter is always treated as class = 1 unless it was set in Set Mode.

Example:

```
AT+CCWA=1                    //Enable call waiting on Module
OK
AT+CCWA=?
+CCWA: (0-1)
OK
AT+CCWA?
+CCWA: 1
OK
Examples of +CCWA set command - network interrogation
AT+CCWA=1,2                  //Class parameter is considered as 7
+CCWA: 1,1          //Call waiting is active for class 1, voice
OK
AT+CCWA=1,2,2       //Class parameter is 2
+CCWA: 0,2          //Call waiting is not active for class 2, data
OK
AT+CCWA=1,1
OK                  //Enable the call waiting feature in the network, and in the Module
Example +CCWA indication
atd9311234567;                //Originate a voice call
OK
OK                    //Voice call connected
(...conversation...)

(… call waiting indication received by the Module …)
+CCWA: "+358317654321",145,1,"Bob"

AT+CHLD=0           //Release the waiting call
OK
NO CARRIER
AT+CRC=1            //RING indication is not relevant to CCWA indication
OK
(…waiting call…, caller restricted to its CLI presentation (used AT+CLIR)…)
+CCWA: "",128,1,"",1          //CLI is restricted, but call type recognized as voice
```

5.1.11 +CHLD, Call Related Supplementary Services Command

This command controls the Call Hold and Multiparty Conversation services. This command manipulates voice calls only. The Set command allows the control of the following call related services:

- Call HOLD: A call can be temporarily disconnected from the Module, but the connection is retained by the network.
- MTPY (Multi party) Conversation: Conference calls.

The network does not reserve more than one traffic channel for a mobile station; therefore the Module can have only one call on hold at a time.

Note: Only voice calls can be put on HOLD.

A precondition for the multi-party service is that the Module is in control of one active call and one call on hold. In this situation, the Module can request the network to begin the MTPY (Multi Party) service. Once a MTPY call is active, remote parties may be added, disconnected or separated (removed from the MTPY call, but remain connected to the served mobile subscriber).The maximum number of remote parties is 5.In this command, the term CALL refers to a single or MTPY call.

A single Active call is considered a MTPY call with one call index numbered as 1.

Command	Response/Action
+CHLD=<n>	If the call is terminated: NO CARRIER OK (approve request was submitted) If the call state is changed (link, split, from active to hold, and so on): OK (approve request was done) If the call is terminated and another call is answered: NO CARRIER OK (call answered and is now connected)

Command	Syntax	Response/Action	Remarks
Test	+CHLD=?	+CHLD: (list of supported <n>s) OK	The Test command returns <n> values supported by the Module to the terminal

The following table shows the +CHLD parameters.

<Parameter>	Description
<n>	Call hold operation: 0 - Releases all held calls or: Sets User Determined User Busy for a waiting call 1 - Releases all active calls and accepts the held or waiting call 1x - Release specific call x, where x is the serial number of a call participating in an active MTPY call. 2 - Places all active calls on hold and accepts the held or waiting call 2x - In the case of an active MTPY call, places all active calls on hold, except for call X x. Call x remains active. 3 - Adds a held call to the conversation – MTPY

Example:

```
AT+CHLD=?
+CHLD: (0,1,1x,2,2x,3)
OK
AT+CCWA=1    //Enable call waiting
OK
atd9311234567;     //Originate a voice call
OK
OK (...conversation...)
+CCWA: "+358317654321 ",145,1,"Bob"     //Awaiting call alerts
AT+CHLD=2     //Put first call on hold and answer the second call
OK (...conversation...)
AT+CHLD=3     //Add the held call to the conversation
OK
(...MTPY conversation...)
AT+CHLD=22       //Split: Place the MO active call on hold, MT call remains active
OK
AT+CHLD=0       //Release the held call
OK
```

NO CARRIER

ath //Release the active call

NO CARRIER

OK

atd9311234567; //Originate a voice call

OK

OK

+CCWA: "055728386",129,1," ",0 //Waiting call alerts

AT+CHLD=1 //Release the active call, accept the waiting call

OK

NO CARRIER //Active 9311234567 was released

OK //Waiting 055728386 was answered

5.1.12+CCFC, Call Forwarding Number and Conditions

This command enables control of the call-forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported.

Command	Syntax	Response/Action	Remarks
Set	+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	If the command succeeds: +CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]] [<CR><LF> +CCFC: <status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][...]] +CCFC: (list of supported <reason>s)	The Set command instructs the Module which call forwarding settings to request from network. The Set command, in query mode, interrogates the network about the subscriber current call forwarding status.
Test	+CCFC=?	+CCFC: <reason> OK	The Test command returns <reason> values supported by the Module to the terminal.

The following table shows the +CCFC parameters.

<Parameter>	Description
<reason>	0 - Unconditional

	1 - Mobile busy 2 - No reply 3 - Not reachable 4 - All call forwarding 5 - All conditional call forwarding
<mode>	0 - Disable 1 - Enable 2 - Query status 3 - Registration 4 - Erasure
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format-. 145 Default when dialing string includes international access code character "+". 161 Default when making a local call.
<subaddr>	NULL, field not used (String type subaddress of format specified by <satype>).
<satype>	Field not used. Value is always 129 (unknown) - type of sub address octet in integer format.
<classx>	The sum of integers representing a class of information. 1 - Voice The default value is 1.
<time>	1-30 - The number of seconds to wait before calls are forwarded, when "no reply" is enabled or queried. The default value is 20. Note: The parameter must be a multiple of 5, for example, 5, 10, 15 and so on. If not, the module of 5 will be ignored.
<status>	0 - Not active 1 - Active

Note: A forward-to phone <number> (and the optional fields <type>, <subaddr> and <satype>) are tied

to a <reason> and a <class>. This means that there can be a different <number> for the same <reason> because of a different <class>. When registering without mentioning a <class>, <class>=7 is selected.

A <number> field is mandatory when registering (<mode>=3) and it is irrelevant (ignored) in all other <mode>s.

Example:

```
AT+CCFC=?
+CCFC: (0-5)
OK
AT+CCFC=0,3,"01256316830",129,1
OK
AT+CCFC=1,3,"0545658278",129,1     //Register UC forward-to of all classes.
OK
AT+CCFC=1,1       //Activate UC forward-to of all classes.
OK
AT+CCFC=1 ,2       //Interrogate reason not-reachable of all classes.
+CCFC: 1,1,"+97254151200",145
OK            //For <reason>=3, forward only voice calls is activated.
AT+CCFC=4,2        //Interrogate reason all-call-forwarding for all classes.
+CME ERROR: no network service//Interrogation of <reason>=30 is not supported by network.
AT+CCFC=2,3,"+972545658278"
OK
AT+CCFC=2,0       //Disable call-forwarding for reason no-reply of all classes.
OK
AT+CCFC=2,2
+CCFC: 0,1,"+972545658278",145,,25
OK
```

5.1.13 +CLIR, Calling Line Identification Restriction

This command instructs the Module to query, enable or disable the presentation of the CLI (calling line ID) of a MO call to the called party. The restriction of the CLI (disable presentation) is dependent both on the Module and on the network.

The network enables three possible provisions of CLIR:

- Not provisioned (CLIR Off - presentation allowed)
- Provisioned permanently
- Provisioned with Temporary mode

The provision is fixed and cannot be changed by an AT command. Temporary Mode:

Temporary mode can be in one of two states:

A - Presentation restricted (CLIR On) as default.

B - Presentation allowed (CLIR Off) as default. A subscriber to Temporary mode always has a default subscription to state A or B. Temporary-mode provisioning means that the terminal can request the module to switch the default mode from A to B, and vice versa.

Note: When a service is in state A, and the terminal wants to enable the CLI presentation (turn CLIR off) for a single call, it can do so using the ATD command. This does not change the Temporary mode state. This can also be done when the service is in state B and the terminal wants to disable the CLI presentation (turn CLIR on) for a single call.

Command	Syntax	Response/Action	Remarks
Set	+CLIR=<n>	OK or: +CME ERROR: <err>	The Set command instructs the Module to enable/disable CLI restriction for all MO calls.
Read	+CLIR?	+CLIR: <n>,<m> OK	The Read command returns the current setting of CLIR on the network <m> and on the Module <n>.
Test	+CLIR=?	+CLIR: (list of supported<n>s)	The Test command returns <n> values supported by the Module.

The following table shows the +CLIR parameters.

<Parameter>	Description
<n>	Adjustment for outgoing calls 0 - Presentation indicator is used according to the subscription of the CLIR service 1 - CLIR invocation 2 - CLIR suppression The default value is 2.
<m>	Subscriber CLIR service status in the network 0 - CLIR not provisioned 1 - CLIR provisioned in permanent mode 2 - Unknown (for example, no network and so on) 3 - CLIR Temporary mode presentation restricted (can be the default) 4 - CLIR Temporary mode presentation allowed (can be the default)

Example:

AT+CLIR=?
+CLIR: (0-2)
OK
AT+CLIR?
+CLIR: 0,0
OK
AT+CLIR=2
OK
atd054565195; //MO voice call
OK
(… calling …)
(… a Module that has 054565195 SIM and is CLIP enabled will receive the following on the terminal:
RING
+CLIP: "",128,,128,"",1
RING
+CLIP: "",128,,128,"",1)
ath
NO CARRIER
OK
AT+CLIR=0
OK
atd054565195; //MO voice call
OK
(… calling …)
(… a Module that has 054565195 SIM and is CLIP enabled will receive the following on the terminal:
RING
+CLIP: "054565006",129,,128," ",0
RING
+CLIP: "054565006",129,,128," ",0 …)
ath
NO CARRIER
OK

5.1.14 O, Return to Online Data State

This command returns the Module from the Command mode to the Online Data mode and issues a CONNECT or CONNECT <text> result code.

After dialing or answering (atd/ata commands and connect), the phone enters the Online Data mode where it is able to transfer data, but not to enter AT commands.

The ESC command +++, transfers the phone to the Command mode. The O command returns the phone to the fully online Data mode (as it was before using the ESC command).

Note: The escape character '+' can be changed using the S2-register.

The time delay between consecutive escape characters is configured using the S 12-register.

Command	Syntax	Response/Action
Execute	ATO	CONNECT +CME ERROR: <err> If phone is not in Data Call NO CARRIER: If connection is not successfully resumed.

Example:

```
AT+MIPODM    //Calling a remote modem - data mode
CONNECT      //Module is in Data mode
             //Escaping back to Command mode using the +++ sequence
OK
AT           //Module is in Command mode
OK
ATO          //Returning to Data mode
CONNECT
```

5.1.15 +CHUP, Hang up Call

This command causes the Module to hang up the current GSM call.

Command	Syntax	Response/Action	Remarks
Set	+CHUP	OK or: +CME ERROR <err>	The Set command hangs up the current GSM call.

5.1.16 +MDC, Selection of Desired Message to Be Displayed Upon Connection of a Voice Call

This AT command enables you to select the desired messages to be displayed upon connection of a voice call with a remote party. The OK and CONNECT messages are available.

Command	Syntax	Response/Action	Remarks
Set	+MDC= <mode>	OK or: +CME ERROR: <err>	The Set command selects which of the supported messages will be displayed upon connection of a voice call. <mode> Command Parameters: 0 - Display OK on voice call connection 1 - Display CONNECT on voice call connection Default Values: Power Up - As previously saved in NVM FLEX bit 0 - Before Set command is first used
Read	+MDC?	+MDC: <mode> OK	The Read command should return the current selection of <mode>.
Test	+MDC=?	+MDC: (list of supported <mode>s) OK	The Test command returns the possible <mode> values.

Example:

AT+MDC=?
+MDC: (0-1)
OK
AT+MDC=1
OK
ATD<number>;

OK
CONNECT
AT+MDC?
+MDC: 1
OK
AT+MDC=0

OK

ATD<number>;

OK

OK

AT+MDC?

+MDC: 0

OK

5.1.17+MHUP, Module Hung UP call

This command hung up a specific call or all calls, and reports a specific disconnect cause to the NW.

Command	Syntax	Response/Action	Remarks
Set	AT+MHUP=<cause>[,<call_id>]	OK or: +CME ERROR: <err>	
Test	AT+MHUP=?	+MHUP: (1,16,17,18,27,31),(0-7) OK	Show list of supported <cause>'s and list of supported <call_id>'s.

The following table shows the +MHUP parameters.

<Parameter>	Description
<cause>	Cause description, send to the NW in the "disconnect" message. 1 "Unassigned (unallocated) number" 16 "Normal call clearing" 17 "User busy" 18 "No user responding" 27 "Destination out of order" 31 "Normal, unspecified"
<call_id>	Index of the call id (same as <idx> in +CLCC command) 0 All calls (default). 1-7 Specific call id.

Example:

```
AT+MHUP=?
+MHUP: (1,16,17,18,27,31),(0-7)
OK
AT+MHUP = 16,3       //Hung up call #3, and send cause "Normal call clearing"
OK
AT+MHUP = 17         //Hung up all calls, and send cause "User busy"
OK
AT+MHUP = 17,0       //Hung up all calls, and send cause "User busy"
OK
```

5.2 Call Status Messages

5.2.1 +CPAS, Phone Activity Status

This command displays the current activity status of the Module; for example, call in progress, or ringing.

Command	Syntax	Response/Action	Remarks
Execute/Read	AT+CPAS	+CPAS: <pas> OK or: +CME ERROR: <err>	The Execute and Read commands return the activity status <pas> of the Module. They can be used to interrogate the Module.
Test	AT+CPAS =?	+CPAS: (list of supported <pas>s) OK	

The following table shows the +CPAS parameters.

<Parameter>	Description
<pas>	0 - Ready - The Module allows commands from the terminal 1 - unavailable(MT does not allow commands from TA/TE) 2 - Unknown - The Module is not guaranteed to respond to instructions 3 - Ringing (MT calls) - The Module is ready for commands from the terminal, but the ringer is active 4 - Call in progress - The Module is ready for commands from the terminal, but a call is in progress 5 – Asleep (MT is unable to process commands from TA/TE, because it is in a low functionality state.

Example:

AT+CPAS
+CPAS: 0
OK
AT+CPAS=?
+CPAS: (0-5)
OK
AT+CPAS?
+CPAS: 4
OK
AT+CPAS//Voice call active state
+CPAS: 4
OK

5.2.2 +CLCC, List Current Calls

This command displays a list of all current Module calls and their statuses, and also enables/disables the unsolicited indication of the call list. (If no calls are received, no information response is sent to the terminal.)

If the command succeeds but no calls are available, no information response is sent to the terminal.

The maximum number of simultaneous multiparty calls is 5+1 (5 in active group and 1 on hold).

Command	Syntax	Response/Action	Remarks
Set	AT+CLCC=<state>	OK or: +CME ERROR: <err>	The Set command enables/disables unsolicited indications.
Execute	AT+CLCC	+CLCC: <idx>,<dir>,<call state>, <mode>,<mpty>,<number>,<type>[,<alpha>] [<CR><LF> + CLCC: <idx>,<dir>,<call state>,<mode>,<m	The Execute command enables the receiving of data about current calls.

		pty>,<number>,<type>[,<alpha>] […]] OK	
Read	AT+CLCC?	+CLCC: <state> OK or: +CME ERROR <err>	The Read command returns the call status.
Test	AT+CLCC=?	+CLCC: (List of supported <state>s) OK or: +CME ERROR <err>	

The following table shows the +CLCC parameters.

<Parameter>	Description
<state>	0 Disable CLCC unsolicited indication 1 Enable CLCC unsolicited indication The default value is 0.
<idx>	Integer type, call identification number
<dir>	0 Mobile originated call (MO) 1 Mobile terminated call (MT)
<call state>	The state of the call 0 Active 1 Held 2 Dialing (MO call) 3 Alerting (MO call) 4 Incoming (MT call)

	5 Waiting (MT call) 6 Released
<mode>	Bearer/Teleservice 0 Voice Call
<mpty>	Multiparty status 0 Call is not part of a multiparty call 1 Call is one of multiparty call parties
<number>	Phone number in the format specified by <type>. Contains a string of up to 32 characters.
<type>	Phone number display format. Type of address octet in integer format (refer to GSM 04.08 [8] subclause 10.5.4.7) 161 Local number 145 International number with access character +

Note: When a mobile-originated call is routed to PSTN (PABX), no ALERT indication is prompted.

Example:

```
AT+CLCC=?
+CLCC: (0-1)
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"01256316830",129,
OK
AT+CLCC?
+CLCC: 0
OK
AT+CLCC=1 //Example with unsolicited indication
OK
ATD055490698;
OK
+CLCC: 1,0,2,0,0,"055490698",129,
+CLCC: 1,0,3,0,0,"055490698",129,
```

OK

+CLCC: 1,0,0,0,0,"055490698",129,

ATH

NO CARRIER

OK

+CLCC: 1,0,6,0,0,"055490698",129,

5.3 Supplementary Services

This set of commands enables control over supplementary service notifications, including Structured and Unstructured Supplementary Service Data (USSD) data.

5.3.1 +CSSN, Supplementary Service Notifications

This command handles the enabling and disabling of supplementary service-related, network-initiated, notifications.

Command	Syntax	Response/Action	Remarks
Set	+CSSN=[<n>[,<m>]]	OK or: +CME ERROR: <err>	The Set command enables/disables the display of notification result codes to the TE. When <n>=1 and a supplementary service notification is received after a mobile-originated call setup, the +CSSI: notification is sent to the TE before any other mobile-originated call setup result codes. When several different notifications are received from the network, each of them receives its own +CSSI result code. When <m>=1 and a supplementary service notification is received during a mobile-terminated call setup or during a call, or when a forward check supplementary service notification is received, the unsolicited result code +CSSU: is sent to the TE. In case of a mobile-terminated call setup, a CSSU is sent after every +CLIP result code (“+CLIP, Calling Line Identification”). When several different events are received from the network, each of them receives its own +CSSU result code. Note: The values for <n> and <m> are not saved after power cycle.
Read	+CSSN?	+CSSN: <n>,<m>	The Read command displays the current

		OK	supplementary service notification setting.
Test	+CSSN=?	+CSSN: (0-1), (0-1) OK	The Test command displays the list of supported CSSN values.

The following table shows the +CSSN parameters.

<Parameter>	Description
<n>	Sets/displays the +CSSI result code presentation status. This value must be specified. 0 Disable (default) 1 Enable
<m>	Sets/displays the +CSSU result code presentation status. This value is optional, but cannot be specified without <n>. 0 Disable (default) 1 Enable

Value	Description	Module Support
0	Unconditional call forwarding is active	Yes
1	Some conditional call forwarding is active	Yes
2	Call has been forwarded	Yes
3	Call is waiting	Yes (GSM only)
4	CUG call (<index> is present)	Yes
5	Outgoing calls are barred	Yes
6	Incoming calls are barred	Yes
7	CLIR suppression rejected	Yes
8	Call has been deflected	No

Value	Description	Module Support
0	This is a forwarded call (Mobile-terminated call setup).	Yes

1	CUG call (<index> is present; mobile-terminated call setup).	Yes
2	Call has been put on hold (during a voice call)	Yes
3	Call has been retrieved (during a voice call)	Yes
4	Multiparty call has been entered(during a voice call)	Yes
5	Call on hold has been released(during a voice call; not a supplementary service notification)	Yes
6	Forward check supplementary service message received (can be received at any time)	Yes
7	Call is being connected with the remote party in an alerted state using an explicit call transfer operation (during a voice call).	Yes
8	Call has been connected with the other remote party using an explicit call transfer operation (during a voice call or during mobile-terminated call setup).Number and subaddress parameters may be present: <number>String type phone number of format defined by <type> <type>Type of address octet in integer format (refer to GSM04.08 [8], subclause 10.5.4.7) <subaddr>String type subaddress of format defined by <satype> <satype>Type of subaddress octet in integer format (refer to GSM 04.08 [8], subclause10.5.4.8)	Yes
9	Deflected call (mobile-terminated call setup)	No

Example:

```
AT+CSSN=?    // test command
+CSSN: (0-1),(0-1)
OK

AT+CSSN=0,0    // disable both options
OK
AT+CSSN=1,0    // set n value as enabled, m disabled
OK
AT+CSSN?
+CSSN: 1,0       // display the current n & m values
```

OK

+CSSI: 1 // displayed after mobile originated call setup of call forward and n enable

+CSSU: 2 //displayed when a call has been placed on hold (during the call) using the +CHLD AT command and m enable

5.3.2 +CUSD, Unstructured Supplementary Service Data

This command allows control of Unstructured Supplementary Service Data (US SD), according to GSM 02.90.

Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) +CUSD: <m>[,<str>,<dcs>] to the TE. In addition, value <n>=2 is used to cancel an ongoing USSD session. When <str> is given, a mobile initiated USSD-string or a response USSD-string to a network initiated operation is sent to the network. The response USSD-string from the network is returned in a subsequent unsolicited +CUSD result code.

Command	Syntax	Response/Action	Remarks
Set	AT+CUSD=[<n>[,<str>[,<dcs>]]]	OK or: +CME ERROR: <err>	The Set command enables/disables the display of the unsolicited result code.
Unsolicited Report		+CUSD: <m>[,<str>[,<dsc>]]]	The USSD response from the network.
Read	+CUSD?	+CUSD: <n> OK	The Read command displays the current value of <n>.
Test	+CUSD=?	+CUSD: (list of supported <n>s) OK	The Test command displays the supported values of <n>.

The following table shows the +CUSD parameters.

<Parameter>	Description
<n>	0 Disable the result code presentation in the TA. 1 Enable the result code presentation in the TA. 2 Cancel session (not applicable to read command response).
<str>	String type USSD-string (when <str> parameter is not given, network is not interrogated):

	If <dcs> indicates that GSM 03.38 [25] default alphabet is used: • If TE character set other than "HEX" (refer command Select TE Character Set +CSCS): ME/TA converts GSM alphabet into current TE character set according to rules of GSM 07.05 [24] Annex A. • If TE character set is "HEX": ME/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number (e.g. character ? (GSM 23) is presented as 17 (IRA 49 and 55)). If <dcs> indicates that 8-bit data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal numbers (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)).
<dcs>	GSM 03.38 - Cell Broadcast Data Coding Scheme in integer format. The supported value are: 17 - USC2 Language Indicator. (The first character in a USC2 Lang IND has the language ID in it. This situation is not defined by the GSM 7.07 or the 3GPP 27.007 so the assuming that the first character should have the correctly formatted and packed language ID already in it). 72 - USC2 (16 bit). 68 - 8 bit. Each other value except of 96, 80, and 240 are 7 bit. Not supported values are: 96, 80, 240 The default value is 15 (7 bit).
<m>	0 No further user action required (network initiated US SD-Notify, or no further information needed after mobile Initiated operation). 1 Further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation). 2 USSD terminated by network. the reason for the termination is indicated by the index, as described in CUSD Termination Cause Table Index. 3 Other local client has responded. 4 Operation not supported. 5 Network timed out.

CUSD Termination Cause Table Index:

Termination Cause	Index
NO_CAUSE	0
CC_BUSY	1
PARAMETER_ERROR	2
INVALID_NUMBER	3
OUTGOING_CALL_BARRED	4
TOO_MANY_CALLS_ON_HOLD	5
NORMAL	6
DROPPED	10
NETWORK	12
INVALID_CALL_ID	13
NORMAL_CLEARING	14
TOO_MANY_ACTIVE_CALLS	16
UNASSIGNED_NUMBER	17
NO_ROUTE_TO_DEST	18
RESOURCE_UNAVAILABLE	19
CALL_BARRED	20
USER_BUSY	21
NO_ANSWER	22
CALL_REJECTED	23
NUMBER_CHANGED	24
DEST_OUT_OF_ORDER	25
SIGNALING_ERROR	26
NETWORK_ERROR	27
NETWORK_BUSY	28
NOT_SUBSCRIBED	29
SERVICE_UNAVAILABLE	31
SERVICE_NOT_SUPPORTED	32

PREPAY_LIMIT_REACHED	33
INCOMPATIBLE_DEST	35
ACCESS_DENIED	43
FEATURE_NOT_AVAILABLE	45
WRONG_CALL_STATE	46
SIGNALING_TIMEOUT	47
MAX_MPTY_PARTICIPANTS_EXCEEDED	48
SYSTEM_FAILURE	49
DATA_MISSING	50
BASIC_SERVICE_NOT_PROVISIONED	51
ILLEGAL_SS_OPERATION	52
SS_INCOMPATIBILITY	53
SS_NOT_AVAILABLE	54
SS_SUBSCRIPTION_VIOLATION	55
INCORRECT_PASSWORD	56
TOO_MANY_PASSWORD_ATTEMPTS	57
PASSWORD_REGISTRATION_FAILURE	58
ILLEGAL_EQUIPMENT	59
UNKNOWN_SUBSCRIBER	60
ILLEGAL_SUBSCRIBER	61
ABSENT_SUBSCRIBER	62
USSD_BUSY	63
CANNOT_TRANSFER_MPTY_CALL	65
BUSY_WITH_UNANSWERED_CALL	66
UNANSWERED_CALL_PENDING	68
USSD_CANCELED	69
PRE_EMPTION	70
OPERATION_NOT_ALLOWED	71

NO_FREE_BEARER_AVAILABLE	72
NBR_SN_EXCEEDED	73
NBR_USER_EXCEEDED	74
Call Control by SIM Causes	
NOT_ALLOWED_BY_CC	75
MODIFIED_TO_SS_BY_CC	76
MODIFIED_TO_CALL_BY_CC	77
CALL_MODIFIED_BY_CC	78
App. Cause	
FDN_FAILURE	90

Example:

AT+CUSD=1,"*00*0549598743#"
+CUSD: 0,"Connecting...",15
+CUSD: 0,"Connected",15
+CLCC: 1,1,4,0,0,"0545550099",129,"" >Call from USSD server
RING
ATA > answer to the server (when answered, the server call to 0549598743)
OK
+CLCC: 1,1,0,0,0,"0545550099",129,""
NO CARRIER
+CLCC: 1,1,6,0,0,"0545550099",129,""

5.3.3 +COLP, Connected Line Identification Presentation

This command relates to the GSM supplementary service called COLP (Connected Line Identification Presentation), which enables a calling subscriber to obtain the connected line identity (COL) of the called party after setting up a mobile-originated call with the Module. For example, after setting up a mobile-originated call to one number that is forwarded to another number, the calling party will see the number of that third party.

When this command is enabled (and the called subscriber permits it), the following intermediate result code is returned:

+COLP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]].

Note: This command is activated when COLP is supported by the network.

Command	Syntax	Response/Action	Remarks
Set	+COLP=[<n>]	OK +CME ERROR: <err>	The Set command enables/disables the display of the COL at the TE on the Module. The value set by this command is not retained after a power cycle.
Read	+COLP?	+COLP: <n>,<m> OK	The Read command displays the status of <n>. It also initiates a query of the COLP service provision status and displays <m>.
Test	+COLP=?	+COLP: (list of supported <n>s) OK	The Test command displays the supported values of <n>.

The following table shows the +COLP parameters.

<Parameter>	Description
<n>	Sets/displays the result code presentation status of the Module. 0 Disable (default) 1 Enable
<m>	Displays the subscriber's COLP service status in the network. 0 COLP not provisioned 1 COLP provisioned 2 Unknown (for example, no network, and so on)
<number>	Sets the phone number, using the format specified by <type>.
<type>	Sets the address octet type in integer format (refer to GSM 04.08 [8] subclause10.5.4.7). 129 Unknown 145 International (used when dialing string includes "+" international access code character)
<subaddr>	Sets the subaddress, using the format specified by <satype>.
<satype>	Sets the address octet type in integer format (refer to GSM 04.08 [8] subclause 10.5.4.8).
<alpha>	An optional, string-type, alphanumeric representation of <number> corresponding to the entry found in the phone book. The character set is defined by +CSCS (Refer to "+CSCS, Select Terminal Character Set", page 3-4).

Example:

AT+COLP=0
OK
AT+COLP=2
+CME ERROR: operation not supported

6 Phone and Date Books and Clock

6.1 Directory Access Commands - Phone Book

This set of commands enables read/write access to the phone book contained within the Module, including both the numeric and the alpha information contained in the location. The presentation is according to GSM 07.07.

In some cases, it may be possible to use these commands to access the dialed and received call stacks. However, as these phone books cannot be edited, the +CPBW command does not work on them.

6.1.1 +CPBS, Select Phone Book Memory

6.1.2 This command handles the selection of the memory to be used for reading and writing entries in the Module's phone book's memory.

Command	Syntax	Response/Action	Remarks
Set	AT+CPBS=<storage>[,<pin2>] <pin2>is optional while <storage> = "FD" only	OK or: +CME ERROR: <err>	The Set command selects the phone book memory storage which is to be used by other phone book commands.
Read	+CPBS?	+CPBS: <storage>[,<used>,<total>] OK	The Read command returns the currently selected phone book memory, number of used entries and total number of entries in the phone book memory.
Test	+CPBS=?	+CPBS: (list of supported<storage>s) OK	Test command returns the supported storage as a compound value.

Note: Read format of +CPBS joins RC and MC, therefore the united list will be prompted.

The following table shows the +CPBS parameters.

<Parameter>	Description
<storage>	List of supported phone books and their storage IDs

	FD: SIM Fixed dialing phone book.
	ON: Own numbers (MSISDNs) list (reading this storage is also available through +CNUM). SM: SIM phone book. LD: SIM last-dialing phone book The default phone book is SM.
<used>	Integer type value indicating the number of used locations in the selected memory.
<total>	Integer type value indicating the total number of entries in the selected phone book memory.
<pin2>	String type. PIN2 password 4 - 8 digits.

Example:

```
AT+CPBS="SM"
OK
AT+CPBR=?
+CPBS: ("SM","ON",”FD","LD")
OK
AT+CPBR=1
OK
AT+CPBR=1,3 //There is nothing written in entry 1,2,3
OK
AT+CPBS="FD","<correct pin2>"
OK // +CPBW pin2 unlocked
AT+CPBW=1,"034546565",129,"xyz"// Write into FD storage
OK
AT+CPBS="FD","<wrong pin2>"
+CME ERROR: incorrect password
AT+CPBS="FD","<pin2 longer then 8 chars>"
+CME ERROR: text string too long
```

6.1.3 +CPBR, Read Phone Book Entries

This command recalls phone book entries from a specific entry number or from a range of entries. If only one entry is specified, and that entry is empty, OK is returned. If a range of entries is requested, all entries that contain data within that range are returned. If a listing fails in a Module error, +CME ERROR: <err> is returned. This command can also be used to obtain information about the number of entries and the maximum size of a phone number and alpha tag fields in the phone book.

This command acts on the currently active phone book, as selected with the +CPBS command.

Command	Syntax	Response/Action	Remarks
Set	+CPBR=<index1>[,<index2>]	[+CPBR: <index1>,<number>,<type>,<text>[<CR><LF> +CPBR: <index2>,<number>,<type>,<text>]] OK or: +CME ERROR: <err>	The Set command returns phone book entries.
Test	+CPBR=?	+CPBR: (list of supported<index>s)[,<nlength>],[<tlength>] OK	The Test command returns the entry range supported by the current storage as a compound value and the maximum lengths of the <number> and <text> fields.

The following table shows the +CPBR parameters.

<Parameter>	Description
<index1> <index2>	Index for a given phone book entry
<number>	Phone number of a given entry
<type>	The address type of a phone number 161 Use for local call 145 Use “+” for international access code 129 Unknown “129" is used to represent an email address or a mailing list. In this case, <ph_type> can be used to further differentiate between the two.
<text>	Text identifier for a phone book entry, according to the character set as specified by command +CSCS.

<nlength>	The maximum number of digits in the <number>.
<tlength>	The maximum number of characters in the <text> entry

Note: The MC and RC have the same memory storage area; therefore there are only 10 entries in total. Some of the entries are listed if the MC phone book is selected, and others are listed if the RC phone book is selected. The phone book selection is done using the AT+CPBS command.

Example:

```
AT+CPBS="SM"
OK
AT+CPBR=?
+CPBR: (1-250),20,14
OK
At+CPBR=1
OK
AT+CPBR=1,3     //There is nothing written in entry 1,2,3
OK

AT+CPBR=4
+CPBR: 4,"18888888",129,"Tom"
OK
```

6.1.4 +CPBF, Find Phone Book Entries

This execution command enables the user to search for a particular entry, by name, in the currently active phone book. If no matching entry is found, the command returns OK. If multiple matches are found, all are returned.

Command	Syntax	Response/Action
Set	+CPBF=<findtext>	[+CPBF: <index1>,<number>,<type>,<text>[[...] <CR><LF> +CBPF: <index2>,<number>,<type>,<text>]] OK or: +CME ERROR: <err>
Test	AT+CPBF=?	+CPBF: [<nlength>][,<tlength>] OK

The following table shows the +CPBF parameters.

<Parameter>	Description
<findtext>	Case-sensitive text substring to search for, according to the character set specified by the +CSCS command.
<index1> <index2>	Index for a given phone book entry
<number>	Phone number of a given entry
<type>	The address type of a phone number 129 Use for local call 145 Use “+” for international access code 128 Unknown Note: "128" is used to represent an email address or a mailing list. In this case, <ph_type> can be used to further differentiate between the two.
<text>	Text identifier for a phone book entry that starts with the substring <findtext>, according to the character set as specified by command +CSCS.

Example:

```
AT+CPBS="SM"    //Selecting phone book
OK
AT+CPBF="Lin"
+CPBF: 1,"18888888",129,"Linzhao"
OK
AT+CPBF="Voice"    //Searching for string "Voice" and finding Voice Mail
+CPBF: 2,"+8613800138000",145,"Voicemail"
OK
AT+CPBF=""    //Searching for everything in phone book, and finding all entries
+CPBF: 1,"18888888",129,"Linzhao"
+CPBF: 2,"+8613800138000",145,"Voicemail"
+CPBF: 3,"18888888",129,"???"
OK
```

6.1.5 +CPBW, Write Phone Book Entry

This command enables the user to store a new entry in the phone book, or edit/delete an existing entry from the phone book. A particular entry in the phone book can be stored, or the next available entry is used.

This command writes the entry in the currently active phone book, selected with the +CPBS command (Refer to “+CPBS, Select Phone Book Memory”). The entry is selected by <index>, the phone number is entered into the <number> field and text associated with the number is entered into the <text> field. If these fields are omitted, the phone book entry is deleted. If the <index> field is omitted, but a number is entered in the <number> field, the phone number is entered into the first available entry in the phone book. If the writing fails in a Module error, +CME ERROR: <err> is returned.

The phone book and date book are share dynamic memory storage. If the writing fail in a Module error in case of "full memory" error while the memory is not full by 'used' field of +CPBS command (Refer to “+CPBS, Select Phone Book Memory”).

Note: The "FD" phone book supports single wild card characters (?) and prefixes of a number in the telephone number field. In cases of fixed dialing, these entries in the "FD" phone book define a group of permitted numbers.

Call indications related to a fixed dialing entry containing wild cards or only a prefix of a number do not display any <alpha> identifier.

Command	Syntax	Response/Action	Remarks
Set	AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]	OK or: +CME ERROR: <err>	
Test	AT+CPBW=?	+CPBW: (list of supported<index>s)[,<nlength>],(list of supported<type>s)[,<tlength>] OK	This command queries the allowable command field and sizes.

The following table shows the +CPBW parameters.

<Parameter>	Description
<index>	Index for a given phone book entry
<number>	Phone number of a given entry
<type>	The address type of a phone number 161 Use for local call 145 Use “+” for international access code

	129 Unknown Note: "128" is used to represent an email address or a mailing list. In this case, <ph_type> can be used to further differentiate between the two.
<text>	Text identifier for a phone book entry, according to the character set as specified by command +CSCS.
<nlength>	The maximum size of a phone number, in digits. There is a limited number of PB records that can be stored with this length. The number of "long" PB records depends on the size of the SIM card EXT1 extension file. If the extension file is full, an attempt to store a new record with more than 20 digits returns an error.
<tlength>	The maximum number of characters in the <text> entry. This applies to GSM standard characters only. Non-GSM standard character sets and extended GSM characters require additional space in storage. In some cases, when using such characters the text cannot be stored. In this case, the Module returns a "text string too long"error.

6.2 System Date and Time Access Commands

6.2.1 +CCLK, Read/Set System Date and Time

This command reads and sets the Module current date, time and time zone.

Command	Syntax	Response/Action	Remarks
Set	+CCLK=<time>	OK or: +CME ERROR: <err>	The Set command sets the date, time and time zone of the system clock. Note: Set Command sets user defined system clock values and saves them in the NVM memory. These saved values are kept after power-cycle as well.
Read	+CCLK?	+CCLK: <time> OK or: +CME ERROR: <err>	The Read command returns the current date, time and time zone setting. By default, <time> will represent the network updated time. If the user has used the Set command once, then <time> will represent the Set command setting. Note: If network operator does not support System Clock Update Message, the initial date, time and time zone, displayed by CCLK Read Command could be invalid (user's responsibility to set date,

			time and time zone by CCLK Set Command). **Note:** See Execute Command for how-to enable back network update time.
Test	+CCLK=?	+CCLK (list of supported <time>s) OK	The Test command returns valid parameters for the +CCLK Set command.

The following table shows the +CCLK parameters.

<Parameter>	Description
<time>	ASCII string of format: yy/MM/dd,hh: mm: ss±zz or yy/MM/dd,hh: mm: ss or yy/MM/dd,hh: mm yy - 2-digit year [2000-2069] MM - 2-digit month [01-12] dd - 2-digit day of month [00-31] hh - 2-digit hour [00-23] mm - 2-digit minute [00-59] ss - 2-digit seconds [00-59] zz - (optional) time zone offset from GMT, in quarter-hours [-47...+48]. If this value is not specified, the time zone offset will be 0.

Example:

AT+CCLK=?

+CCLK: "88/12/31, 23: 59: 59(-47-+48)”

OK

AT+CCLK="01/01/01, 01: 01: 01-06"

OK

AT+CCLK?

+CCLK: "01/01/01, 01 : 01 : 01-06"

OK

7 SMS

7.1 SMS Commands

Module supports SMS PDU and SMS TEXT mode according to ETSI specifications 07.05 & 3.40.

7.1.1 +CPMS, Preferred Message Storage

This command handles the selection of the preferred message storage area. The message storage area is divided into three parts, mem1, mem2 and mem3.

Command	Syntax	Response/Action	Remarks
Set	+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK or: +CMS ERROR: <err>	The Set command sets the memory storage.
Read	+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> OK or: +CMS ERROR: <err>	The Read command displays the selected memory storage type for the three memory areas.
Test	+CPMS=?	+CPMS: (list of supported<mem1>s),(list of supported <mem2>s),(list of supported <mem3>s) OK or: +CMS ERROR: <err>	The Test command lists the supported memory storage for <mem1>, <mem2> and <mem3>.

The following table shows the +CPMS parameters.

<Parameter>	Description
<mem1>	Memory from which messages are read and deleted. Supported values are: "SM". The default value at power-up is "SM".
<mem2>	Memory to which writing operation is made. Supported value is: "SM" The default value at power-up is "SM".
<mem3>	Memory to which received SMS are stored (unless forwarded directly to TE). Supported value is: "SM". The default value at power-up is "SM".
"SM"	SIM message storage

Example:

```
AT+CPMS="SM"
+CPMS: 5,50,5,50,5,50
OK
AT+CPMS?
+CPMS: "SM",5,50,"SM",5,50,"SM",5,50
OK
```

7.1.2 +CMGF, Message Format

This command is a basic command. The Set command handles the selection of the message format used with send, list, read and write commands, as well as the format of unsolicited result codes resulting from message receipts. The Module supports both PDU mode (where entire TP data units are used) and text mode (where the body of the message and its headers are given as separate parameters).

Command	Syntax	Response/Action	Remarks
Set	+CMGF=<mode>	OK or: +CMS ERROR: <err>	The Set command sets the message format to use.
Read	+CMGF?	+CMGF: <mode>	The Read command displays the current message format.

		OK	
Test	+CMGF=?	+CMGF: (list of supported mode>s) OK	The Test command lists all the supported message formats.

The following table shows the +CMGF parameters.

<Parameter>	Description
<mode>	Message format: 0 PDU mode (default) 1 Text mode

Example:

AT+CMGF=1
OK
AT+CMGF?
+CMGF: 1
OK
AT+CMGF=?
+CMGF: (0,1)
OK

7.1.3 +CSCA, Service Center Address

This command enables to write/read SCA to/from SIM.

7.1.4 In SMS text mode, SCA stored in SIM is added to any stored and sent SMS.

In SMS pdu mode, SCA stored in SIM is added to stored SMS and send SMS only when SCA address length coded in PDU equals zero.

Command	Syntax	Response/Action	Remarks
Set	+CSCA=<sca>[,<tosca>]	OK or: +CMS ERROR: <err>	Sets service center address stored in SIM (EF-SMSp -Short message service parameters). <tosca> is optional parameter, default value is 129 (local number). When <sca> is prefixed with '+' it indicates that

			<tosca> is set to 145(International number).
Read	+CSCA?	+CSCA: <sca>,<tosca> OK	Read command displays <sca> and <tosca> stored in SIM*EF-SMSp).
Test			The Test command for +CSCA is not defined by ETSI.

The following table shows the +CSCA parameters.

<Parameter>	Description
<sca>	Service Center Address“ ”"+" character prefix of <sca> indicates <tosca> of 145. Minimum 1 and up to 20 characters, where each character is represented by semi octets (excluding ‘+’ character). If <sca> contains an odd number of digits, bits 4 to 7 of the last octet shall be filled with an end mark coded “s "1”11".
<tosca>	Type of service center address. <tosca> of 129 is mostly use for local number and 145 for International. <tosca> of 129 is default value. <tosca> values are in range of 0-255. Valid values are defined according to: GSM03.40 v7.4.0 section 9.1.2.5 as follow: Bit 7 is 1 Bits 6,5–4 - Present Type of number as follow: Bits 6 5 4 0 0 0 Unknown 0 0 1 International number 0 1 0 National number 0 1 1 Network specific number 1 0 0 Subscriber number 1 0 1 Alphanumeric, (coded according to GSM TS 03.38 7-bit default alphabet) 1 1 0 Abbreviated number 1 1 1 Reserved for extension

	Numbering-plan-identification (applies for Type-of-number = 000,001,010) Bits 3 2 1 0 0 0 0 0 Unknown 0 0 0 1 ISDN/telephone numbering plan (E.164/E.163) 0 0 1 1 Data numbering plan (X.121) 0 1 0 0 Telex numbering plan 1 0 0 0 National numbering plan 1 0 0 1 Private numbering plan 1 0 1 0 ERMES numbering plan (ETSI DE/PS 3 01-3) 1 1 1 1 Reserved for extension. All other values are reserved.

+CSCA <SCA> parameters.

Following table describes +CSCA <SCA> valid parameters including the conversion when using stored <SCA> in SMS PDU mode (editing SMS via +CMGW or +CMGS without SCA). This is according to 24.008V031000P Table 10.5.118/GSM 24.008V031000P: Called party BCD number:

<SCA> Character in SMS (Text mode)	**Mapped character for SMS (PDU mode)**
Digits: 0-9	Digits: 0-9
'+'	0x91
'*'	'A'
'#'	'B'
'A'	'C'
'B'	'D'
'C'	'E'

Example:

```
AT+CSCA?
+CSCA: "+97212356",145        // Read SCA address and TOSCA stored in SIM (EF-smsp)
OK

AT+CSCA="97212356"
OK
AT+CSCA?
+CSCA: "97212356",129
OK

AT+CSCA?
```

```
+CSCA: "*A”C#",129
OK

AT+CMGW=13
> 0481ABCD1211640A8150224902450000A700     // ‘*’->’A’,   ‘A’->B’, ‘B’->C’, ‘#’->’D’

+CMGW: 15
OK

AT+CMGR=15
+CMGR: 2,,13
0481ABCD1211640A8150224902450000A700        // SCA read as stored for current SMS
OK
AT+CSCA?
+CSCA: "*A”C#",129   // Read command remained       // SCA settings didn’t change
OK
AT+CSCA?
+CSCA: "*A”C#",129
OK
AT+CMGW=
> 0011640A8150224902450000A700
+CMGW: 16
OK
AT+CMGR=16
+CMGR: 2,,13
0481CAEDFB11640A8150224902450000A700     // SCA is: ACDEB in pdu,   mapped to *ABC#
OK
AT+CMGW=13
> 0381AB1211640A8150224902450000A700          // Set SCA to BA21
+CMGW: 17
OK
AT+CMGR=17
+CMGR: 2,,13
0381AB1211640A8150224902450000A700        // SCA is set correctly only for current SMS but
+CSCA setting didn’t changed
OK
AT+CSCA?
+CSCA: "*A”C#",129   /SCA didn’t   change in storage
OK
```

7.1.5 +CSMP, Set Text Mode Parameters

This command is a basic command and is used to select values for additional parameters needed when SM is sent to the network or placed in storage when TEXT mode is selected.

Command	Syntax	Response/Action	Remarks
Set	+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK or: +CMS ERROR: <err>	The set command selects values for additional parameters needed when SM is sent to the network or placed in storage when text format message mode is selected.
Read	AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs> OK	The read command returns the current parameters value.
Test	AT+ CSMP =?	OK	The test command just returns OK.

The following table shows the +CSMP parameters.

<Parameter>	Description
<fo>	First octet of GSM 03.40. in integer format. For details see +CMGW definitions. The default value at power-up is 17. (Message type is: SMS-SUBMIT and relative VP format).
<vp>	Validity Period. Depending on SMS-SUBMIT <fo>, TP-Validity-Period-Format bits setting. If there is no correlation between the VPF and the VP value. an error message will be returned. Either in integer format (see Table) or in time-string format ("yy/MM/dd,hh:mm:ss±zz").
<pid>	Protocol-Identifier. The one octet information element by which the SM-TL either refers to the higher layer protocol being used, or indicates inter-working with a certain type of telematic device. "0 - no inter-working, SME-to-SME protocol (default) "Any value between 0-255 will be accepted. The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one, which is not supported.
<dcs>	One octet of Data Coding Scheme, indicates the data coding scheme of the DATA, and may indicate a message class.

	Note: For DCS expanded information, see section “DCS handling”. default alphabet: 00xx00xx, 111 100xx, 1 101xxxx 8 bit data: 00xx01xx, 111101xx UCS2: 00xx10xx, 1110xxxx reserved: 00xx11xx, 0100xxxx-1011xxxx The default value at power-up is 0 - Default alphabet.

<Parameter>	Description
0 to 143	(TP-VP + 1) x 5 minutes (i.e. 5 minutes intervals up to 12 hours)
144 to 167	12 hours + ((TP-VP - 143) x 30 minutes)
168 to 196	(TP-VP - 166) x 1 day
197 to 255	(TP-VP - 192) x 1 week

Example:

```
AT+CSMP?
+CSMP: 17,167,0,0 (default values for SMS-SUBMIT)
OK
AT+CSMP= 1,256,0,0
+CMS ERROR: numeric parameter out of bounds
AT+CSMP=?
OK
AT+CSDH=1
OK
AT+CMGF=1
OK
AT+CMGW="15820447141"
> ABC→(^Z)
+CMGW: 6
OK
AT+CMGR=6
+CMGR: "STO UNSENT","15820447141","",129,17,0,0,167,"+8613800755500",145,3
ABC
OK
```

7.1.6 +CSDH, Show Text Mode Parameters

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

Command	Syntax	Response/Action	Remarks
Set	+CSDH=[<show>]	OK or: +CMS ERROR: <err>	The set command controls whether detailed header information is shown in text mode result codes.
Read	AT+CSDH?	+CSDH: (<show>) OK	The read command returns the current <show> parameter value.
Test	AT+CSDH=?	+CSDH: (list of supported <show>s) OK	

The following table shows the +CSDH parameters.

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

Example:

```
AT+CSDH=?
+CSDH: (0-1)
OK
AT+CSDH?
+CSDH: 0
OK
AT+CMGR=160// SMS-SUBMIT
+CMGR: "STO UNSENT","0544565034",
ABC
OK
AT+CSDH=1
OK
```

AT+CMGR=160

+CMGR: "STO UNSENT","0544565034",,81,29,0,0,"04/11/04,09: 48: 36+08","+97254120032",145,3

ABC

OK

7.1.7 +CNMI, New Message Indications to Terminal

This command handles enabling of unsolicited notifications to the terminal when an SM is received by the Module.

After sending an unsolicited response to the TE, the Module will expect a +CNMA (new message acknowledge) from the TE within a predefined timeout of 60 seconds. The Module will not send another unsolicited response to the TE before the previous one is acknowledged. If acknowledged within the timeout, the new SM is not saved in the message storage. If not, the new SM is saved in the message storage and +CNMI parameters are set to 0.

Command	Syntax	Response/Action
Set	+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK or: +CMS ERROR: <err>
Read	+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK
Test	+CNMI=?	+CNMI: (list of supported <mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>s), (list of supported <bfr>s) OK

The following table shows the +CNMI parameters.

<Parameter>	Description
<mode>	0 Buffer unsolicited result codes in the TA; if the TA buffer is full, the oldest indication may be discarded and replaced with the new received indications (ring buffer).
	1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved; otherwise forward them directly to the terminal. 2 buffer unsolicited result codes in the TA when the serial link is busy (e.g. data-transfer); otherwise forward them directly to the terminal.

<mt>	0	No SMS-DELIVER indications are routed to the terminal (default)
	1	If SMS-DELIVER is stored in the Module, the memory location indication is routed to the terminal using the unsolicited result code: +CMTI: <mem>,<index>
	2	SMS-DELIVER (except class2 SMS) are routed directly to the TE using the unsolicited result code: +CMT: [<alpha],<length><CR><LF><pdu> (in PDU mode) or +CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF> If ME has its own display device then class 0 SMS and SMS in the message waiting indication group (discard message) may be copied to both ME display and to terminal. In this case ME shall send the acknowledgement to the network. Class 2 SMSs and messages in the message waiting indication group (storage message) result in indication as defined in <mt>=1
<bm>	0	No CBM indications are routed to the terminal (default)
<ds>	0	No SMS-STATUS-REPORT indications are routed to the terminal (default)
	1	SMS-STATUS-REPORT is routed directly to the terminal
<bfr>	0	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes).

Example:

```
AT+CNMI=?
+CNMI: (0-2),(0-2),(0),(0-1),(0)
OK
AT+CNMI?
+CNMI: 0,0,0,0
OK
AT+CNMI=1,1
OK
```

```
AT+CMSS=142,"0544565034"    // send to myself
+CMSS: 72
OK
+CMTI: "SM",15
AT+CNMI=1,2
OK
AT+CSDH=1
OK
AT+CMSS=142,"054565034"     // send to myself
+CMSS: 73
OK
+CMT: "+972544565034",,"04/11/04,09: 48: 36+08",145,4,0,0,"+97254120032",145,3
ABC
AT+CSMP=49,167       /*Set first octet to status report - see status report parameters in CMGW*/
OK
AT+CSMP?
+CSMP: 49,167,0,0
OK
AT+CNMI=1,,,1
OK
AT+CNMI?
+CNMI: 1,0,0,1,0
OK
AT+CNMI=1,0,0,1,0
OK
AT+CMGS="0524680592"
> HELLO
+CMGS: 168
OK
+CDS: 6,168,"+972524680592",145,"05/08/02,15: 20: 12+08","05/08/02,15: 20: 14+08",0
AT+CNMI=1,0,0,2
OK
AT+CMSS=296
+CMSS: 185
OK
```

7.1.8 +CMTI, Unsolicited Response (New SMS-DELIVER Receipt Indication)

The +CMTI unsolicited response is sent to the TE upon receipt of a new SMS-DELIVER SM, if the +CNMI parameter <mt> is set to 1. Refer to “+CNMI, New Message Indications to Terminal”.

This unsolicited message indicates that a new SMS-DELIVER message was received, and is stored in location <index>:

+CMTI: <mem>,<index>

The following table shows the +CMTI parameters.

<Parameter>	Description
<mem>	Message memory space. "SM" - SIM memory storage.
<index>	Location of the new message.

Example:

AT+CNMI=1,2
OK
AT+CMGS=1 8 //send to my self
> 079179521201009511000c917952428650290004AA0441424344
+CMGS: 69
OK
+CMTI: "SM",4

7.1.9 +CMT, Unsolicited Response (New SMS-DELIVER Receipt)

The +CMT unsolicited response is sent to the TE upon receipt of a new SMS-DELIVER SM if the +CNMI parameter <mt> is set to 2. Refer to “+CNMI, New Message Indications to Terminal”.

This unsolicited message displays the received SMS-DELIVER message:

In text mode: (+CMGF=1):

+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>] <CR><LF><data>

(about parameters in italics, refer command Show Text Mode Parameters +CSDH).

In PDU mode: (+CMGF=0):

+CMT: [<alpha>],<length><CR><LF><pdu>

The following table shows the +CMT parameters.

<Parameter>	Description
<oa>	Message origination address.

<scts>	Service center time stamp.
<toda>	Type of origination address
<fo>	First octet of the SM
<pid>	Protocol Identifier
<dcs>	Data Coding Scheme
<sca>	Service Center Address
<tosca>	Type of Service Center Address
<data>	Message contents.
<alpha>	Alpha ID of message.
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: number of characters included in the <data>
<pdu>	Message header and contents in PDU mode format. See description in "+CMGR, Read Message".

After sending a +CMT unsolicited response to the TE, the Module will expect a +CNMA (new message acknowledgment) from the TE within a predefined timeout of 60 seconds. The Module will not send another +CMT unsolicited response to the TE before the previous one is acknowledgement. If the +CMT is acknowledged within the timeout, the new SM is not saved in the message storage. If the +CMT is not acknowledged and the timeout has expired, the new SM is saved in the message storage and +CNMI parameter <mt> is set to 0.

Example:

```
AT+CNMI=1,2
OK
AT+CSDH=1
OK
AT+CMSS=142,"054565034" // send to myself
+CMSS: 74
OK
+CMT: "+972544565034",,"04/11/04,09: 48: 36+08",145,4,0,0,"+97254120032",145,3
ABC
AT+CNMA
OK
AT+CMGF=0
```

OK

AT+CMGS=18 // send to myself

> 07917952120100951100 0c91795244650543000 4AA0441424344

+CMGS: 70

OK

+CMT: ,23

07917952120100950 40C91795244650543000450203211543080044142 4344

7.1.10 +CDS, Unsolicited Response (New SMS-STATUS-REPORT Receipt)

The +CDS unsolicited response is sent to the TE upon receipt of a new mobile-terminated SM if the +CNMI parameter <ds> is set to ’1’.

This unsolicited message displays the received SMS-DELIVER message.

Unsolicited Response

In text mode: (+CMGF=1):

+CDS: <fo>,<mr>[,<ra>][,<tora>],<scts>,<dt>,<st><CR><LF>

In PDU mode: (+CMGF=0):

+CDS: <length><CR><LF><pdu>

The following table shows the +CDS parameters.

<Parameter>	Description
<fo>	First octet of the SM
<mr>	Message Reference
<ra>	Message Recipient address
<tora>	Type of Recipient address
<scts>	Service center time stamp
<dt>	Discharge-Time
<st>	Status

After sending a +CDS unsolicited response to the TE, the Module will expect a +CNMA (new message acknowledgment) from the TE within a predefined timeout of 60 seconds. The Module will not send another +CDS unsolicited response to the TE before the previous one is acknowledged. If the +CDS is acknowledge d within the timeout, the new SM is not saved in the message storage. If the +CDS is not acknowledged and the timeout has expired, the new SM is saved in the message storage and +CNMI parameter <ds> is set to ’0’.

Example:

```
AT+CMGF=1
OK
AT+CSMP=49,167
OK
AT+CSMP?
+CSMP: 49,167,0,0
OK
AT+CNMI=1,0,0,1
OK
AT+CMGS="052468000"
> Hello
+CMGS: 187
OK
+CDS: 6,187,"+97252468000",145,"05/08/03,08: 56: 34+08","05/08/03,08: 56: 34+08",70
AT+CNMA
OK
```

7.1.11 +CMGL, +MMGL, List Messages

These commands display a list of all SMS with the status value <stat>, from the Module message storage <mem1> (selected using the +CPMS command). The command returns a series of responses, one per message, and each containing the message index, status, and data. If the status of a message is "RECEIVED UNREAD", execution of the +CMGL command changes the status of the message to "RECEIVED READ".

The +MMGL command does not change the message status. In addition, +MMGL includes a <stat> selection that can be used to query the Module for a list of message headers without attendant message data.

Command	Syntax	Response/Action	Remarks
Set	+CMGL[=<stat>] or +MMGL[=<stat>]	If text mode (+CMGF=1) command execution is successful and SMS-SUBMITs and/or SMS-DELIVERs: +CMGL: <index>,<stat>,<oa/da>[,<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>[,,<scts>][,<tooa/toda>,	

		<length>]<CR><LF><data>[...]] The parameters <tooa/toda>,<length> refer command shows the Text Mode Parameters +CSDH and will be shown according to +CSDH settings. If text mode (+CMGF=1) command execution is successful and SMS-COMMANDs: +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]] If text mode (+CMGF=1), command execution is successful and CBM storage: +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages><CR><LF><data>[...]] If text mode (+CMGF=1) command execution is successful and SMS-STATUS_REPORTs: +CMGL: <index>,<stat>,<fo>,<mr>[,<ra>][,<tora>],<scts>,<dt>,<st>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>[,<ra>][,<tora>],<scts>,<dt>,<st>[...]] In PDU mode (+CMGF=0): +CMGL: <index>,<stat>[,<alpha>],<length><CR><LF><pdu>[<CR><LF> +CMGL: <index>,<stat>[,<alpha>],<length><CR><LF><pdu>[…]] Or	

		+CMS ERROR: <err>	
Test	+CMGL=? +MMGL=?	+CMGL: (list of supported <stat>s)	The Test command lists all the supported <stats>

The following table shows the +CGML/+MMGL parameters.

<Parameter>	Description
<index>	1-352 Index of message in storage.
<stat>	Status of message in memory: PDU mode / Text mode / Description 0 / "REC / Received unread messages 1 / "REC READ" / Received read messages 2 / "STO / Stored unsent messages 3 / "STO SENT" / Stored sent message 4 / "ALL" / All messages
<oa/da>	Original/destination address.
<data>	Message contents in text mode
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: Number of characters included in <data>.
<pdu>	Message header and contents in PDU mode format. See description in "+CMGR, Read Message".
<toda/toda>	Type of origination address / destination address
<fo>	First octet of the SM
<mr>	Message Reference
<ra>	Recipient-Address
<tora>	Type of Recipient address
<scts>	Service center time stamp
<ct>	Command type
<sn>	Message serial number
<mid>	Message ID
<page>	Current page number

<pages>	Total number of pages
<dt>	Discharge-Time
<st>	Status

Example:

```
AT+CMGL=?
+CMGL: ("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL")
OK
AT+CPMS="SM"    // read messages from SIM.
+CPMS: 2,20,11,61,2,20
OK
AT+CMGL       // read "rec-unread" messages with changing message stat
+CMGL: 1,"REC UNREAD","+972544565034",,"05/01/01,09: 21 : 22+08"
message text
OK
AT+CMGL
OK     // the message stat was changed. No "rec-unread" messages.
AT+CPMS="ME"
+CPMS: 11,61,11,61,2,20
OK
AT+CMGL="sto sent"
+CMGL: 142,"STO SENT","054565034",,
message text
OK
AT+CSDH=1
OK
AT+CMGL="STO SENT"
+CMGL: 142,"STO SENT","054565034",,,81,<message length>
message text
OK
AT+CMGS=18    //send to myself
> 07917952120100951100 0c91795244650543 0004AA0441424344
+CMGS: 68
OK
AT+CPMS="sm"    // change to SIM to read the incoming messages
+CPMS: 2,20,11,61,2,20
OK
```

7.1.12+CMGR, +MMGR, Read Message

These commands handle the reading of SMS. The command displays the message in location <index> of the preferred message storage <mem1> (selected using the +CPMS command). If the status of the message is "RECEIVED UNREAD", the +CMGR command changes the status to "RECEIVED READ". The difference between +CMGR and +MMGR is that +MMGR doesn't change <stat>value.

Command	Syntax	Response/Action	Remarks
Set	+CMGR=<index> +MMGR=<index>	If text mode (+CMGF=1) command execution is successful and SMS-DELIVER: +CMGR: <stat>,<oa>[,<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> If text mode (+CMGF=1) command execution is successful and SMS-SUBMIT: +CMGR: <stat>,<da>[,<alpha>][,<toda>,<fo>,<pid>,<dcs>[,<vp>],<sca>,<tosca>,<length>]<CR><LF><data> If text mode (+CMGF=1) command execution is successful and SMS-COMMAND: +CMGR: <stat>,<fo>,<ct>[,<pid>[,<mn>][,<da>][,<toda>],<length><CR><LF><cdata>] If text mode (+CMGF=1) command execution is successful and CBM storage: +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> If text mode (+CMGF=1) command execution is successful and SMS-STATUS-REPORT:	The Set command reads the SM located at <index> in the Module message storage and displays it

		+CMGR: <stat>,<fo>,<mr>[,<ra>][,<tora>],<scts>,<dt>,<st> If PDU mode (+CMGF=0) and command execution is successful: +CMGR: <stat>[,<alpha>],<length><CR><LF><pdu> otherwise: +CMS ERROR: <err>	

The following table shows the +CMGR parameters.

<Parameter>	Description
<index>	1-352 Index in storage of the message. to be retrieved.
<stat>	Status of message in memory: PDU / Text mode / Description 0 / "REC / Received unread messages 1 / "REC READ" / Received read messages 2 / "STO / Stored unsent messages 3 / "STO SENT" / Stored sent message 4 / "ALL" / All messages
<alpha>	Alpha ID of message (not present).
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: Number of characters included in <data>.
<pdu>	Message header and contents in PDU mode format. See description in the table below.
<oa/da>	Original/destination address.
<data>	Message contents in text mode
<toda/toda>	Type of origination address / destination address
<fo>	First octet of the SM
<pid>	Protocol Identifer

<dcs>	Data Coding Scheme
<sca>	Service Center Address
<tosca>	Type of Service Center Address
<vp>	Validity Period. Either in integer format or in time-string format (“yy/MM/dd,hh: mm: ss±zz”)
<mr>	Message reference
<scts>	Service center time stamp
<ct>	Command type
<sn>	Message serial number
<mn>	Message Number
<cdata>	Command-Data
<mid>	Message ID
<page>	Current page number
<pages>	Total number of pages
<mr>	Message reference
<ra>	Message Recipient address
<tora>	Type of Recipient address
<scts>	Service center time stamp
<dt>	Discharge-Time
<st>	Status

Reference	Description	Length
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet.	1 BYTE
<TP-OA>	Originating address formatted according to the formatting rules of address fields.	2-12 BYTES

<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-SCTS>	The TP-Service-Center-Time- Stamp field is given in semi-octet representation, and represents the local time as described in GSM03.40	7 BYTE
<TP-UDL>	User data length	1 BYTE
<TP-UD>	User data	0-140 BYTES

Note: Any unused bits will be set to zero and shall be ignored by the receiving entity.

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 0 0 SMS-DELIVER (in the direction SC to MS)
2	TP-More-Message-To-Send	Parameter indicating whether or not more messages is waiting to the MS in the SC. 0 More messages are waiting for the MS in this SC 1 No more messages are waiting for the MS in this SC
5	TP-Status-Report-Indication	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested
6	TP-User-Data-Header-Indicator	Parameter indicating whether or not a status report will be returned to the SME. 0 A status report will not be returned to the SME 1 A status report will be returned to the SME
7	TP-Reply-Path	Parameter indicating that Reply Path is set or not. 0 TP-Reply-Path parameter is not set 1 TP-Reply-Path parameter is set

Reference	Description	Length
<sca>	Mandatory: Service Center address:	1, 3-12 BYTES (When length is 1, length

	1 BYTE: length (number of followed octets) Mandatory: 1 BYTE: <tosca> - value Between 128-255	BYTE = 0)
<fo>	Mandatory: First Octet.	1 BYTE
<mr>	Mandatory: Message Reference number, which identifying the previously submitted SMS-SUBMIT or SMS-COMMAND	1 BYTE
<TP-RA>	Mandatory: Recipient address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-SCTS>	Mandatory: The TP-Service-Center-Time-Stamp field is given in semi-octet representation, and represents the local time as described in GSM03.40	7 BYTE
<TP-DT>	Mandatory: Discharge-Time of <TP-ST>, is given in semioctet representation, and represents the local time as described in GSM03.40	7 BYTES
<TP-ST>	Mandatory: Status of the MO message	1 BYTE
<TP-PI>	Optional: Parameter indicating the presence of any of the optional parameters which follow.	1 BYTE
<TP-PID>	Optional: Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Optional: Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-UDL>	Optional: User data length	1 BYTE
<TP-UD>	Optional: User data	131 BYTES

Note:

- Any unused bits will be set to zero by the sending entity and will be ignored by the receiving entity.
- The maximum guaranteed length of TP-UD is 131 octets. In order to achieve the maximum octet of 143, the TP-RA field must have a length of two octets and TP-PID and TP-DCS must not be present.
- TP-PI is Mandatory if any of the optional parameters following TP-PI is present, otherwise optional.

Bit/s	Reference	Description
0-1	Mandatory: Message-Type-Indicator	Parameter describing the message type. 1 0 SMS-STATUS-REPORT (in the direction SC to MS)
2	Mandatory: TP-More-Message-To-Send	Parameter indicating whether or not more messages is waiting to the MS in the SC. 0 More messages are waiting for the MS in this SC 1 No more messages are waiting for the MS in this SC
5	Mandatory: TP-Status-Report-Qualifier	Parameter indicating whether the previously submitted TPDU was an SMS-SUBMIT or an SMS-COMMAND: 0 The SMS-STATUS-REPORT is the result of a SMS-SUBMIT. 1 The SMS-STATUS-REPORT is the result of an SMS-COMMAND
6	Optional: TP-User-Data-Header-Indicator	Parameter indicating whether or not a status report will be returned to the SME. 0 A status report will not be returned to the SME 1 A status report will be returned to the SME

Bit/s	Description
0	0 TP-PID not presence 1 TP-PID not presence
1	0 TP-DCS not presence 1 TP-DCS presence
2	0 TP-UDL not presence 1 TP-UDL presence
3-7	Reserved

Note: Reserved bits are ignored.

Example:

```
AT+CPMS?
+CPMS: "SM",13,50,"SM",13,50,"SM",13,50
OK
AT+CMGR=1
+CMS ERROR: invalid index
AT+CMGR=142
+CMGR: "STO SENT","054565034",
message text
OK
AT+CSDH=1
OK
AT+CMGR=142
+CMGR: "STO SENT","054565034",,”129,25,0,0”,"05/04/03,21 : 22: 23+08",161,17,0,8,"+
97254120032",145,<message length>
message text
OK
AT+CMGW=18
> 07917952120100951100 0c91795242865029 0004AA0441424344
+CMGW: 143
OK
AT+CMGR=143
+CMGR: 2,,23
07917952120100950 40C91795242865029000450203211020180044 1424344
OK
AT+CPMS="SM"     // change to SM to read SMS-DELIVER messages.
+CPMS: 2,20,11,61,2,20
OK
AT+CMGR=1
+CMGR: "REC READ","+972544565034",,"05/02/23,11 : 20:
10+08",145,4,0,4,"+97254120032",145,4 41424344
OK
AT+CMGF=0
OK
AT+CMGR=1
+CMGR: 0,,23
```

0791 07917952140230F2040C917952446505430004502032110201800441424344

OK

AT+CMGR=14

+CMGR: 0,,25

07917952120100950 6BC0B917952428600F0508030807512805080308075128046

// SMS-STATUS-REPORT message in PDU mode

OK

AT+CMGF=1

OK

AT+CMGR=14 // SMS-STATUS-REPORT message in Text mode

+CMGR: "REC READ",6,188,"+97252468000",145,"05/08/03,08: 57: 21+08","05/08/03,08: 57: 21+08",70

OK

7.1.13 +CMSS, Send Message from Storage

This command sends a pre-stored message, written previously using the +CMGW command. The <da>, <toda> parameters are optional. If a DA is given, the message is sent to that address. Otherwise the message is sent to the DA it was stored with (if any was entered). If no DA is found, an error occurs. When the given index is an incoming message index the header settings will be as follows:

- <first-octet> will be SMS-SUBMIT and VPF - relative.
- The TP-RP and TP-UDHI settings will be taken from the incoming message's first octet.
- <vp> - will be set to the default value -167 - as defined in 03.40.
- <sca>,<tosca>, <pid> and <dcs> will be set according the incoming message parameters.
- If <da> and/or <toda> are not given by the command, the <oa> and <tooa> will be set instead.

Command	Syntax	Response/Action	Remarks
Set	+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr> or: +CMS ERROR: <err>	The Set command sends a message from storage to the network.

The following table shows the +CMSS parameters.

<Parameter>	Description
<index>	1-352 Index in storage of the message to be sent.
<da>	Destination address in quoted string. This field contains a single phone number.
<toda>	Type of DA. Value range is 128-255 (according to GSM 03.40, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<mr>	Sent message reference number.

Example:

AT+CMSS=7
+CMSS: 12
OK
AT+CMSS=7,"054565132",129
+CMSS: 13
OK

Note: Any character sent by TE to Module before Module has reported a result of AT+CMSS operation, will abort AT+CMSS command execution. However, if SMS was already sent to network and sending operation was successful, the result of operation "+CMSS <mr>" will be reported by Module. If after aborting AT+CMSS command execution and before result of operation was reported by Module, a second AT+CMSS command is executed, then the result of the second AT+CMSS operation only will be reported by Module.

7.1.14+CMGW, Write Message to Memory

This command is used to write and save a message to <mem2>. The message is saved in memory, and the message index is displayed to the user.
By default, messages are saved with the status of "STO UNSENT", but status "STO SENT" can be applied using the <stat> parameter.
In TEXT mode, the header parameters will be set according to CSMP settings.

Command	Syntax	Response/Action	Remarks
Set	If text mode (+CMGF=1): +CMGW[=<da>[,<toda>[,<stat>]]]<CR>text is entered<ctrl-Z/ESC> if PDU mode (+CMGF=0): +CMGW=<length>[,<stat>]<CR> PDU is given<ctrl-Z/ESC>	+CMGW: <index> or: +CMS ERROR: <err>	The Set command writes a message and stores it.

The following table shows the +CMGW parameters. Layout of SMS-SUBMIT in PDU Mode: (according to GSM03.40)

<Parameter>	Description
<da>	Destination address in quoted string. This field contains a single phone number.

<toda>	Type of DA. Value range is 128-255 (according to GSM 03.40, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<stat>	Status of new message In text mode: “STO UNSENT” (default) or “STO SENT” In PDU mode: 2 (default) or 3
<length>	Size of message in PDU mode format, in octects, excluding SMSC data.
<index>	1-352 Index in storage of the stored message.
<PDU>	Message header and contents in PDU mode format. See description in the tables below.

Reference	Description	Length
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet. See the table below.	1 BYTE
<TP-MR>	Message Reference. An integer representation of a reference number of the SM submitted to the SC by the MS. Values between 0-255.	1 BYTE
<TP-DA>	Destination address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-VP>	Validity Period. Depending on <fo>, TP-Validity-Period-Format bits setting.	0, 1, 7 BYTE
<TP-UDL>	User data length	1 BYTE
<TP-UD>	User data	0-140 BYTES
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet.	1 BYTE

<TP-MR>	Message Reference. An integer representation of a reference number of the SM submitted to the SC by the MS. Values between 0-255.	1 BYTE
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-CT>	Command Type	1 BYTE
<TP-MN>	Message Number	1 BYTE
<TP-DA>	Destination address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-CDL>	Command data length	1 BYTE
<TP-CD>	Command data	0-156 BYTES

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 0 1 SMS-SUBMIT (in the direction MS to SC)
2	TP-Reject-Duplicates	Parameter indicating whether or not the SC shall accept an SMS-SUBMIT for an SM still held in the SC which has the same MR and the same DA as a previously submitted SM from the same OA. 0 Instruct the SC to accept an SMS-SUBMIT as mention above 1 Instruct the SC to reject SMS-SUBMIT as mention above. In this case an appropriate TP-FCS value will be returned in the MS-SUBMIT-REPORT.
3-4	TP-Validity-Period-Format	Parameter indicating whether the TP-VP field is present and in which format. 0 0 TP-VP field not present 1 0 TP-VP field present - relative format 0 1 TP-VP field present – enhanced format - valid only in PDU mode 1 1 TP-VP field present - absolute format
5	TP-Status-Report-Request	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested

6	TP-User-Data-Header-Indicator	Parameter indicating whether the beginning of the User Data field contains a Header in addition to the short message or contains only the short message 0 The TP-UD field contains only the short message 1 The beginning of the TP-UD field contains a Header in addition to the short message
7	TP-Reply-Path	Parameter indicating that Reply Path is set or not. 0 TP-Reply-Path parameter is not set 1 TP-Reply-Path parameter is set

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 1 0 SMS-COMMAND (in the direction MS to SC)
5	TP-Status-Report-Request	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested
6	TP-User-Data-Header-Indicator	Parameter indicating whether the beginning of the User Data field contains a Header in addition to the short message or contains only the short message 0 The TP-UD field contains only the short message 1 The beginning of the TP-UD field contains a Header in addition to the short message

Note: Any unused bits will be set to 0. If AT+CSCS=”HEX” , the DATA saved by CMGW is not that was entered.

Example:

AT+CMGF=1
OK
AT+CMGW="5124335432"
>This is the message body <CTRL+Z> //<CTRL+Z> ends the prompt text mode and returns to regular AT command mode

```
+CMGW: 126
OK
AT+CMGW
> TEST <CTRL+Z>
+CMGW: 195
OK
AT+CMGF=0
OK
AT+CMGW=24
>07917952120100951 1FF0B917962543940F20008001400410042004300440045 <CTRL+Z>
+CMGW: 128
OK
AT+CMGR=128
+CMGR: 2,,24
07917952120100951 1FF0B917962543940F20008001400410042004300440045
OK
AT+CMGF=1
OK
AT+CSDH=1
OK
AT+CMGR=128
+CMGR: "STO UNSENT", "+97264593042",,145,17,0,8,0,"+972521100059",145,5
00410042004300440045
OK
AT+CSMP=25,"05/03/15,21 : 22: 23+08",0,0
OK
AT+CMGW="0544565034"
A<CTRL+Z>
+CMGW: 129
OK
AT+CMGR=129
+CMGR: "STO UNSENT", "0544565034",,129,25,0,0,"05/03/15,21 : 22:
23+08","+972521100059",145,1
OK
AT+CMGF=0
OK
AT+CMGR=129
+CMGR: 2,,20
07917952120100951 9FF0A8150446505430000503051122232800141
```

AT+CMGW=18

> 0011000c917952428650290004AA0441424344 // SCA is not given

+CMGW: 130

OK

AT+CMGR=130

+CMGR: 2,,18

07917952120100951100 0C917952428650290004AA0441424344

OK

AT+CMGW=19

> 07917952120100951100 0c917952428650290004AA0441424344 //Invalid length (19)

+CMS ERROR: invalid PDU mode parameter

AT+CMGW=19

> 07917952120100951100 0c917952428650290004AA044142434477 //UDL is not equal to UD length

+CMS ERROR: invalid PDU mode parameter

AT+CMGW=17

> 07917952120100950100 0c9179524286502900040441424344 //No VP in PDU message

+CMGW: 131

OK

AT+CMGR=131

+CMGR: 2,,17

07917952120100950100 0C9179524286502900040441424344

OK

AT+CMGW=14

> 07917952140230F212000000000c9179524286502900 //SMS Command

+CMGW: 132

OK

AT+CMGR=132

+CMGR: 2,,14

07917952140230F212000000000C9179524286502900

OK

AT+CMGF=1

OK

AT+CMGR=132

+CMGR: "STO UNSENT",18,0,0,0,"+972524680592",145,0

OK

7.1.15+CMGD, Delete Message

This command handles deletion of a single message from memory location <index>, or multiple messages according to <delflag>. If the optional parameter <delflag> is entered, and is greater than 0, the <index> parameter is practically ignored. If deletion fails, result code +CMS ERROR: <err> is returned.

Note: The deletion of multiple commands is a time-consuming process that may require more than 60 seconds.

Command	Syntax	Response/Action	Remarks
Set	+CMGD=<index>[,<delflag>]	OK or: +CMS ERROR: <err>	
Read			The Read command for +CMGD is not defined by ETSI, and therefore is not supported by the Module. The Module returns an error.
Test	+CMGD=?	+CMGD: (list of valid<index>s), (list of valid<deflag>s)	The Test command displays the supported values of <n>.

The following table shows the +CMGD parameters.

<Parameter>	Description	
<index>	1-352 Index in the SMS memory of the message to be deleted.	
<delflag>	0	Deletes the message specified in <index>
	1	Deletes all read messages
	2	Deletes all read messages and sent MO messages
	3	Deletes all read messages, sent and unsent MO messages
	4	Deletes all messages

Example:

```
AT+CMGD=4
OK
AT+CMGD=1,3
OK
```

7.1.16+CMGS, Send SM to Network

This command sends an SM from the Module to the network. The message reference value <mr> is returned to the Module upon successful delivery of the message.

Valid <toda> will be any value from 128 to 255.

The header parameters in TEXT mode will be set according to CSMP settings.

Command	Syntax	Response/Action	Remarks
Set	If text mode (+CMGF=1): +CMGS=<da>[,<toda>]<CR>text is entered<ctrl-Z/ESC> If PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is entered<ctrl-Z/ESC>	+CMGS: <mr> OK or: +CMGS ERROR: <err>	The Set command validates the input parameters, sends the SM to network and reports the result of the operation to the Module.

The following table shows the +CMGS parameters.

<Parameter>	Description
<da>	Destination address in quoted string. This field contains a single MIN number.
<toda>	Type of DA. Value range is 128-255 (according to GSM 03.40, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<length>	Size of message in PDU mode format, in octets, excluding SMSC data.
<mr>	Sent message reference number.
PDU	Message header and contents in PDU mode format. See description in “+CMGW, Write Message to Memory”.

Example:

AT+CMGS="064593042",129

>This is the message body <CTRL+Z> //<CTRL+Z> ends the prompt text mode and returns to regular AT command mode

OK

AT+CMGF=0

OK

AT+CMGS=24

>07917952120100951 1FF0B917962543940F20008001400410042004300440045 <CTRL+Z>

+CMGS: 128

OK

Note:

- Any character sent by TE to Module before Module has reported a result of AT+CMGS operation, will abort AT+CMGS command execution. However, if SMS was already sent to network and sending operation was successful, the result of operation "+CMGS <mr>" will be reported by Module.
- A flex dependent enhancement enables the reporting of numeric error code to TE, in case the sending operation has failed. The numeric error code will be reported in format: "+CMGS ERROR: <err>".
- If after aborting AT+CMGS command execution and before result of operation was reported by Module, a second AT+CMGS command is executed, then the result of the second AT+CMGS operation only will be reported by Module.
- If AT+CSCS=”HEX” , the SMS cannot be sent (CMGS).

8 Access and Security

8.1 Access Control Commands

When the phone or SIM card is locked or blocked, the only accessory operations allowed are those found in the list of Core AT commands (allowed while phone/SIM card is locked), shown in “Core AT Commands”. All other AT commands are not executed, for example, accessing phone book entries. However, the phone is still capable of sending asynchronous message events via AT responses, for example, incoming call notification.

8.1.1 A/, Repeat Last Command

This command repeats the last command. It is not necessary to press <Enter> after this command.

Note: Only “AT” will not be repeated.

Command	Syntax	Response/Action
Execute	A/	Repeats last command Command “AT” will ignore

Example:

AT&D?
&D: 1
OK
A/
&D: 1
OK

8.1.2 AT, Check AT Communication

This command only returns OK.

Command	Syntax	Response/Action
Execute	AT	OK

Example:

AT
OK

8.1.3 +CPIN, Enter PIN for Unlocking SIM Card or Enter PUK for Unblocking SIM Card

This command locks the SIM card, and therefore is only relevant for phones that use SIM cards. It unlocks the SIM card when the proper SIM PIN is provided and unblocks the SIM card when the proper SIM PUK is provided. The SIM card is unlocked only once the provided pin is verified as the SIM PIN. If the required PIN (determined by the error code returned from the requested operation or the Read command) is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM card. When entering the pin, a <new pin> is not required. A SIM card related error is returned if an AT command operation is unsuccessful due to a SIM card problem.

The following table shows the SIM card errors.

Error	Description
10 SIM not inserted	SIM Card is not inserted
11 SIM PIN required	SIM Card waiting for SIM PIN to be entered
12 SIM PUK required	SIM PIN is blocked
13 SIM failure	SIM Card is permanently blocked
17 SIM PIN2 required	SIM Card is waiting for SIM PIN2 to be entered
18 SIM PUK2 required	SIM PIN2 is blocked

Command	Syntax	Response/Action	Remarks
Set	AT+CPIN =[<puk> or <pin>][,<newpin>]	OK or: +CME ERROR: <err>	The Set command sends the password to the Module that is necessary before it can be operated (SIM PIN or SIM PUK). If there is no PIN request pending, no action is taken towards the Module, and an error message, +CME ERROR, is returned to the terminal. The Set command issued gives the code (SIM PIN or SIM PUK) corresponding to the error code required or returned as the result of the Read command. For example, if the SIM PIN is blocked, the error code 11 or "SIM PIN required" is returned. The user must then issue the Set command with the SIM PIN.
Read	AT+CPIN ?	+CPIN: <code> OK or:	The Read command returns an alphanumeric string indicating the status of the SIM card, and whether a password is required or not. This is an independent

		+CME ERROR: <err>	SIM card lock status check only, and does not check the phone lock status.
Test	AT+CPIN =?	OK	

The following table shows the +CPIN parameters.

<Parameter>	Description
<puk>	PUK code for unblocking a blocked phone
<pin>	Current PIN for unlocking a locked phone
<newpin>	New PIN (after changing or after entering PUK) 4 - 8 digits
<code>	READY - Not waiting for a password SIM PIN - Waiting for SIM PIN SIM PUK - Waiting for SIM PUK SIM PIN2 - Waiting for SIM PIN, this response is given when the last executed command resulted in PIN2 authentication failure SIM PUK2 - Waiting for SIM PUK2, this response is given when the last executed command resulted in PUK2 authentication failure
SIM PIN SIM PUK SIM PUK2 SIM PIN 2	AT+CPIN=<pin> AT+CPIN=<puk>,<newpin> AT+CPIN=<puk2>,<newpin2> AT+CPIN=<pin2>

Example:

AT+CPIN=?
OK
AT+CLCK="SC",1,"<correct PIN>" //Not case-sensitive
OK
The facility is enabled by the +CLCK command (Refer to “+CLCK, Facility Lock”)
AT+CPIN?
+CPIN: SIM PIN
OK
AT+CPIN="<correct PIN>"
OK

AT+CPIN?

+CPIN: READY

OK

The status of the SIM is still enabled, but the PIN is READY for this session.

The SIM is enabled per session. After power-up SIM must be unlocked again by using the +CLCK command.

The following case shows an example of three unsuccessful attempts at entering the PIN:

AT+CPIN?

+CPIN: SIM PIN

OK

AT+CPIN="<wrong pin>"

+CME ERROR: incorrect password

AT+CPIN="<wrong pin>"

+CME ERROR: incorrect password

AT+CPIN="<wrong pin>"

+CME ERROR: SIM PUK required

AT+CPIN?

+CPIN: SIM PUK //PIN is blocked. The PUK is needed for unblocking.

OK

AT+CPIN="<PUK>","<NEW PIN>" //Enter PUK and new PIN

OK

AT+CLCK="FD",1,"<wrong PIN2>"

+CME ERROR: incorrect password

AT+CLCK="FD",1,"<wrong PIN2>"

+CME ERROR: incorrect password

AT+CLCK="FD",1,"<wrong PIN2>"

+CME ERROR: SIM PUK2 required

AT+CPIN?

+CPIN: SIM PUK2 //PIN2 is blocked. The PUK2 is needed for unlocking.

OK

AT+CPIN="<PUK2>","<NEW PIN2>" //Enter PUK2 and new PIN2

OK

8.1.4 +TPIN, Query Number of Remaining SIM PIN/PUK Entering Attempts

This command returns the number of remaining attempts of entering the PIN and PUK for the SIM card in use. The command returns the number of remaining attempts for PIN1 (CHV1), PIN2 (CHV2), PUK1 (unblock CHV1) and PUK2 (unblock CHV2).

Number of available attempts is provider dependent. Typically it is 3 attempts for PIN, 10 attempts for PUK.

This command will return error if SIM is not inserted.

Command	Syntax	Response/Action	Remarks
Read	AT+TPIN?	+TPIN: <chv1>, <unb1_chv1>,<chv2>,<unb1_chv2> or: +CME ERROR: <err>	

The following table shows the +TPIN parameters.

<Parameter>	Description
<chv1>	Number of remaining PIN attempts
<chv2>	Number of remaining PIN2 attempts
<unbl_chv1>	Number of remaining PUK attempts
<unbl_chv2>	Number of remaining PUK2 attempts

Example:

```
AT+TPIN?
+TPIN: 3,10,3,10
OK
AT+CPIN="7777"
+CME ERROR: incorrect password
AT+TPIN?
+TPIN: 2,10,3,10
OK
```

8.1.5 +CPWD, Change Password

This command sets a new password for the facility lock. The password can only be changed once the required facility is enabled by the +CLCK command.

A password can be changed only if the provided password <oldpwd> has been verified. The entered password <newpwd> must also comply to the password rules. The facility value <fac> is not case-sensitive. In the password value, letters are not allowed.

Command	Syntax	Response/Action	Remarks
Set	AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK or: +CME ERROR: <err>	The Set command sets a new password for the facility lock function, defined by the +CLCK command.
Read	AT+CPWD?	+CME ERROR: <err>	
Test	AT+CPWD=?	+CPWD: list of Supported (<fac>,<pwdlength>)s OK or: +CME ERROR: <err>	The Test command returns a list of pairs which represent the available facilities, and the maximum length of their passwords.

The following table shows the +CPWD parameters.

<Parameter>	Description
<fac>	List of supported facilities. All the facility messages, except for SC and P2, are sent to the network. (The facilities are not case-sensitive.) SC SIM (lock SIM card) The SIM requests the password during Module power-up and when this command is issued. AO BAOC (Bar All Outgoing Calls) OI BOIC (Bar Outgoing International Calls) OX BOIC-exHC (Bar Outgoing International Calls except to Home Country) AI BAIC (Bar All Incoming Calls) IR BIC-Roam (Bar Incoming Calls when Roaming outside the home

	country) AB All Barring services (applicable only for <mode>=0) AG All out Going barring services (applicable only for <mode>=0) AC All in Coming barring services (applicable only for <mode>=0) P2 SIM PIN2
<oldpwd>	String type, 4-8 character password specified for the facility from the Module user interface.
<newpwd>	String type, 4-8 character new password specified by the user.
<pwd length>	Maximum length of the family password. Integer type.

Example:

```
AT+CPWD =?
+CPWD: ("SC",8),("P2",8)
OK
AT+CPWD?
+CME ERROR: operation not supported
AT+CLCK="sc",1,"current pin password"
OK
AT+CPWD="sc","incorrect old password","new password"
+CME ERROR: incorrect password
AT+CLCK="sc",2
+CLCK: 0
OK
AT+CPWD="sc","old password","new password"
+CME ERROR: operation not allowed
AT+CLCK="fd",1,"current pin2 password"
AT+CPWD="p2","old password","new password"
OK
AT+CLCK="ai",2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK
AT+CLCK="ai",1,"correct password"
OK
```

AT+CLCK="ai",2

+CLCK: 1,1

+CLCK: 1,2

+CLCK: 1,4

OK

AT+CPWD="ai","old password","new password"

OK

8.1.6 +CLCK, Facility Lock

This command locks, unlocks or interrogates a Module or a network facility <fac> (any kind of call barring program). A password is mandatory for performing locking and unlocking actions, but not for querying. The features of the Module that are affected by this are the keypad power-up operation and fixed dialing list. When querying the status of a single call barring program <mode>=2, the <status> for each call type will be returned.

For <fac>="SC", SIM Card PIN setting and for <fac>="FD", SIM Fixed Dialing memory setting, the <class> is irrelevant (For more information about <class>, refer to the following table shows the +CLCK parameters.). The <passwd> for "SC" is SIM PIN, and for "FD" it is SIM PIN2.

Command	Syntax	Response/Action	Remarks
Set	+CLCK=<fac>,<mode>[,<passwd>[,<classx>]]	For <fac> where <class> is irrelevant(SC, FD): +CLCK=<fac>,2 +CLCK: <status> For <fac> with several supported <class>es: +CLCK=<fac>,2 +CLCK: <status>,<class1> [<CR><LF> +CLCK: <status>,<class2> […]] OK	The Set command performs the specified <mode> action on the specified <fac>.
Read	+CLCK?	ERROR	
Test	+CLCK=?	+CLCK: (list of supported <fac>s)	The Test command returns the list of supported facilities.

The following table shows the +CLCK parameters.

<Parameter>	Description
<fac>	SC SIM Card PIN setting <mode> 0 Disable PIN 1 Enable PIN FD SIM Fixed Dialing memory setting <mode> 0 Disable fixed dialing feature 1 Enable fixed dialing feature
<passwd>	String type, 4-8 character password
<mode>	0 Unlock 1 Lock 2 Query status (<passwd> does not apply) Note: Query mode return only the active <fac>. In case no <fac> is active the query will return the default (7).
<class>	Sum of integers, each representing a class of information <class>. Only applies to call barring related facilities. The default value is 1. 1 Voice (telephony) 8 SMS (Short Message Services)
<status>	0 Inactive 1 Active

Example:

```
AT+CLCK=?
+CLCK: ("SC","FD")
OK
AT+CLCK="SC",2
+CLCK: 0
OK
AT+CLCK="SC",1
+CME ERROR: operation not allowed
AT+CLCK="SC",1,"incorrect password
+CME ERROR: incorrect password
AT+CLCK="SC",1,"correct password"
OK
(From now SIM Card is locked and PIN is requested on power up)
```

9 Network

9.1 Network Commands

9.1.1 +CSQ, Signal Strength

This command displays the received signal strength indication <rssi> and channel bit error rate <ber> from the Module.

Command	Syntax	Response/Action
Execute/Read	AT+CSQ AT+CSQ?	+CSQ: <rssi>,<ber> OK
Test	AT+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s) OK

The following table shows the +CSQ parameters.

<Parameter>	Description
<rssi>	0 through 31- covers the range of -113 dbm (or less) to -5 1dbm (or greater)
<ber>	Channel bit error rate (in percent) 0-7 RXQUAL values in the GSM 05.08 table 99 Unknown or not detectable

Example:

AT+CSQ
+CSQ: 23,99
OK
AT+CSQ=?
+CSQ: (0-31,99),(0-7,99)
OK

9.1.2 +CREG, Network Registration Status

Command	Syntax	Response/Action	Remarks
Set	AT+CREG =[<n>]	OK or: +CME ERROR: <err	The Set command controls the presentation of an unsolicited result code and the result of the Read operation.
Read	AT+CREG ?	+CREG: <n>,<stat>[,<lac>, <ci>] OK	The Read command returns the status of the result code presentation and shows whether the network has currently indicated the registration of the Module. Location information elements <lac> and <ci> are returned only when <n>=2 and the Module is registered in the network.
Test	AT+CREG =?	+CREG: (list of supported <n>s) OK	

The following table shows the +CREG parameters.

<Parameter>	Description
<n>	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CREG: <stat>. 2 Enables the network registration and location information in unsolicited reports and Read command +CREG: <stat>[,<lac>,<ci>]. The default value is 0.
<stat>	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown.

	5 Registered, roaming.
<lac>	Two-byte location area code in hexadecimal format.
<ci>	Two-byte cell ID in hexadecimal format.

Example:

```
AT+CREG=?
+CREG: (0-2)
OK
AT+CREG?
+CREG: 0,1
OK
AT+CREG=2
OK
AT+CREG?
+CREG: 2,1,"27A0","0DE1"
OK
AT+CREG=1
OK
AT+CREG?
+CREG: 1,1
OK
AT+CREG=0
OK
```

9.1.3 +CGREG, GPRS Network Registration

Command	Syntax	Response/Action	Remarks
Set	AT+CGREG=<n>	OK or: +CME ERROR: <err>	The Set command controls the presentation of an unsolicited result code "+CGREG: " and the result of the Read operation.
Read	AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>] OK	The Read command returns the status of the result code presentation and shows whether the network has currently indicated the GPRS registration of the Module. Location information elements

			<lac> and <ci> are returned only when <n>=2 and the Module is registered in the network.
Test	AT+CGREG=?	+CGREG: (list of supported <n>s) OK	The Test command displays the supported values of <n>.

The following table shows the +CGREG parameters.

<Parameter>	Description
<n>	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CGREG: <stat>. 2 Enables the network registration and location information in unsolicited result code and Read command +CGREG: <stat>[,<lac>,<ci>]. The default value is 0.
<stat>	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown. 5 Registered, roaming.
<lac>	Two-byte location area code in hexadecimal format.
<ci>	Two-byte cell ID in hexadecimal format.

Example:

```
AT+CGREG=?
+CGREG: (000-002)
OK
AT+CGREG=2
OK
AT+CGREG?
```

```
+CGREG: 002,001,2648,988b
OK
AT+CGREG=1
OK
AT+CGREG?
+CGREG: 001,001
OK
AT+CGREG=0
OK
```

9.1.4 +COPS, Operator Selection

This command enables accessories to access the network registration information, and the selection and registration of the GSM network operator. The Module is registered in the Home network.

The Enhanced Operator Name String (EONS) feature enables the Module to return the operator name displayed on the handset. This feature allows the SIM card to store a mapping of MCC/MNC code pairs to the displayed operator name. As a result, several operators can share a single network while having their handsets display their own name as the network operator.

Testing the enhanced ONS feature requires a "SIM ONS" SIM card.

Command	Syntax	Response/Action	Remarks
Set	AT+COPS=[<mo de>[,<format> [,<oper>]]]	OK or: +CME ERROR: <err>	The Set command can force an attempt to select and register a specific GSM network operator. The <mode> selects whether this is done automatically by the Module or whether the selection is forced to an operator <oper> (given in format <format>). If the selected operator is not available, no other operator is selected (except when the <mode> is set to 4). <mode>=2 forces an attempt to deregister from the network. <mode>=3 sets the operator format to all further Read commands (+COPS?) as well. The selected mode applies to future network registrations, for example, once you deregister from the network, the Module remains unregistered until you select <mode>=0, <mode>=1, or <mode>=4

Read	AT+COPS?	+COPS: <mode>[,<format>,<oper>] OK or: +CME ERROR: <err>	The Read command returns the current mode and the currently selected operator.
Test	AT+COPS=?	+COPS: [list of supported (<stat>, long alpha numeric <oper>,short alphanumeric<oper>, numeric<oper>)] [,list of supported <mode>s,(list of supported<format>s)] OK	The Test command returns a list of quadruplets, each representing an operator present in the network. A quadruplet consists of an integer indicating the availability of the operator <stat>, long and short alphanumeric format of the name of the operator, and numeric format representation of the operator. If any of the formats are unavailable, there is an empty field. The list of operators is in the following order: home network, networks referenced in SIM or active application in the UICC (GSM or USIM) in the following order: HPLMN selector, User controlled PLMN selector, Operator controlled PLMN selector and PLMN selector (in the SIM or GSM application), and other networks. After the operator list, the G30 returns lists of the supported <mode>s and <format>s. These lists are separated from the operator list by two commas.

The following table shows the +COPS parameters.

<Parameter>	**Description**
<format>	The operator format type (The default value is 0): 0 Long alphanumeric 1 Short alphanumeric 2 Numeric
<mode>	Determines whether what is displayed is defined by <oper>, or is done

	automatically by the Module. 0 Automatic (<oper> field is ignored) 1 Manual (<oper> field is present) 2 De-register from network 3 Set only <format> (<oper> field is ignored); used for Read command only, do not attempt registration/de-registration 4 Manual/automatic (<oper> field is present; if manual selection fails, use automatic mode) The default value is 0.
<stat>	0 Unknown 1 Available 2 Current 3 Forbidden
<oper>	Operator name displayed. The long alphanumeric format can be up to 16 characters long. The short alphanumeric format can be up to 8 characters long. The numeric format is the GSM Location Area Identification number (refer to GSM 04.08 [8] subclause 10.5.1.3), consisting of a three BCD digit country code (as per ITU-T E.212 Annex A [10]), plus a two BCD digit network code, which is administration specific. The returned <oper> is not in BCD format, but in IRA characters converted from BCD, and therefore the number has the following structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit2)(network code digit 1)

Example:

```
AT+COPS=?
+COPS: (2,"CHINA  MOBILE","CMCC","46000"),(3,"CHINA UNICOM","CHINA
UNICOM","46001")
OK
 AT+COPS?
+COPS: 0,0,"CHINA  MOBILE"
OK
```

```
AT+COPS?
+COPS: 0,2,"46000"          //Specific provider number
OK
AT+COPS=2
OK
AT+CREG=2
OK
AT+COPS=1,2,"46001"
ERROR
+CREG: 3
AT+COPS=4,2,"46001"
+CREG: 3
+CREG: 2
+CREG: 1,"27A0","0DEB"
OK
AT+COPS?
+COPS: 0,2,"46000"
OK
```

9.1.5 +CPOL, Preferred Operators

This command is used to edit the PLMN selector lists in the SIM card or active application in the UICC (GSM or USIM).

If no list has been previously selected, the EFPLMNwAcT - user controlled PLMN selector with Access Technology list, is the one accessed by default.

Command	Syntax	Response/Action	Remarks
Set	AT+CPOL=[<index>][,<format>[,<oper>]]	OK or: +CME ERROR: <err>	Note: In case the index already exists in the list, the new entry will erase the old one and replace it in the list. The Module may also update this list automatically when new networks are selected.
Read	AT+CPOL?	+CPOL: <index1>,<format>,<oper1>[<CR><LF> +CPOL:	

		<index2>,<format>,<oper 2>[...]] OK or: +CME ERROR: <err>	
Test	AT+CPOL=?	+CPOL: (list of supported<index>s),(list of supported<format>s) OK or: +CME ERROR: <err> * Index range is SIM dependent	The Test command displays the entire index range supported by the SIM.

The following table shows the +CPOL parameters.

<Parameter>	Description
<indexn>	Order number of network operator in the SIM preferred operator list
<format>	Defines the <oper> format: 0 Long alphanumeric format (up to 16 characters) (default) 1 Short alphanumeric format (up to 8 characters) 2 Numeric
<oper>	Name of the network operator

Note1:

If <index> is given but <oper> is left out, entry is deleted.

If <oper> is given but <index> is left out, <oper> is put in the next free location.

If only <format> is given, the format of the <oper> in the read command is changed.

Note2:

User is prevented from editing index No. 0. This index is reserved for the HPLMN record and can not be modified.

When entering a new item with an <index> to a full list, the Module deletes the last item, stores the new item in the requested entry, and shifts the rest of the list down.

When entering a new item without an <index> to a full list, the Module replaces the last entry with the new item.

Note3: MT may also update the User controlled PLMN selector with Access Technology list - EFPLMNwAcT, automatically when new networks are selected.

Note4: The Operator controlled PLMN selector with Access Technology EFOPLMNwAcT and HPLMN selector with Access Technology - EFHPLMNwAcT cannot be written since the access conditions is Administrative.

Note5: The command is implemented according to 3GPP TS 27.007 without acceptance in attention the <GSM_AcT2>, <GSM_Compact_AcT2>, <UTRAN_AcT2>] bits since the Module device not using this bits to get the best PLMN.

Example:

```
AT+CPOL=?
+CPOL: (1-32),(0-2)
OK
AT+CPOL?
+CPOL: 0,2,"42501"
OK
AT+CPOL=,0
OK
AT+CPOL?
+CPOL: 0,0,"IL ORANGE"
OK
AT+CPOL=?
+CPOL: (1-32),(0-2)
OK
AT+CPOL=1,2,"42502"
OK
AT+CPOL?
+CPOL: 0,0,"IL ORANGE"
+CPOL: 1,0,"IL Cellcom"
OK
AT+CPOL=1
OK
AT+CPOL?
+CPOL: 0,0,"IL ORANGE"
OK
```

9.1.6 +MCELL, Module Cell Description

This command displays information about the Cellular Network. The information is divided throughout 21 screens, each of them with different parameters data.

Command	Syntax	Response/Action	Remarks
Set	+MCELL=<mode>, <screen_num>	OK or: +CME ERROR: <err>	The Set command will return “OK” only. The relevant <screen_info> will return back with +MCELL format few seconds later.
Read	+MCELL?	OK	The Read command just returns OK and does nothing.
Test	+MCELL=?	+MCELL: (list of supported <mode>s), (list of supported <screen_num>s) OK	The Test command returns the possible <mode> & <screen_num> values.

The following table shows the +MCELL parameters.

<Parameter>	Description
<mode>	0 One shot requested.
<screen_num>	The requested screen number - An integer number. 1 Serving Idle Information screen 2 Circuit Switched Serving Cell Information screen 3 Miscellaneous Information screen 4 Uplink Data Transfer screen 5 Downlink Data Transfer screen 6 Neighbor 1 Cell Information screen 7 Neighbor 2 Cell Information screen 8 Neighbor 3 Cell Information screen

	9 Neighbor 4 Cell Information screen 10 Neighbor 5 Cell Information screen 11 Neighbor 6 Cell Information screen 12 Neighbor Cells Summary screen 13 Re-selection screen 14 Hopping Information screen 15 PDP1 Context Information screen 16 PDP2 Context Information screen 17 PDP3 Context Information screen 18 PDP4 Context Information screen 19 Serving Cell paging parameters 20 Optional SYSINFOs 21 Serving and Neighbor Cells Information screen 22 Serving Cell Information screen 23 Neighbor Cells Information screen 24 The LAC and Cell ID of Serving and Neighbor Cells I

9.1.7 +MCELL Indication

After AT+MCELL command, the information about the Cellular Network will return back by this +MCELL indication format few seconds later.

+MCELL: <screen_title><CR><LF><screen_info><CR><LF>

The following table shows the +MCELL parameters.

<Parameter>	Description
<screen_title>	The requested screen title is written on the first line of each screen.
<screen_info>	The requested screen information.

<screen title>	Description	<screen num>
Serving Idle/PI	Idle/Packet Idle mode; Serving Cell Information screen.	1

Serving CS/TBF	Circuit Switched mode; Serving Cell Information screen.	2
Serving Misc	Idle/Packet Idle mode; Miscellaneous Information screen.	3
Uplink Transfer	Dedicated/TBF modes; Uplink Data Transfer screen.	4
Downlink Transfer	Dedicated/TBF modes; Downlink Data Transfer screen.	5
Adjacent Cell x	Neighbor Cell Information screen. x - index cell.	6-11
Neighbors	Neighbor Cells Summary screen.	12
Reselection	Re-selection screen.	13
Hopping Info	Dedicated/TBF modes; Hopping Information screen.	14
PDP Context	PDP Context Information screen	15-18
GPRS-Parameters	Idle/Packet Idle mode; GPRS parameters.	19
SysInfos	Idle/Packet Idle mode; Optional SYSINFO.	20
Serving and Neighbors	Serving and Neighbor Cells Information screen	21
Serving Cell	Serving Cell Information screen	22
Neighbor Cells	Neighbor Cells Information screen	23
Serving and Neighbors	The LAC and Cell ID of Serving and Neighbor Cells I	24

Example:

AT+MCELL?

OK

AT+MCELL=?

+MCELL: 0,(1-24)

OK

AT+MCELL=0,3

OK

+MCELL:Serving Misc

(P)BCCH ARFCN:00536,BSIC:056,RxLev:037,Cell ID:03583,(PD)TCH ARFCN:INVALID_ARFCN,Timeslot:00,CBA:000,CBQ:000,T3314:00

AT+MCELL=0,19

OK

+MCELL: GPRS-Parameters:

(P)BCCH ARFCN:00536,BSIC:056,RxLev:039,Cell ID:03583,(PD)TCH ARFCN:INVALID_ARFCN,Timeslot:00,BS_PA_MFRMS:02,BS_AG_BLK_RES:01,BS_PAG_BLK_RES: 0,BS_PBCCH_BLOCKS:1

at+MCELL=0,21

OK

MCC:460,MNC: 0,LAC:09339,Cell ID:03600,BSIC:027,(P)BCCH ARFCN:0076,RxLev:057,RxDbm:-53

MCC:460,MNC: 0,LAC:09339,Cell ID:04361,BSIC:041,(P)BCCH ARFCN:0082,RxLev:035,RxDbm:-75

MCC:460,MNC: 0,LAC:09339,Cell ID:04362,BSIC:038,(P)BCCH ARFCN:0060,RxLev:009,RxDbm:-101

MCC: -1,MNC:255,LAC:00000,Cell ID:65535,BSIC:255,(P)BCCH ARFCN:0000,RxLev:000,RxDbm:-110

MCC: -1,MNC:255,LAC:00000,Cell ID:65535,BSIC:255,(P)BCCH ARFCN:0000,RxLev:000,RxDbm:-110

MCC: -1,MNC:255,LAC:00000,Cell ID:65535,BSIC:255,(P)BCCH ARFCN:0000,RxLev:000,RxDbm:-110

MCC: -1,MNC:255,LAC:00000,Cell ID:65535,BSIC:255,(P)BCCH ARFCN:0000,RxLev:000,RxDbm:-110

at+MCELL=0,22

OK

MCC:460,MNC:0,LAC:9339,Cell ID:03600,BSIC:27,(P)BCCH ARFCN:76,RxLev:56,RxDbm:-54,C1:30,C2:30,TxPower:5,RxAccMin:6,(PD)TCH ARFCN:INVALID_ARFCN,Timeslot:0,MAIO:0,HSN:0,Timing Advance:255,RxQualFull:6,RxQualSub:6

at+MCELL=0,23

OK

NCELL:1,MCC:460,MNC:0,LAC:9339,Cell ID:04361,BSIC:41,(P)BCCH ARFCN:82,RxLev:32,RxDbm:-78,C1:17,C2:13

NCELL:2,MCC:460,MNC:0,LAC:9339,Cell ID:04362,BSIC:38,(P)BCCH ARFCN:60,RxLev:9,RxDbm:-101,C1:-1,C2:-1

9.1.8 +MCI, Module Cell Information

This command returns neighbor cell information. The command returns ARFCN, BSIC and RX level of serving and adjacent cells. In case Module is registered, adjacent cells are from registered PLMN. In case Module is in Emergency Mode, adjacent cells are physical neighbors. BSIC is displayed only in case SCH (Synchronization Channel) is decoded.

The parameter <enable_TA> determines whether <TA> will be reported by +MCI command. <TA> is defined for serving cell only. This value will be displayed only in Dedicated mode. The command output is <Filter>dependent. In case the command output should be filtered to include just cells of a specific GSM band (one or more) the filter parameter should be set accordingly. The filtering will apply to the neighbor's cells only – the serving cell info will always be returned.

Using the set command without a parameter will return output according to the currently set <Filter> value.

Command	Syntax	Response/Action	Remarks
Set Execute	AT+MCI=<Filter>[,<enable_TA>] or:	OK or: +CME ERROR: <err>	This command will return “OK” only. The neighbor cell information will return back with +MCI format few seconds later.

	AT+MCI		
Read	AT+MCI?	+MCI: <Filter>, <enable_TA> OK	The Read command returns the current set <Filter> and <enable_TA> values.
Test	AT+MCI=?	+MCI: (List of supported <Filter>s), (Range of supported <enable TA>s) OK	The Test command returns the ranges of <Filter>'s supported values and <enable TA> supported values.

The following table shows the +MCI parameters.

<Parameter>	**Description**
<Filter>	The requested GSM band's ARFCNs. This is an integer which can be a combination of all (1-15): 1 - GSM 850 2 - GSM 900 4 - GSM 1800 8 - GSM 1900 The default value is 15.
<enable TA>	This parameter defines whether <TA> will be reported by +MCI command. Defined values: 0 - Do not report <TA> value. 1 - Report <TA> value. The default value is 0.

9.1.9 +MCI Indication

After AT+MCI command, the neighbor cell information will return back by this +MCI indication format few seconds later.

+MCI: <serving cell ARFCN>,<serving cell BSIC>,<signal strength>[,<TA>][,<neighbor 1ARFCN>[,<neighbor 1 BSIC>],<signal strength>[,<neighbor 2 ARFCN>[,<neighbor 2 BSIC>],<signal strength>[,<neighbor 3 ARFCN>[,<neighbor 3 BSIC>],<signal strength>[,<neighbor 4 ARFCN>[,<neighbor 4 BSIC>],<signal strength>[,<neighbor 5 ARFCN>[,<neighbor 5 BSIC>],<signal strength>[,<neighbor 6 ARFCN>[,<neighbor 6 BSIC>],<signal strength>]]]]]]

The following table shows the +MCI parameters.

<Parameter>	Description
<ARFCN>	Absolute Radio Frequency Channel Number Range: [1-124], [128-251], [512-885], [975-1023].
<BSIC>	Base transceiver Station Identity Code Range: [0 - 63]
<signal strength>	Range: -110 - (-48) dBm. For serving cell signal strength is defined as: • In dedicated mode - TCH Rx level • In idle mode average BCCH Rx level For adjacent cells, signal strength is defined as the average Rx level in the both modes.
<TA>	TA (Timing Advance) is defined for serving cell only. This value will be reported only in Dedicated and TBF modes. Valid value range is from 0 to 63.

9.1.10 +CA Indication

After AT+MCI command, the available ARFCN of cell allocation will return back by this +CA indication format few seconds later.

+CA: <Cell allocation 1>,<Cell allocation 2>,<Cell allocation 3>…

The following table shows the +CA parameters.

<Parameter>	Description
<Cell allocation 1>,<Cell allocation 2>,<Cell allocation 3>	Absolute Radio Frequency Channel Number Range: [1-124], [128-251], [512-885], [975-1023].

Example:

AT+MCI=1 // Get the current serving and neighbor info.

OK

+MCI: 58,48,-71, ,72,29,-70,522,47,-76,84,24,-77,68,42,-81,88,17,-82,86,42,-85

+CA: 7,12,29,37,41,44,47,58,73

9.1.11 +MJDC Jamming Detection

Detect the jamming.

Command	Syntax	Response/Action	Remarks
Set	+MJDC=<mode>	OK or: +CME ERROR: <err>	The Set command controls the presentation of an unsolicited result code "+MJDC: " and the result of the Read operation.
Read	+MJDC?	+MJDC: <mode>[,<jamming>] OK	The read command returns the current <mode> parameter value and detect result. Only <mode> is 1,the <jamming> will show .
Test	+MJDC=?	+MJDC: (list of supported <mode>s) OK	The Test command returns the possible <mode>.

The following table shows the +MJDC parameters.

<Parameter>	Description
<mode>	0 don’t detect the jamming 1 detect the jamming
< jamming>	0 no jamming 1 there are jamming detected

9.1.12 +MJDC Indication

After AT+MJDC=1 set,if there are jamming detection,+MJDC Indication will output.

+MJDC: <jamming>

The following table shows the +MJDC parameters.

<Parameter>	Description
<jamming>	0 no jamming 1 there are jamming detected

Example:

AT+MJDC=1
OK
AT+MJDC?
+MJDC: 1,0
OK

+MJDC: 1

AT+MJDC?
+MJDC: 1,1
OK

+MJDC: 0

AT+MJDC?
+MJDC: 1,0
OK
AT+MJDC=0
OK
AT+MJDC?
+MJDC: 0
OK

9.1.13 +CGED, Module Cell Description

This command displays information about the Cellular Network. The information is divided throughout 21 screens, each of them with different parameters data.

Command	Syntax	Response/Action	Remarks
Set	+MCELL=<mode>, <screen_num>	OK or: +CME ERROR: <err>	The Set command will return “OK” only. The relevant <screen_info> will return back with +MCELL format few seconds later.
Read	+MCELL?	OK	The Read command just returns OK and does nothing.
Test	+MCELL=?	+MCELL: (list of supported <mode>s), (list of supported <screen_num>s) OK	The Test command returns the possible <mode> & <screen_num> values.

The following table shows the +MCELL parameters.

<Parameter>	Description
<mode>	0 One shot requested.
<screen_num>	The requested screen number - An integer number. 1 Serving Idle Information screen 2 Circuit Switched Serving Cell Information screen 3 Miscellaneous Information screen 4 Uplink Data Transfer screen 5 Downlink Data Transfer screen 6 Neighbor 1 Cell Information screen 7 Neighbor 2 Cell Information screen 8 Neighbor 3 Cell Information screen 9 Neighbor 4 Cell Information screen

	10 Neighbor 5 Cell Information screen 11 Neighbor 6 Cell Information screen 12 Neighbor Cells Summary screen 13 Re-selection screen 14 Hopping Information screen 15 PDP1 Context Information screen 16 PDP2 Context Information screen 17 PDP3 Context Information screen 18 PDP4 Context Information screen 19 Serving Cell paging parameters 20 Optional SYSINFOs 21 Serving and Neighbor Cells Information screen 22 Serving Cell Information screen 23 Neighbor Cells Information screen 24 The LAC and Cell ID of Serving and Neighbor Cells I

9.1.14 +CBAND, Change Radio Band

This command allows to switch from automatic band selection to selection of one or more (up to four) bands from the following:

- 850 MHz
- 900 MHz
- 1800 MHz
- 1900 MHz

Command	Syntax	Response/Action
Set	AT+CBAND=[<band_1>[,<band_2>[,<band_3>[,<band_4>]]]]	OK or CME ERROR: <err>
Read	AT+CBAND?	+CBAND: [<band_1>[,<band_2>[,<band_3>[,<band_4>]]

		]] OK
Test	AT+CBAND=?	+CBAND: (list of supported bands) OK

The following table shows the +CBAND parameters.

<Parameter>	**Description**	
<band_1> or <band_2> or <band_3> or <band_4>	0	Automatic band selection(entering every time possible, display improbable)
	850	Selection of 850 MHz band
	900	Selection of 900 MHz band
	1800	Selection of 1800 MHz band
	1900	Selection of 1900 MHz band

Example:

AT+CBAND?

+CBAND: 900,1800

OK

AT+CBAND=?

+CBAND: (0,900,1800)

OK

AT+CBAND=900

OK

AT+CBAND?

+CBAND: 900

OK

9.1.15 +GTPLMNLS, Clear Arfcn list

This command allows to Clear Arfcn list and PLMN from nv,that the Arfcn and PLMN is saved after the last register network. So the time of register network is longer after clear Arfcn and PLMN.

Command	Syntax	Response/Action
Set	AT+GTPLMNLS=n	OK or CME ERROR: <err>
Read	AT+GTPLMNLS?	[SIM0]PLMN: [SIM0]COUNT: [SIM0]ARFCN: [SIM1]PLMN: [SIM1]COUNT: [SIM1]ARFCN: OK
Test	AT+ GTPLMNLS =?	ERROR

PLMN is MCC and MNC; COUNT is number of frequency points; ARFCN is frequency points

The following table shows the +GTPLMNS parameters.

<Parameter>	Description	
n	1	Clear Arfcn list and PLMN of SIM1 from nv
	2	Clear Arfcn list and PLMN of SIM2 from nv

Example:

AT+GTPLMNLS?

[SIM0]PLMN:64,f0,10

[SIM0]COUNT:19

[SIM0]ARFCN:637,644,645,647,648,649,650,655,658,660,662,665,100,109,112,120,121,124,656,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

[SIM1]PLMN:0,0,0

[SIM1]COUNT:0

[SIM1]ARFCN:0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

OK

AT+GTPLMNLS=1

OK

AT+GTPLMNLS?

[SIM0]PLMN:0,0,0

[SIM0]COUNT:0

[SIM0]ARFCN:0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

[SIM1]PLMN:0,0,0

[SIM1]COUNT:0

[SIM1]ARFCN:0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

OK

10 Hardware Information

10.1 Hardware Information Commands

10.1.1 +MMAD, Query and Monitor ADC Value

This command intends to query and monitor ADC value. G510-A20 supports 1-ways ADC connector. This command returns the current ADC values for the requested channel. The values received from the first converters represent the DC voltage levels of the input pin.

The returned value is a multiplication of the input level by 1000 (e.g. input level of 0.56V will return 560).

Command	Syntax	Response/Action	Remarks
Execute	AT+MMAD	+MMAD: <Converter_number>,<Converted_Value> OK Or: +CME ERROR: <err>	
Read	AT+MMAD?		Same as AT+MMAD

The following table shows the +MMAD parameters.

<Parameter>	Description
<Converter Number>	1-2 Select the A2D converter.
<Converted Value>	A decimal value represents the returned digital value. The input level multiplied by 1000.

Example:

AT+MMAD
+MMAD: 1,500
OK

10.1.2+MTSM, Temperature Sensor Measurement

This command measures the current temperature sensor value in Celsius degrees.

This temperature is taken from a internal thermostatically of Egold.

All the parameters are saved on the NVM, and used after power up.

All the parameter values should be 0 (zero) in first operation of the module.

Note: In case AT parameters are set and executed, and a reset or a power-cycle occurs, the G510-A20 continues with the execution of the AT command using the saved parameters, until the user changes the settings.

Command	Syntax	Response/Action	Remarks
Set	+MTSM=<Report>[,<Rate>][,<Low>,<High>]	For <Report>=0 OK For <Report>=1 +MTSM: <Temp> OK For <Report>=2 or 3 OK +MTSM: <Temp> … +MTSM: <Temp> or: ERROR: <error code>	Read the temperature.
Read	+MTSM?	+MTSM=<Report>,<Rate>,<Low>,<High> OK	Read the setting parameters.
Test	+MTSM=?	+MTSM: (range of <Report>),(range of <Rate>),(range of <Low>/<High>) OK	

The following table shows the +MTSM parameters.

<Parameter>	Description
<Temp>	-40 - 95; Temperature measurements in Celsius degrees.
<Report>	0; Deactivate unsolicited report. 1; Report once the current temperature.

	2; Activate unsolicited report. 3; Activate unsolicited report only for out-off boundaries events.
<Rate>	1-255; Select the time interval in seconds between the unsolicited reports. (Default value = 1 Second).
<Low>	-40 - 95; The lowest boundary level of the temperature value for unsolicited report. (Default value = 0 Celsius). Setting corresponding <Low> and <High> temperature boundaries for <Report>=3 only.
<High>	-40 - 95; The Highest boundary level of the temperature value for unsolicited report. (Default value = 0 Celsius). Setting corresponding <Low> and <High> temperature boundaries for <Report>=3 only.

Example:

```
AT+MTSM=?           // Test the range of the parameters.
+MTSM: (0-3),(1-255),(-40-95)
OK

AT+MTSM=1           // Set to read for once the current temperature measurement.
+MTSM: 35           // Current temperature is +35 Celsius degree.
OK

AT+MTSM=2,5                 // Set to unsolicited temperature reports to TE for every 5 seconds.
OK
+MTSM: -10          // Current temperature measure report -10 Celsius.
+MTSM: -5           // Unsolicited temperature report -5 Celsius after 5 seconds.
+MTSM: 7            / Unsolicited temperature measure report +7 Celsius after 10 seconds.
+MTSM: 20           // Unsolicited temperature measure report +20 Celsius after 15 seconds.
…
+MTSM: 50           // Unsolicited temperature measure report +50 Celsius after Nx5 seconds.

AT+MTSM=0           // Set to stop the unsolicited report.
OK
```

AT+MTSM=3,30,-10,40 // Set to out-off boundary (-10 to +40 Celsius) unsolicited reports for every 30 seconds.

OK

+MTSM: -20 // Unsolicited current report out-off the Low boundary.

+MTSM: -12 // Unsolicited report out-off the Low boundary after 30 seconds.

+MTSM: 47 // Unsolicited report out-off the High boundary after Nx30 seconds

AT+MTSM? // Read the current setting.

+MTSM: 3,30,-10,40

OK

AT+MTSM=0 // Set to stop the unsolicited report.

OK

AT+MTSM? // Read the current setting.

+MTSM: 0

OK

10.1.3+CBC, Battery Charger Connection

This command enables a user to query the battery power level.

Command	Syntax	Response/Action
Read	+CBC	+CBC: <bcs>,<bcl> OK

The following table shows the +CBC parameters.

<Parameter>	Description
<bcs>	Battery status values 0 Battery powered 1 Externally powered - not implemented in Module Note: The Module input power source is connected via the battery pins only, so it is always battery powered.
<bcl>	VBAT voltage value, A decimal value represents the returned digital value. The input level multiplied by 1000.

Note: The Module does not allow the detection of battery use. The power supply of the Module is connected via the battery pins. However, users can use this command to verify the level of the Module input power source.

Example:

AT+CBC
+CBC: 0,3802
OK

10.1.4+CBAUD, Baud Rate Regulation

This command sets the uniquely UART baud rate. The baud rate of the Module is changed/set to the request value <rate> written in the command.
Specifying a value of 0 allows operation only at rates automatically detectable by the Module. The specified rate takes effect following the issuing of any result code(s) associated with the current command line.
Note: ATZ command sets the Module to default baud rate - Auto baud rate. The auto baud rate can support 9600, 14400, 19200, 57600, 115200 and 230400.
After sent any AT command, the module will lock on single baud rate. Read command can feedback the currently baud rate. The module cannot re-auto baud without send AT+CBAUD=0command or re-power up. The parameter can't be saved after power up.

Command	Syntax	Response/Action
Set	+CBAUD=<n> +CBAUD=<rate>	OK or: +CME ERROR: <err>
Read	+CBAUD?	+CBAUD: <rate> OK
Test	+CBAUD=?	+CBAUD: (list of supported <n>s, list of supported <rate>s) OK

The following table shows the +CBAUD parameters.

<Parameter>	Description	
	0	Auto baud rate detection

	1	2400
	2	4800
	3	9600
	4	14400
	5	19200
	6	28800
	7	33600
	8	38400
	10	57600
	11	115200
	12	230400
	13	460800
	The default value is 0	

10.1.5+IPR, Local Terminal Serial Port Rate

This command is responsible for setting and saving the request baud rate. This numeric extended-format parameter specifies the data rate at which the Module accepts commands. Specifying a value of 0 disables the function and allows operation only at rates automatically detectable by the Module. The specified rate takes effect following the issuing of any result code(s) associated with the current command line.

The <rate> value specified is the rate in bits per second at which the terminal-Module interface operates, for example, 19200 or 115200. The rates supported by the Module are manufacturer-specific. However, the +IPR parameter permits setting any rate supported by the Module during online operation.

The UART is configured to rates of 1200, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bits per second according to the parameters of the +IPR command.

Using AT+IPR=<rate> with a <rate> value other than 0 disables the auto baud rate detection feature. The entered baud rate is stored in the Module and is restored after power up. The auto baud rate can support 9600, 14400, 19200, 57600, 115200 and 230400.

Note: +IPR is similar to +CBAUD, but with the ability to save.

The baud rate after ATZ (or AT&F) is the last baud rate that was set by +IPR, or +CBAUD.

Command	Syntax	Response/Action
Set	+IPR=<n> +IPR=<rate>	OK or:

		+CME ERROR: <err>
Read	+IPR?	+IPR: <rate> OK
Test	+IPR=?	+IPR: (list of supported <rate>s), OK

Note: Read mode returns the current baud rate and not the value that was set by Set Mode.

The following table shows the +IPR parameters.

<Parameter>	Description	
	0	Auto baud rate detection
	1	2400
	2	4800
	3	9600
	4	14400
	5	19200
	6	28800
	7	33600
	8	38400
	10	57600
	11	115200
	12	230400
	13	460800
	The default value is 0	

Example:

AT+IPR=5
OK
AT+IPR?
+IPR: 19200
OK
AT+IPR=?
+IPR:
(1-8,10-13,2400,4800,9600,14400,19200,28800,33600,38400,57600,115200,230400,460800)
OK

10.1.6&K, RTS/CTS Flow Control

This command configures the flow control. The RTS (Request To Send) is an input line. The RTS signal is received from the terminal and a low condition indicates that the Module can send more data. The CTS (Clear To Send) is an output line. The CTS signal is sent to the terminal and a low state indicates that more data can be sent to the Module.

The RTS and CTS together make up what is called RTS/CTS or “hardware” flow control. Both lines are used when “hardware flow control” is enabled in both the terminal and the Module devices. When the terminal is ready and able to receive data, it puts the RTS line in an active (low) condition to indicate this to the Module. If the terminal is not able to receive data (typically because its receive buffer is almost full), it puts the RTS line in an inactive (high) condition as a signal to the Module to stop sending data. When the terminal is ready to receive more data (for example, after data has been removed from its receive buffer), it places this line back in the active condition.

The RTS line complements the CTS line. The Module puts the CTS line in an active condition to tell the terminal that it is ready to receive the data. Likewise, if the Module is unable to receive data, it places the CTS line in an inactive condition.

Command	Syntax	Response/Action
Set	AT&K<param>	OK or: +CME ERROR: <err>
Read	AT&K?	&K: <param> OK
Test	AT&K=?	&K: (list of supported <param>s) OK

The following table shows the &K parameters.

<Parameter>	Description
<param>	0 Disable all terminal/Module flow control 3 Enable CTS/RTS terminal/Module flow control 6 Enable CTS/RTS terminal/Module flow control The default value is 0.

10.1.7+IFC, RTS/CTS Flow Control

This parameter controls the operation of the local flow control between the terminal and the Module during the data state when V.42 error control is used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric sub parameters:

• <DCE_by_DTE>: Specifies the method to be used by the terminal to control the flow of received data from the Module.

• <DTE_by_DCE>: Specifies the method to be used by the Module to control the flow of transmitted data from the terminal.

Command	Syntax	Response/Action
Set	AT+IFC=[<DCE_by_DTE >[,DTE_by_DCE]]	OK or: ERROR
Read	AT+IFC?	+IFC: <rate> OK
Test	AT+IFC=?	+IFC: (list of supported < DCE_by_DTE >s, list of supported < DTE_by_DCE >s) OK

The following table shows <DCE_by_DTE> and <DTE_by_DCE> parameters.

<Parameter>	Description
<DCE_by_DTE>	0 None 2 Circuit 133 (RTS)
<DTE_by_DCE>	0 None 2 Circuit 106 (CTS)

Example:

```
AT+IFC?
+IFC: 0,0
OK

AT+IFC=2,2
OK
```

10.1.8&C, Circuit 109 Behavior

This parameter determines how the state of the DCD line relates to the detection of the received line signal from the distant end. Changing the parameters will take effect immediately in both the command and online command states.

The DCD line is an output line that indicates the following:

In Circuit Switch Data mode an active (low) indicates that a valid carrier (data signal) was detected by the Module (CONNECT message is received), and inactive (high) indicates idle. The AT&C command always puts the DCD command ON, when set to 0. If the AT&C command is set to 1 then the "+++" escape command sets the DCD signal to an inactive state and the ATO command is set to active. The AT&C set to 2 sets the DCD signal OFF.

In GPRS mode, the DCD line indicates the PDP context status. PDP context active sets the DCD to active (low); PDP context inactive sets the DCD to inactive (high). The DCD is activated only when the PDP context is achieved. The DCD is de-activated when the PDP context is off.

In Local Link mode, the DCD line indicates the Local Link data status.

When AT&C is set to 0, the DCD signal is always ON.

When AT&C is set to 1:

DCD signal is set to ON when +MDLC command has been launched.

DCD signal is set to OFF when Local link has been stopped. When AT&C is set to 2, the DCD signal is always OFF.

When AT&C is set to 0, the DCD signal is always ON. When AT&C is set to 1, the DCD is activated in online mode. When AT&C is set to 2, the DCD is activated only when the PDP context is achieved (temporary IP address is received).

Note: If &C is set to 2 when a CSD call is set, DCD will always remain OFF.

Command	Syntax	Response/Action
Set	AT&C<param>	OK
Read	AT&C?	&C: <param>
Test	AT&C=?	&C: (list of supported <param>s)

The following table shows the &C parameters.

<Parameter>	Description
<param>	DCD signal ON 0 DCD is forced ON at all times. 1 DCD is set to ON when: a A ODM carrier is detected. b A GPRS external session is being established:

	Module enters PPP mode TE is about to send an LCP configure-request to the Module (GPRS connection is not yet established). DCD is set to OFF when: a No ODM carrier is detected. This can happen when a ODM call As been disconnected or when Module enters ODM online command mode (switch operation). b The Module has lost its GPRS connection with the network (PDP context was deactivated and the IP address is cancelled). 2 DCD is set to ON when Module establishes a GPRS connection with the network (PDP context is activated and the IP address is received from the network). DCD is set to OFF when Module has lost its GPRS connection with the network (PDP context was deactivated and the IP address is cancelled). The default value is 1.

10.1.9&D, Circuit 108 Behavior

This command determines how the Module responds when the DTR (Data Terminal Ready) status is changed from ON to OFF during the online data state. The DTR is an input line that indicates that the terminal is ready.

The DTR line must be active (low) in order for the Module to recognize the terminal. This signal is raised by the terminal when a process activates the serial port. If the DTR is not used by the application, it should connect this line to ground (DTR active). The default value is active (low).

In case of local link during initial PPP retries, DTR change will be ignored.

Command	Syntax	Response/Action
Set	AT&D<param>	OK
Read	AT&D?	&D: <param>
Test	AT&D=?	&D: (list of supported <param>s)

The following table shows the &D parameters.

<Parameter>	Description
<param>	The Module's reaction when the DTR status is changed from ON to OFF. In ODM: 0,4 Ignores DTR changes 1 Switches the ODM to asynchronous command mode (the ODM

	remains connected) 2,3 Disconnects the ODM and returns to the command mode In GPRS calls: 0,4 Ignores DTR changes 1 Switches the GPRS session to asynchronous command mode (the session remains connected) 2,3 Deactivates the GPRS and returns to command mode In MUX and MUX_INIT state: 0-3 Ignores DTE changes 4 Drops the MUX application and returns to PRE_MUX state The default value is 0.

10.1.10 +CFUN, Shut Down Phone Functionality

It's important to define the module's status in works.

This command shuts down the phone functionality of smart phones and PDAs with phone capabilities in order to prevent interference from a nearby environment. This enables other functionality to continue to be used in environments where phone use is either impractical or not permitted. For example, on airplanes the use of cellular phones is forbidden during the entire flight, but the use of computers is allowed during much of the flight. This command enables other functionality to continue while preventing use of phone functionality.

Command	Syntax	Response/Action	Remarks
Set	+CFUN=<fun>	OK +CME ERROR: <err>	The Set command selects the level of functionality <fun> in the smart phone or PDA incorporating the Module.
Read	+CFUN?	+CFUN: <fun>, OK	The Read command displays the current level of functionality.
Test	+CFUN=?	+CFUN: (list of supported <fun>s) OK	The Test command displays the list of supported functionality settings.

The following table shows the AT+CFUN parameters.

<Parameter>	Description
<fun>	Functionality levels:

	0 Turn off (With logging out network). 1 Full functionality meaning start up MS(from offline mode) 4 Disables phone transmit & receive RF circuits. 15 Hardware reset. (Need re-turn on the module)

Example:

```
AT+CFUN=?
+CFUN: (0,1,4,15)
OK
AT+CFUN?
+CFUN: 1,0
OK
AT+CFUN=4          //Disable phone transmit and receive RF circuits
OK
AT+CFUN?
+CFUN: 4
AT+COPS?
+COPS: 2
OK
AT+CFUN=1        // Enable phone transmit and receive RF circuits through '1' OK
OK
AT+CFUN?
+CFUN: 1
OK
AT+COPS?
+COPS: 0,0,"CHINA    MOBILE"
OK
```

10.1.11 +ICF, DTE-DCE Character Framing

This command determines the local serial port start/stop (asynchronous) character framing used by the DCE when accepting DTE commands and transmitting information text and result codes, whenever these are not done automatically. Auto detect framing is not supported.

Command	Syntax	Response/Action	Remarks
Set	+ICF=[<format>[,<parity>]]	OK +CME ERROR: <err>	The Set command determines the local serial port start/stop character

			framing.
Read	+ICF?	+ICF: <format>,<parity> +CME ERROR: <err>	The Read command displays the currently selected character framing.
Test	+ICF=?	+ICF:(list of supported <format> values),(list of supported <parity> values) +CME ERROR: <err>	The Test command displays a list of supported <format> and <parity> values.

The following table shows the +ICF parameters.

<Parameter>	Description
<format>	Determines the number of bits in the data bits, the presence (or absence) of a parity bit, and the number of stop bits in the start/stop frame. 1 8 Data, 2 St–p - can be set only with <parity> 4 2 8 Data, 1 Parity, 1 Stop - can be set with <parity> of 0 or 1 3 8 Data, 1 Stop (default) - can be set only with <parity> 4 5 7 Data, 1 Parity, 1 Stop - can be set with <parity> of 0 or 1 7 8 Data, 1 Parity, 2 Stop - can be set with <parity> of 0 or 1 8 7 Data, 1 Parity, 2 Stop - can be set with <parity> of 0 or 1
<parity>	Determines how the parity bit is generated and checked (if present). 0 Odd 1 Even 4 No parity (default)

Example:

AT+ICF?
+ICF: 3,4
OK
AT+ICF=?
+ICF: (1-3,7),(0,1,4)
OK
AT+ICF=3,1
OK

10.1.12 +MRST, Perform Hardware power down

The +MRST command enables customer software to perform a hardware power down to the Module unit. This command provides a software power-off without network logging off.

Command	Syntax	Response/Action	Remarks
Set	+MRST	OK	The Set command performs a graceful hardware power down to the Module. Note: The Read and Test commands are not permitted for the +MRST command.

Example:

AT+MRST
OK
// Result - Module performs a power down

10.1.13 +WRIM, RI signal width setting

In IDLE Mode, Module's RI pin is High voltage level. When Module receive a SMS or Call, This pin can output a Low voltage pulse. This command defines the width of pulse can be set.

Command	Syntax	Response/Action	Remarks
Set	+WRIM=<type>,<width>	OK or: ERROR	Set width
Read	+WRIM?	+WRIM: <type>,<width> OK or: ERROR	The read command returns the current parameter of RI pin.
Test	+WRIM=?	+WRIM: <type>,<width> OK or ERROR	The test command displays the list of supported <type> and <width> values.

The following table shows the +WRIM parameters.

<Parameter>	Description
< type >	0: make effective on Call 1: make effective on SMS
<width>	0: default value. // (0,1000) and (1,150) 1～2000: 1～2000ms

Example:

AT+WRIM=?
+WRIM: (0-1),(0-2000)
OK
AT+WRIM=1,1000
OK
AT+WRIM?
+WRIM: 0,1000
+WRIM: 1,1000
OK

10.1.14 +MSMPD, Enable/Disable SIM Card Hot Plug

This command can Enable/Disable SIM card hot plug feature. The default status is disable this feature. The parameter will be saved in profile and can restore at power cycle.

Command	Syntax	Response/Action	Remarks
Set	AT+MSMPD=< status>	OK Or: +CME ERROR: <err>	Enable/Disable SIM card hot plug
Read	AT+MSMPD?	+MSMPD: <status> OK	Read the current status
Test	AT+MSMPD=?	+MSMPD: (0-1) OK	

The following table shows the +MSMPD parameters.

<Parameter>	Description
<status>	0: Disable the SIM card hot plug feature 1: Enable the SIM card hot plug feature The default value is 0

Notes: This feature need HW support.

Example:

AT+MSMPD=?
+MSMPD: (0-1)
OK
AT+MSMPD=1
OK
AT+ MSMPD?
+MSMPD: 1
OK

10.1.15 +GTWD, Enable/Disable Watchdog

This command can Enable/Disable watchdog feature. The default status is disable this feature.

Command	Syntax	Response/Action	Remarks
Set	AT+GTWD=< status>	OK Or: +CME ERROR: <err>	Enable/Disable watchdog
Read	AT+GTWD?	+GTWD: <status> OK	Read the current status
Test	AT+GTWD=?	+GTWD: (0-1) OK	

The following table shows the +GTWD parameters.

<Parameter>	Description
<status>	0: Disable the watchdog feature 1: Enable the watchdog feature The default value is 0

Example:

AT+GTWD=?
+GTWD: (0-1)
OK
AT+GTWD=1
OK
AT+GTWD?
+GTWD: 1
OK

10.2 UART2 Configuration

There are two UART in Module. The primary one is called UART1 and the secondary called UART2. UART2 have two types of work mode. One is for AT command, the other is for sending/receiving user data. The default mode is for AT command.

10.2.1+GTSET="UARTMODE", switch UART2 work mode

The +GTSET="UARTMODE" command set current UART work mode, for AT command or for send/receive user data.

Command	Syntax	Response/Action	Remarks
Set	+GTSET="UARTMODE",<mode>	OK or: ERROR	Set current UART work mode

The following table shows the +UARTMODE parameters:

<Parameter>	Description
<mode>	0 – Uart2 use for AT command (default) 1 – Uart2 use for sending/receiving data, Uart1 receive data only 2 – Uart1 use for sending/receiving data, Uart2 receive data only

10.2.2+GTSET="UARTREV", report data mode

The +GTSET="UARTREV" command set current UART report data mode, for data length or for all data, or the UART1 output data len or all data. This command is only effective when the value of UART MODE is 1 or 2.

Command	Syntax	Response/Action	Remarks
Set	+GTSET="UARTREV",<mode>	OK or: ERROR	Set current UART report data mode

The following table shows the +UARTREV parameters:

<Parameter>	Description
<mode>	0 – When receive data, do not report(default) 1 – When receive data, only report data length 2 – When receive data, report all data

10.2.3+UARTSEND, Send data to UART2

This command intends to send data to UART2. This command can be used in UART1 ports to send data to UART2.

The data format is in hex. As the input command can only be character, so here use two characters to indicate one hex number. E.g.: “35” means 0x35. Module will change the format internally.

Command	Syntax	Response/Action	Remarks
Set	AT+UARTSEND=<source>,<data>	OK Or: +CME ERROR: <err>	Used to send data to UART2.
Test	AT+UARTSEND=?	+UARTSEND: <source>,<data> OK or ERROR	Return supported values

The following table shows the +UARTSEND parameters.

<Parameter>	Description
<source>	1 (For internal reason 1 indicates UART1 here) 2(For internal reason 2 indicates UART2 here)
<data>	0-F (The data should be wrap up with “”, and the valid character is 0-F)

Example:

AT+UARTSEND=2,”30313233”
OK //UART2 will output “0123”

AT+UARTSEND=?
+UARTSEND: (2),(“data”)

10.2.4UART2 use for AT Command

When use for AT command. It supports the following AT commands only:

CFSN

CGMI

CGMM

CGMR

CGREG

CGSN

CIMI

COPS

CPIN

CREG

CSQ

11 Audio

11.1 Scope

The audio control can be summarized to the following three issues:
Path: Selection of microphone and speaker to be used.
Gain: Control of volume levels for rings, voice, etc.
Algorithm: Activation of audio algorithms (echo cancellation, noise suppression and side tone).
Audio Control of Path, Gain and Algorithms is available by these two different modes sets of commands. It is advised to select the audio mode according to the application needs, either the 'Basic Audio' set or the 'Advanced Audio' set.

11.2 General Audio Commands

The following audio commands can be used in both Basic and Advanced audio modes: +CRTT, +VTD, +VTS, +CALM, +MMICG

11.2.1 +CRSL, Call Ringer Level

This command handles the selection of the incoming call ringer sound level on the current speaker of the Module. The new value remains after power cycle.

Command	Syntax	Response/Action	Remarks
Set	+CRSL=<level>	OK or: +CME ERROR: <err>	The Set command sets the call ringer and alert (SMS) level.
Read	+CRSL?	+CRSL: <level> OK	The Read command displays the current ringer alert (SMS) sound level setting.
Test	+CRSL=?	+CRSL: (list of supported <level>s) OK	The Test command displays the list of supported sound level settings.

The following table shows the +CRSL parameters.

<Parameter>	Description
<level>	1-7 Manufacturer-specific volume range. The default value is 6.

11.2.2 +CLVL, Loudspeaker Volume

This command sets the volume of the internal loudspeaker (which also affects the key feedback tone) of the Module.

Note: In this command, the new value remains after power cycle. The +CLVL command can be used even when the SIM is not inserted.

Command	Syntax	Response/Action	Remarks
Set	+CLVL=<level>	OK or: +CME ERROR: <err>	The Set command sets the internal loudspeaker volume level.
Read	+CLVL?	+CLVL: <level> OK	The Read command displays the current internal loudspeaker volume setting.
Test	+CLVL=?	+CLVL: (list of supported <level>s) OK	The Test command displays the possible loudspeaker volume settings.

The following table shows the +CLVL parameters.

<Parameter>	Description
<level>	0-6 Manufacturer-specific volume range. 0 is lowest volume (not mute). The default value is 6.

11.2.3 +CMUT, Mute/Unmute Microphone Path

This command is used to mute/unmute the currently active microphone path by overriding the current mute state. The CMUT setting should take effect only for the current call or for the next call once the command setting was typed in idle mode.

Command	Syntax	Response/Action	Remarks
Set	+CMUT=<state>	OK or: +CME ERROR: <err>	The Set command enables/disables uplink voice muting during a voice call.
Read	+CMUT?	+CMUT: <state> OK	The Read command returns the current uplink voice mute/unmute state.
Test	+CMUT=?	+CMUT: (list of supported <state>s) OK	The Test command returns the possible <state> values.

The following table shows the +CMUT parameters.

<Parameter>	Description
<state>	0 Unmute microphone path (default) 1 Mute microphone path

Example:

```
AT+CMUT=?
+CMUT:(0-1)
OK
AT+CMUT?
+CMUT: 0              //uplink voice is unmuted
OK
AT+CMUT=1                  //uplink voice is muted
OK
AT+CMUT?
+CMUT: 1
OK
AT+CMUT =2
+CME ERROR: <err>
```

11.2.4 S94, Sidetone Effect

This command reduces the microphone audio input that is routed to the selected speaker, so that people speaking will hear themselves talking.

Command	Syntax	Response/Action	Remarks
Set	ATS94=<n>	OK or: +CME ERROR: <err>	The Set command sets the sidetone status.
Read	ATS94?	+S94:<n> OK	The Read command returns the sidetone status.

The following table shows the S94 parameters.

<Parameter>	Description
<n>	0-7 Sidetone range. 0 is lowest sidetone (not mute). The default value is 004.

11.2.5 S96, Echo Canceling

This command suppresses a large amount of the output sound picked up by the input device (cancels all echo).

Command	Syntax	Response/Action	Remarks
Set	ATS96=<n>	OK or: +CME ERROR: <err>	The Set command sets the echo canceling status.
Read	ATS96?	+S96:<n> OK	The Read command returns the echo canceling status.

The following table shows the S96 parameters.

<Parameter>	Description
<n>	0-7 echo canceling range. 0 is lowest echo canceling (not mute). The default value is 004.

11.2.6 +CALM, Alert Sound Mode

This command handles the selection of the Module's Call and SMS alert sound mode. The value of the command is saved after a power cycle.

Command	Syntax	Response/Action	Remarks
Set	+CALM=<call_mode>,<SMS_mode>	OK or: +CME ERROR: <err>	The Set command sets the Call and SMS alert sound mode.
Read	+CALM?	+CALM: <call_mode>,<SMS_mode> OK	The Read command displays the current alert sound mode setting.
Test	+CALM=?	+CALM: (0-1),(0-1) OK	The Test command displays the list of supported modes.

The following table shows the +CALM parameters.

<Parameter>	Description
<call_mode>	Call alert sound mode of the Module. 0 Ring (default) 1 Silent mode (ring prevented)

<SMS_mode>	SMS alert sound mode of the Module. 0 Ring (default) 1 Silent mode (ring prevented)

Note:

- Selecting the ring mode with this command retrieves the current alert volume level setting
- SMS_mode can be omit when use Set command, then SMS_mode equal to call_mode.

11.2.7 +VTD, Tone Duration

This command handles the selection of tone duration. An integer <n> defines the length of tones emitted as a result of the +VTS command. This command does not affect the D (dial) command. In this command, the new value is saved after power down.

Note: In GSM, the tone duration value can be modified depending on the specific network.

Command	Syntax	Response/Action	Remarks
Set	+VTD=<n>	OK or: +CME ERROR: <err>	The Set command sets the tone duration.
Read	+VTD?	+VTD: <n> OK	The Read command displays the current tone duration.
Test	+VTD=?	+VTD: (list of supported <n>s) OK	The Test command displays the list of supported tone duration.

The following table shows the +VTD parameters.

<Parameter>	Description
<n>	Defines the length of tones emitted by the +VTS command. 1-255 200mS to 1S adjustable.

11.2.8 +VTS, Command-Specific Tone Duration

This command transmits a string of DTMF tones when a voice call is active. DTMF tones may be used, for example, when announcing the start of a recording period. The duration does not erase the VTD duration.

Note: In GSM, the tone duration value can be modified depending on the specific network.

If the active call is dropped in the middle of playing a DTMF tone, the following unsolicited message transfers to TE: +VTS: "Call termination stopped DTMF tones transmission".

Command	Syntax	Response/Action	Remarks
Set	+VTS=<DTMF>[,<duration>]	OK or: +CME ERROR: <err>	The Set command sets the tone and duration (if entered).

Test	+VTS=?	+VTS: (list of supported <DTMF>,(list of supported <duration>s) OK	The Test command displays the list of supported DTMF tones and tone lengths.

The following table shows the +VTS parameters.

<Parameter>	Description
<DTMF>	String of ASCII characters (0-9, #, *,A-D) String length is up to 32 characters long.
<duration>	A DTMF tone of different duration from that set by the +VTD command. 1-255 200mS to 1S adjustable..

Note: The duration defined by +VTS is specific to the DTMF string in this command only. It does not erase the duration defined by the +VTD command, and is erased when the Module is powered down. If <duration> is not defined, the +VTD value is used.

11.2.9 +MAPATH, Audio Path

This command sets/requests the active input accessory, and the output accessory for each feature. For example, you can choose the headset mic to be active, the voice and keypad feedback to go to the speaker, and the alerts and rings to go to the alert speaker. On power up, the default path, mic, speaker and alert speaker are restored.

Command	Syntax	Response/Action	Remarks
Set	+MAPATH= <channel>	OK or: +CME ERROR: <err>	The Set command sets the audio mode. The mode indicates which I/O accessories are now active for the different audio channel. The <channel> field is only used audio path
Read	+MAPATH?	+MAPATH: channel OK	The Read command returns the active input audio accessory and the output accessory for channel.
Test	+MAPATH=?	+MAPATH: (supported audio channel) OK	The Test command returns the supported audio channel.

The following table shows the +MAPATH parameters.

<Parameter>	Description
<channel>	1 Audio channel 1 2 Audio channel 2 3 PCM(G520 only)

Example:

at+mapath?
+MAPATH: 1
OK
at+mapath=2 //Swith to 2nd audio channel
OK

11.2.10+MAVOL, Volume Setting

This command enables you to determine a volume level for a particular feature via a particular accessory. The gain levels are saved in flex. Therefore, upon power up, the path active (mic, speaker and alert speaker) will have these saved gain levels.

Note: The SMS MT volume is adjusted using the +MAVOL command with type "ring". The RING value is related to the SMS alert, the MT call, and so on.

Command	Syntax	Response/Action	Remarks
Set	+MAVOL=<accy>,<feature>,<vol>	OK or: +CME ERROR: <err>	The Set command sets the volume level <n> to a certain<feature> through a certain <accy>.
Read	+MAVOL?	(Current path volume) +MAVOL: <accy>,<feature1>,vol> +MAVOL: <accy>,<feature2>,vol> +MAVOL: <accy>,<feature4>,vol> +MAVOL:	The Read command returns the volume level of all the features in the current active accessories.

		<accy>,<feature8>,vol> OK	
Test	+MAVOL=?	+MAVOL: (supported accessories),(supported features combinations),(supported volume levels)	Test command returns the supported range of volume levels, accessories and features.

The following table shows the +MAVOL parameters.

<Parameter>	**Description**	
<accy> (1-3)	1	1st channel SPK+/SPK-
	2	2nd channel AUXO+/AUXO-
	3	1 and 2
6<feature> (1-7)	1	Voice
	2	Tone
	3	1 and 2
	4	Audio
	5	1 and 4
	6	2 and 4
	7	1 and 2 and 4
<vol>	Volume level 0-6 Tone volume 0-3	

Example:

AT+MAVOL?
+MAVOL: 1,1,4
+MAVOL: 1,2,1
+MAVOL: 1,4,4

OK

AT+MAVOL=?
+MAVOL: (1-3),(1-7),(0-6)
OK
AT+MAVOL=1,7,3 //Modified all the features in the 1st channel
OK
AT+MAVOL?
+MAVOL: 1,1,3
+MAVOL: 1,2,3
+MAVOL: 1,4,3
OK
AT+MAVOL=3,7,3 //Modified all the features within the 1st channel and 2nd channel
OK

11.2.11+ MMICG, Microphone Gain Value

This command handles the selection of microphone gain values of MIC-handsets and MIC-headsets. The new value remains after power cycle.

Command	Syntax	Response/Action	Remarks
Set	+MMICG=<gain>	OK or: +CME ERROR: <err>	The Set command sets the microphone gain value.
Read	+MMICG?	+MMICG: <gain> OK	The Read command displays the current microphone gain.
Test	+MMICG=?	+MMICG: (list of supported <gain>s) OK	The Test command displays the list of supported gain values.

The following table shows the +MMICG parameters.

<Parameter>	Description
<gain>	Microphone gain values: 0-15 0 is lowest gain value (not mute); The default value is 8.

11.2.12 +MATONE，Start or stop the tone play, and the tone plays only once

Command	Syntax	Response/Action
Set	+MATONE=<state>,<tone_id>,<mix_factor>,<play_time>	OK or: +CME ERROR: <err>
Read	+MATONE?	+CME ERROR: <err>
Test	+MATONE=?	+ MATONE: <state>,<tone_id>,<mix_factor>,<play_time> OK

The following table shows the +MATONE parameters.

<Parameter>	Description
<state>	0 : stop When state=0,means the tone is stop 1 : start
<tone_id>	<tone_id> integer indicating the audio tone ID and may be: 0: aud_tone_DTMF_0 1: aud_tone_DTM F_1 2: aud_tone_DTMF_2 3: aud_tone_DTMF_3 4: aud_tone_DTMF_4 5: aud_tone_DTMF_5 6: aud_tone_DTMF_6 7: aud_tone_DTMF_7 8: aud_tone_DTMF_8 9: aud_tone_DTMF_9 10: aud_tone_DTM F_a 11: aud_tone_DTMF_b 12: aud_tone_DTMF_c 13: aud_tone_DTMF_d 14: aud_tone_DTMF_s;”*” 15: aud_tone_DTMF_p ;”#” 16: aud_tone_dial_tone 17: aud_tone_sv_subscriber_busy 18: aud_tone_sv_congestion

	19: aud_tone_sv_radio_path_ack 20: aud_tone_info_call_dropped 21: aud_tone_special_info 22: aud_tone_sv_call_waiting 23: aud_tone_sv_call_ringing 24: aud_tone_info_test
< mix_factor>	<mix_factor> integer indicating the kind of volume for tone generation; range 0 .. 7
<play_time>	<play_time> play audio time period range 100….60000

12 GPRS

12.1 GPRS Functionality

GSM 07.07 defines commands that a TE may use to control a GPRS ME via a non-multiplexed character-stream interface. This places certain limitations on the functionality of the interface. For example, it is not possible for the ME to send control information to the TE or for the TE to send commands to the ME whilst the interface is in the online data state, unless the layer 2 protocol itself supports this feature (GSM 07.60-12). However, Module-specific escape mechanism (DTR) is provided to enable the TE to switch the Module into limited online command state.

The use of a multiplexed interface, (GSM 07.10), is not considered here (See “RS232 Multiplexer Feature”). The Module-specific escape mechanism use DTR as an escape signal (following &D parameters) and designed for limited non network related commands. This specific mechanism purpose is to give the user a way to retrieve the signal strength. The time limit of consecutive DTR toggles is a minimum of 90 seconds. The Module-specific is not designed to support online command and data states both at the same time, therefore any wrong or extreme usage can cause unexpected behaviors. The basic GPRS concept is be “always connected” and there is no charge for being connected (only per real data transferred).

12.2 GPRS Commands

This section defines commands that a terminal may use to control a GPRS ME. GPRS MTs vary widely in functionality. A class A ME might support multiple PDP-types as well as circuit-switched data, and use multiple external networks QoS profiles.

At the other extreme, a class C ME might support only a single PDP-type using a single external network,

and rely on the HLR to contain the PDP context definition. A comprehensive set of GPRS-specific commands is defined below to provide the flexibility needed by the more complex ME.

The commands are designed to be expandable to accommodate new PDP types and interface protocols, merely by defining new values for many of the parameters. Multiple contexts may be activated if the interface link-layer protocol is able to support them. The commands use the extended information and error message capabilities described in this specification. For MTs of intermediate complexity, most commands have simplified forms where certain parameters may be omitted .

For the simplest MTs, and for backwards compatibility with existing communications software, it is possible to control access to the GPRS using existing modem-compatible commands. This "modem compatible" mode of operation is described below.

12.2.1+CGCLASS, GPRS Mobile Station Class

This command is used to set the Module to operate according to the specified GPRS mobile class. If the requested class is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

Command	Syntax	Response/Action	Remarks
Set	AT +CGCLASS=<class>	OK or: +CME ERROR: <err>	Set GPRS mobile class
Read	AT +CGCLASS?	+CGCLASS: <class> OK	The Read command returns the current GPRS mobile class.
Test	AT +CGCLASS=?	+CGCLASS: (list of supported <class>s) OK	The Test command is used for requesting information on the supported GPRS mobile classes.

Note: Issuing GPRS actions over a poor-quality connection may cause protocol errors and harm data validity. To prevent these problems, Module is equipped with a protection mechanism that confirms GPRS signal strength before issuing GPRS network-related commands.

The following table shows the +CGCLASS parameters.

<Parameter>	Description
<class>	String parameter that indicates the GPRS mobile class: B meaning mobile class B

Example:

AT+CGCLASS=?
+CGCLASS: (“B”)
OK

Note: If a SIM card without GPRS allowance is used:
AT+CGCLASS=?
+CGCLASS: (CC) //Note that CC is a not supported value.

12.2.2+CGDCONT, Define PDP Context

This command specifies the PDP (Packet Data Protocol) context.

Command	Syntax	Response/Action	Remarks
Set	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]]	OK or: +CME ERROR: <err>	The Set command specifies the context identification parameter values for a PDP context. A special form of the Set command, +CGDCONT= <cid> causes the values for context number <cid> to become undefined.
Read	AT+CGDCONT?	+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp>[<CR><LF> +CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<data_comp>,<head_comp> OK	The read command returns the current settings for each defined context. It will be read only “OK” without any set command.
Test	AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s), <PDP_type>, , , (list of supported <d_comp>s), (list of supported <h_comp>s)	The Test command returns the values supported as a compound value. If the ME supports several PDP types, <PDP_type>, the parameter value ranges for each

		OK	<PDP_type> are returned on a separate line.

The following table shows the +CGDCONT parameters.

<Parameter>	Description
<cid>	Numeric parameter specifying a particular PDP context definition (PDP Context Identifier). The parameter is local to the Terminal-Mobile Terminal interface and is used in other PDP context-related commands. The Test command returns the range of permitted values (minimum value=1).
<"PDP_type"> (Packet data protocol type)	String parameter (in quotation marks) specifying the type of packet data protocol: IP
<"APN"> (Access Point Name)	String parameter (in quotation marks), which is a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, the subscription value is requested.
<"PDP_address">	String parameter (in quotation marks), which identifies the ME in the address space applicable to the PDP. If the value is null or omitted, a value may be provided by the terminal during the PDP start up procedure or, failing that, a dynamic address is requested. The Read form of the command continues to return the null string even if an address has been allocated during the PDP start up procedure. The allocated address may be read using the +CGPADDR command. The default value is 0.
<d_comp>	Numeric parameter that controls PDP data compression. 0 OFF Other values are reserved. The default value is 0.
<h_comp>	Numeric parameter that controls the PDP header compression. 0 OFF 1 ON Other values are reserved. Note: Currently, only one data compression algorithm (V.42bis) is provided in SNDCP. If and when other algorithms become available, a command will be

	provided to select one or more data compression algorithms. The default value is 0.

Note: The IP address may be entered without double quotes (" ").

Example:

```
AT+CGDCONT?
OK              // Only without any set command.
AT+CGDCONT=1, “IP”,”CMNET”
OK
AT+CGDCONT=2, “IP”,”CMWAP”
OK
AT+CGDCONT?
+CGDCONT: 1,"IP","CMWAP","0.0.0.0",0,0
+CGDCONT: 2,"IP","CMNET","0.0.0.0",0,0
OK

AT+CGACT=1
OK
AT+CGDCONT?
+CGDCONT: 1,"IP","CMWAP","10.230.50.116",0,0
+CGDCONT: 2,"IP","CMNET","10.3.97.156",0,0
OK

AT+CGDCONT=?
+CGDCONT: (1-2),(“IP”),,,(0),(0,1)
OK
```

12.2.3+CGQMIN, Quality of Service Profile (Min Acceptable)

This command enables the terminal to specify the minimum acceptable profile which is checked by the ME against the negotiated profile returned in the Activate PDP Context Accept message.

Command	Syntax	Response/Action	Remarks
Set	AT+CGQMIN=<cid>[,<precedence>[,<delay>[,	OK or: +CME ERROR: <err>	The Set command specifies a profile for the context identified by the (local) context identification parameter,<cid>. As this is the

	<reliability.>[,<peak>[,<mean>]]]]]		same parameter that is used in the +CGDCONT command, the +CGQMIN command is effectively an extension of the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value.
Read	AT+CGQMIN?	+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF> +CGQMIN: <cid>,<precedence>,<delay>,<reliability.>,<peak>,<mean>[...]] OK or: +CME ERROR: <err>	The Read command returns the current settings for each defined context.
Test	AT+CGQMIN=?	+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK or: +CME ERROR: <err>	The Test command returns the parameter value ranges for each <PDP_type>

The following table shows the +CGQMIN parameters.

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. The value is from 1 to 2.
<precedence>	A numeric parameter that specifies the precedence class.
<delay>	A numeric parameter that specifies the delay class.

<reliability>	A numeric parameter that specifies the reliability class.
<peak>	A numeric parameter that specifies the peak throughput class.
<mean>	A numeric parameter that specifies the mean throughput class.

Example:

```
AT+CGQMIN=?
+CGQMIN: "IP",(1-2),(0-4),(0-5),(0-9),(0-18)
OK
AT+CGQMIN?
+CGQMIN: 1,2,4,3,9,10
+CGQMIN: 2,2,4,3,9,10
OK
```

12.2.4+CGQREQ, Quality of Service Profile (Requested)

This command enables the terminal to specify a Quality of Service Profile that is used when the ME sends an Activate PDP Context Request message to the network.

Command	Syntax	Response/Action	Remarks
Set	AT+CGQREQ=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]	OK or: +CME ERROR: <err>	The Set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. As this is the same parameter that is used in the +CGDCONT command, the +CGQREQ command is effectively an extension of the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value. A special form of the Set command, +CGQREQ= <cid>, causes the requested profile for context number <cid> to become undefined.
Read	AT+CGQREQ?	+CGQREQ: <cid>,<precedence>,<dela	The Read command returns the current settings for each defined

		y>,<reliability>,<peak>, <mean> OK	context.
Test	AT+CGQREQ=?	+CGQREQ: <PDP_type>,(list of supported<precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK	The Test command returns values supported as a compound value. If the ME supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

The following table shows the +CGQREQ parameters.

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. The value is from 1 to 2.
<precedence>	A numeric parameter that specifies the precedence class.
<delay>	A numeric parameter that specifies the delay class.
<reliability>	A numeric parameter that specifies the reliability class.
<peak>	A numeric parameter that specifies the peak throughput class.
<mean>	A numeric parameter that specifies the mean throughput class.

Example:

```
AT+CGQREQ=?
+CGQREQ: ("IP"),(1-2),(0-4),(0-5),(0-9),(1-18,31)
OK
AT+CGQREQ?
+CGQREQ: 1,2,4,3,9,10
+CGQREQ: 2,2,4,3,9,10
OK
AT+CGQREQ=1,0,,0,0,10
OK
AT+CGQREQ?
+CGQREQ: 1,0,4,0,0,10
```

+CGQREQ: 2,2,4,3,9,10

OK

12.2.5 +CGATT, GPRS Attach or Detach

This command attaches/detaches the ME to/from the GPRS service. When the command has completed, the ME remains in V.25ter command state. If the ME is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

Command	Syntax	Response/Action	Remarks
Set	AT+CGATT= <state>	OK or: +CME ERROR: <err>	The Set command attaches/detaches the ME to/from the GPRS service.
Read	AT+CGATT?	+CGATT: <state> OK	The Read command returns the current GPRS service state.
Test	AT+CGATT=?	+CGATT: (list of supported <state>s) OK	The Test command requests information on the supported GPRS service states.

Note: This command has the characteristics of both the V.25ter action and parameter commands. Therefore, it has the Read form in addition to the Execution/Set and Test forms.

The following table shows the +CGATT parameters.

<Parameter>	Description
<state>	Indicates the state of the GPRS attachment: 0 Detached. 1 Attached.

Example:

AT+CGATT=?

+CGATT: (0,1)

OK

AT+CGATT?

+CGATT: 0

OK

AT+CGATT=0

OK

12.2.6D*99, Request GPRS Service "D"

This command enables the ME to perform the actions necessary for establishing communication between the terminal and the external Packet Data Network (PDN).

The ITU V.25ter 'D' (Dial) commands causes the ME to enter the ITU V.25ter Online Data state and together with the terminal, to start the specified layer 2 protocol. The ME returns CONNECT to confirm acceptance of the command prior to entering the ITU V.25ter Online Data state. No further commands may follow on the AT command line.

The detailed behavior after the Online Data state has been entered is dependent on the PDP type, and is described briefly. GPRS attachment and PDP context activation procedures may take place prior to, or during the PDP start up if they have not already been performed using the +CGATT and +CGACT commands.

When the layer 2 protocols have terminated, either as a result of an orderly shutdown of the PDP or an error, the ME enters the ITU V.25ter command state and returns the NO CARRIER final result code.

If <called address> is supported and provided, the ME automatically sets up a virtual call to the specified address after the PDP context has been activated.

If <L2P> and <cid> are supported, the +CGDCONT, +CGQREQ and other such commands may then be used in the modem initialization AT command string to set values for PDP type, APN, QoS and so on.

If <L2P> is not supported, or is supported but omitted, the ME uses a layer 2 protocol appropriate to the PDP type.

If <cid> is not supported, or is supported but omitted, the ME attempts to activate the context using one of the following:

- Any information provided by the terminal during the PDP start up procedure. For example, the terminal may provide a PDP type and/or PDP address to the ME.
- A prior knowl , for example, the ME may implement only one PDP type.

Using the "Empty PDP type" No PDP address or APN is sent in this case and only one PDP context subscription record is present in the HLR for this subscriber.

This command may be used in both normal and modem compatibility modes.

Command	Syntax	Response/Action
Set	ATD*<GPRS_SC> [* [<called_address>] [*[<L2P>] [*[<cid>]]]]#	CONNECT or: ERROR

The following table shows the D*99 parameters.

<Parameter>	Description
<GPRS_SC> (GPRS Service Code)	Digit string (value 99) which identifies a request to use GPRS.
called_addresss>	String that identifies the called party in the address space applicable to the PDP. For communications software that does not support arbitrary characters in the dial string, a numeric equivalent may be used. Also, the comma character "," may be used as a substitute for the period character ".". For PDP type OSP: IHOSS, the following syntax may be used for <called_address>: [<host>] [@[<port>] [@ [<protocol>]]] where <host>, <port> and <protocol> are defined in "+CGDCONT,Define PDP Context". For communications software that does not support arbitrary characters in the dial string, a numeric value equivalent to the host name may be used. However, this should be avoided if at all possible.
<L2P>	String variable which indicates the layer 2 protocol to be used. For communications software that does not support arbitrary characters in the dial string, the following numeric equivalents are used: 0 NULL 1 PPP 2 PAD 3 X25 9 yyyy M-xxxx Other values are reserved and result in an ERROR response to the Set command. **Note:** V.250 (and certain communications software) does not permit arbitrary characters in the dial string. The <L2P> and <called_address> strings are therefore specified as containing digits (0-9) only.
<cid>:	Digit string which specifies a particular PDP context definition (See "+CGDCONT, Define PDP Context").

Example:

ATD*99# //Try connecting to GPRS according to the first <cid>, defined in +CGDCONT

12.2.7+CGACT, PDP Context Activate or Deactivate

This command activates/deactivates the specified PDP context(s).

Command	Syntax	Response/Action	Remarks
Set	AT+CGACT=[<state>[,<cid>[,<cid>[,]]]]	OK or: NO CARRIER or: +CME ERROR: <err>	The Set command activates/deactivates the specified PDP context(s). When the command is completed, the ME remains in V.25 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the requested state for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. If the ME is not GPRS-attached when the activation form of the command is executed, the ME first performs a GPRS attach and them attempts to activate the specified contexts. If the attach fails, the ME responds with an ERROR or, if extended error responses are enabled, with the appropriate failure-to-attach error message.
Read	AT+CGACT?	+CGACT: <cid>,<state><CR><LF> +CGACT: <cid>,<state><CR><LF> +CGACT: <cid>,<state> OK	The Read command returns the current activation states for all the defined PDP contexts.
Test	AT+CGACT=?	+CGACT: (list of supported <state>s) OK	The Test command requests information on the supported PDP context activation states.

The following table shows the +CGACT parameters.

<Parameter>	Description
<state>	Indicates the activation state of the context: 0 Non-active 1 Active
<cid>	1-2 A numeric parameter that specifies a particular PDP context definition

Example:

```
AT+CGACT=?
+CGACT: (0,1)
OK
AT+CGACT?
OK
AT+CGACT=1
ERROR       //GPRS network not present.
```

Note:

- In some GPRS networks, +CGACT is not supported. The ATD*99 # command can be used to establish a connection.
- Activating a context can take up to 150 seconds.
- Deactivating a context can take up to 40 seconds.
- When aborting a +CGACT Set command, the context is closed. This can take up to 40 seconds

12.2.8+CGPADDR, GPRS Addresses

This command reads the allocated PDP addresses for the specified context identifiers.

Command	Syntax	Response/Action	Remarks
Set	AT+CGPADDR=[<cid>[,<cid>[,]]]	+CGPADDR: <cid>,<PDP_addr>[<CR><LF> +CGPADDR: <cid>,<PDP_addr>[…]] OK or: +CME ERROR: <err	The Set command returns a list of PDP addresses for the specified context identifiers.

Test	AT+CGPADDR=?	+CGPADDR: (list of defined <cid>s) OK	The Test command returns the list of defined <cid>s.

The following table shows the +CGPADDR parameters.

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. If no <cid> is specified, the addresses for all defined context are returned.
<PDP_address>	A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.

Example:

AT+CGPADDR=?
+CGPADDR: (1,2)
OK
AT+CGPADDR=1
+CGPADDR: 1,”0.0.0.0”
OK

13 TCP/IP

13.1 Basic Mode

13.1.1 +MIPCALL, Create a Wireless Link

This command sets up a PPP (Point to Point Protocol) connection with the GGSN (Gate GPRS Support Node), and returns a valid dynamic IP for the Module.

Note: Module can't support TCP/IP stack AT command mixed with another AT command which can active the PPP or GPRS in parallel.

Module can't support TCP/IP stack AT command when voice call established.

Command	Syntax	Response/Action
Set	+MIPCALL=<Operation>[,<APN>/<phone number>[,<User name>,<Password>,[<auth>]]]	OK +MIPCALL: <local IP address> or: ERROR: <err> +MIPCALL: 0
Read	+MIPCALL?	+MIPCALL: <status>[,<IP>]
Test	+MIPCALL=?	+MIPCALL: (list of supported <operation>s)

Notes:

The +MIPCALL command does not return the prompt to the terminal until the IP is received from the provider, or time out has occurred, therefore, no other commands can be issued in the meantime.

The +MIPCALL command does not have a general ABORT mechanism; therefore a command cannot be issued until the previous command ends.

In case FTP is established and MIPCALL is set to zero, this will close and disconnect the FTP connection.

When a call exists the dynamic IP address will be returned.

For example:

AT+MIPCALL?

+MIPCALL: 1,172.17.237.80

Activating a context can take up to 150 seconds. Deactivating a context can take up to 40 seconds.

If use AT+MIPCALL=1 to activate PDP. The APN must be set by AT+CGDCONT command.

The following table shows the +MIPCALL parameters.

<Parameter>	Description
operation	0 - disconnect a link 1 - establish GPRS link
<status>	0 Disconnect 1 Connected 2 Busy(disconnecting or connecting)
"APN"	APN of service provider (in quotation marks). Contact your service provider for details.
"Phone Number"	Phone number of CSD service provider (in quotation marks). Contact your service provider for details.
"User name"	User name in provider server (in quotation marks). Contact your service provider for details.
"Password"	Password for provider server (in quotation marks). Contact your service provider for details.
“auth”	Set type of authentication 0 Don,t need authentic 1 PAP 2 CHAP
Local IP-address	IP address given by server after PPP negotiation.

Note: The "User name" and the "Password" parameters can be up to 64 characters each. The "APN" / "Phone number" parameters can be up to 50 characters each.

Example:

AT+MIPCALL=1,"internet","User1 ","Pswd" //Connecting the provider 'Orange' and getting an IP

OK

+MIPCALL: 123.145.167.230

+MIPCALL: 1,123.145.167.230

AT+MIPCALL=0 //The terminal hangs up the link

OK

AT+MIPCALL=1,"internet","User1 ","Pswd",2

OK

AT+MIPCALL?

+MIPCALL: 2

OK

+MIPCALL: 123.145.167.230

13.1.2+MGAUTH, Set type of authentication

This proprietary command allows to enter the type of authentication for a user -name (using a password) for the specified PDP context.This command is used for internal protocol.

Command	Syntax	Response/Action
Set	+MGAUTH=<cid>,<auth>,<name>,<pwd>	OK or: ERROR: <err>
Test	+MGAUTH=?	+MGAUTH: (list of supported <cid>s),(list of supported <auth>s),(max length of <name>), max length of <pwd>

The following table shows the +MGAUTH parameters.

<Parameter>	Description
cid	Digit string which specifies a particular PDP context definition (See "+CGDCONT, Define PDP Context").
auth	Set type of authentication 0 Don,t need authentic 1 PAP 2 CHAP
name	User name in provider server (in quotation marks). Contact your service provider for details.
pwd	Password for provider server (in quotation marks). Contact your service provider for details.

Example:

AT+CGDCONT=1,"IP","CMNET"
OK
AT+MGAUTH=1,2,"USER","PWD"
OK
AT+MIPCALL=1
OK
+MIPCALL: 172.29.34.127

13.1.3+MIPOPEN, Open a Socket (UDP or TCP)

This command causes the Module to initialize a new socket that waits for a connection from a remote machine or opens a common connection with a remote side (according to received parameters). Each socket allocates an accumulating buffer whose size is 1372 bytes for TCP connection and 1024 bytes for UDP connection.

Note: MIPxxx is a complete set of GPRS commands. This set should not be used with other GPRS commands, such as CGATT, CGACT, and so on.The +MIPOPEN command returns a +MIPSTAT unsolicited event if it fails, for example, if it was rejected by the remote side. This command will return in 60 sec when DNS is error.

Command	Syntax	Response/Action	Remarks
Set	AT+MIPOPEN=<Socket_ID>,<Source_Port>,<Remote_IP>,<Remote_Port>,<Protocol>	OK or: +MIPOPEN: <Socket_ID>,<State>[,<Remote_IP>,<RemotePort>] or: +MIPSTAT: <Socket_ID>,<Status> or: ERROR: <err>	The Set command returns <Remote IP> and <Remote Port> parameters only for sockets opened in Listen mode.
Read	AT+MIPOPEN?	+MIPOPEN: [<Socket_ID>] for each socket that can be opened OK	The Read command returns the numbers of the sockets that can be opened.

		or: +MIPOPEN: 0 OK if there are no free sockets.	
Test	AT+MIPOPEN=?	+MIPOPEN: (list of supported<socket_ID>s),(list of supported<source_port>s),(list of supported<"Destination_IP">s), (list of <destination_port>s),(list of supported <protocol>s) OK	

Example:

```
AT+MIPOPEN?
+MIPOPEN: 1, 2, 3, 4       //All sockets closed
OK
AT+MIPOPEN?
+MIPOPEN: 1, 3, 4         //Socket 2 opened
OK
```

The following table shows the +MIPOPEN parameters.

<Parameter>	Description
Socket_ID	A unique number that identifies a connection. Valid socket numbers - 1,2,3 and 4
Source_Port	Port of source site. Port range: 1-65535 (decimal digits)
Remote_IP	IP: IP of the remote site in the format "AAA.BBB.CCC.DDD". The range of each octet is 0-255. Value can be written in 1, 2, or 3 digits. Host name: of remote site. The host-name convention should meet the rules as describe in RFC-1035 section: 2.3 Conventions. Syntax is not validated, except the maximum length (255 characters).
Remote_Port	Port of remote site. Port range: 1-65535 (decimal digits) for outgoing connection. Port 0 for incoming connection.

Protocol	Type of protocol stack. 0 TCP 1 UDP
State	0 Inactive 1 Active

Note: Does not recommend using port numbers below 1024. These numbers are defined to be reserved for operating systems.

Example:

AT+MIPOPEN=1,1200,"123.245.213.012",1234,0 //Opening socket 1, using TCP protocol, from port 1200, targeting 123.245.213.012 port 1234

AT+MIPOPEN=2,1300,"123.133.074.192",1242,1 //Opening socket 2, using UDP protocol, from port 1300, targeting 123.133.074.192 port 1242

AT+MIPOPEN=1,1222,"123.245.213.012",1234,0 //Opening socket 1, using TCP protocol, from port 1222, targeting 123.245.213.012 port 1234

AT+MIPOPEN: //Invalid command

ERROR

AT+MIPOPEN? //Terminal checking the free sockets

+MIPOPEN: 3 4

OK

AT+MIPOPEN=1,0,"WWW.GOOGLE.COM",80,0 //TCP

OK

+MIPOPEN: 1,1

AT+MIPOPEN=2,0,"www.google.com",80,1 //UDP

OK

+MIPOPEN: 2,1

// Listen socket over TCP:

AT+MIPOPEN=1,1100,"0.0.0.0",0,0 // Listens to any port at any IP.

OK

+MIPOPEN: 1,1,122.221.32.64,1200 // Remote side connected to the listen socket.

AT+MIPOPEN=3,3212,"122.1.222.134",0,0 // Listen to any port at specific IP.

OK

+MIPOPEN: 3,1,122.1.222.134,1222 // Remote side connected to the listen socket.

OK

13.1.4+MIPCLOSE, Close a Socket

This command causes the Module to free the socket accumulating buffer and to close the socket.

Note: All data stored in the accumulating buffer will be lost.

Command	Syntax	Response/Action
Set	+MIPCLOSE=<Socket_ID>[,<Mode>]	OK +MIPCLOSE: <Socket_ID>[,<number_of_acknowledged_bytes>],<close_type> or: ERROR
Read	+MIPCLOSE?	+MIPCLOSE: [<socket_ID>] OK (for all ACTIVE sockets) or: +MIPCLOSE: 0 OK (if no active sockets)
Test	+MIPCLOSE=?	+MIPCLOSE: (1-4),(0-1) OK

The following table shows the +MIPCLOSE parameters.

<Parameter>	Description
<Socket_ID>	Unique number that identifies a connection. Valid socket numbers - 1, 2, 3 and 4
<Mode>	This value only used for TCP connection. 0 -- Wait FIN ack from Server (default) 1 – Do not wait FIN response from server.
<number_of_acknowledged_bytes >	Total number of bytes that were acknowledged.
<close_type>	Connection close type:

	0 - Connection was closed correctly. 1 - The remote side didn't reply, so connection closed by close timeout. 2 - Other (The remote side replied with RST, Re-transmission timeout occurred, etc.).

Example:

```
AT+MIPCLOSE=?
+MIPCLOSE: (1-4),(0-1)
OK
AT+MIPCLOSE?
+MIPCLOSE: 0              //No opened sockets
OK
AT+MIPCLOSE=1
OK
+MIPCLOSE: 1,0      // Socket 1 closed. The remote side replies with ACK. Need wait few seconds.
AT+MIPCLOSE=1,1
+MIPCLOSE: 1,2      // Socket 1 closed immediately. The <close type> indicate 2.
OK
AT+MIPCLOSE=3         //The terminal closes the opened socket
OK
+MIPCLOSE: 3,1024,2         //Socket 3 closed. Ack indication enabled - 1024 bytes were acked. The remote side did reply with RST.
AT+MIPCLOSE?         //Sockets 1 and 2 are opened
+MIPCLOSE: 1,2
OK
```

13.1.5+MIPSETS, Set Size and Timeout for Automatic Push

This command causes the Module to set a watermark in the accumulating buffer and set timeout. When the watermark is reached, data is pushed from the accumulating buffer into the protocol stack.
Timeout is used to define interval of time between MIPSEND command and time when data will be automatically pushed from the accumulating buffer into the protocol stack.
Data chunks between the terminal and the Module are limited to be smaller than 600 characters (1200

characters in coded form). In order to reduce the overhead of sending small amounts of data over the air, the Module uses an accumulating buffer. The terminal can specify a watermark within the accumulating buffer size limits to indicate how much data should be accumulated. When the data in the accumulating buffer exceeds the watermark, only data equal to the watermark is sent. Data remaining in the buffer is sent with the next packet.

Arriving data to accumulating buffer triggers a start of time (defined in timeout) countdown. When counter reaches zero, data is moved into the protocol stack. If new data arrived before time is reached zero, it is re-initialized. If data in accumulating buffer reached watermark it is pushed to the accumulating buffer as usual, but if after automatic push there is some remaining data, time countdown is started.

Note: If there is data in the accumulating buffer, the +MIPSETS command will be rejected.

Command	Syntax	Response/Action	Remarks
Set	+MIPSETS=<Socket_ID>,<Size>[,<Timeout>]	OK or: ERROR +MIPSETS: <err>	Timeout is defined in milliseconds.
Read	+MIPSETS?	+MIPSETS: [<Socket_ID>,<Current Size Settings>,< Timeout>] OK For all ACTIVE sockets.	
Test	+MIPSETS=?	+MIPSETS: (1-4),(list of supported <size>s),),(list of supported <Timeout>s) OK	

The following table shows the +MIPSETS parameters.

<Parameter>	Description
Size	Size of the buffer 1< = size <= 2048 The default value is 1372.
Timeout	0 - 1000 mS 0 means no timeout is used (default).
Extended err	3 Operation not allowed

Example:

AT+MIPSETS=1,340 //Asks the Module to accumulate 340 bytes on socket 1 prior to sending (socket should be activated by the +mipopen command)

+MIPSETS: 0

OK

AT+MIPSETS=2,400 //Asks the Module to accumulate 400 bytes on socket 2 prior to sending

+MIPSETS: 0

OK

AT+MIPSETS=?

+MIPSETS: (1-4),(1-2048),(0-1000)

OK

AT+MIPSETS?

+MIPSETS: 1,200,0//Information provided only for active sockets

+MIPSETS: 2,400,0//Information provided only for active sockets

OK

AT+MIPSETS=1,200,50 //Asks the Module to send all accumulated data after 50 msec of receiving data in mipsend command.

+MIPSETS: 0

OK

AT+MIPSETS?

+MIPSETS: 1,200,50

+MISETS: 2,400,0

OK

13.1.6+MIPSEND, Send Data

This command causes the Module to store the data that the terminal provides in the accumulating buffer, and then send this data using an existing protocol stack when the amount of data reaches the predefined amount (see “+MIPSETS, Set Size and Timeout for Automatic Push” on. Before sending data, a valid connection must be created using the +MIPCALL and +MIPOPEN commands.

Recommends that the terminal sets the watermark in the accumulating buffer prior to this command, using the +MIPSETS command. By default, the watermark is set to 2048 bytes of data.

Command	Syntax	Response/Action	Remarks
Set	+MIPSEND=<Socket_ID>,<	ERROR	Data in the +MIPSEND command is limited to 1024

	Data>	+MIPSEND: <Socket_ID>,<Status>,<FreeSize>	characters (2048 in coded form). <Status>: 0 - Success 1 - Socket is flowed off
Read	+MIPSEND?	+MIPSEND <Socket_ID>,<FreeSize>>[<Socket_ID>,FreeSize>]<CR><LF> OK For all ACTIVE sockets.	

The following table shows the +MIPSEND parameters.

<Parameter>	**Description**
<socket_ID>	1,2,3,4 Number of valid socket
<FreeSize>	Free space in current buffer. Free size is calculated from the 2048. 0< Free Size < 2048
<Data>	User data string is sent encoded with 0-F hexadecimal digits (String ends with a <CR>)

Example:

```
(Socket 4 was not opened using +MIPOPEN AT command)
AT+MIPSEND=4,"4444"
ERROR
AT+MIPSEND=1,"4444"
+MIPSEND: 1,0,2046                //2048- 2 chars 'DD' = 2046
OK
AT+MIPSEND=?
ERROR
AT+MIPSEND?
+MIPSEND: 1,2048
+MIPSEND: 2,2048          //Sockets 1 and 2 were opened using + MIPOPEN AT command
OK
```

13.1.7+MIPPUSH, Push Data into Protocol Stack

This command causes the Module to push the data accumulated in its accumulating buffers into the protocol stack. It is assumed that before using this command, some data should exist due to previous +MIPSEND commands.

Command	Syntax	Response/Action	Remarks
Set	+MIPPUSH=<Socket_ID>[,<"Destination_IP">,<Destination_Port>]	+MIPPUSH: <Socket_ID>,<Status>[,<accumulated_sent_length>] OK or: ERROR	Optional parameters are used only for UDP connections. If the Destination IP and Destination Port are not provided by the user, a datagram is sent to the last target (or the default target provided by the +MIPOPEN command). <accumulated_sent_length> - this parameter counts how many bytes were sent to the remote side by the Module TCP/IP stack. When user open socket, <accumulated_sent_length> initialized to zero. Size of <accumulated_sent_length> is four octets unsigned digit (0-4294967295). <Status>: 0 - Success 1 - socket is flowed off 2 - there is no data in socket to send
Read	+MIPPUSH?	MIPPUSH: [<socket_ID>] OK	
Test	+MIPPUSH=?	MIPPUSH=<socket_ID>,<IP>,<Port> OK	

The following table shows the +MIPPUSH parameters.

<Parameter>	Description
Socket_ID	1,2,3,4Number of valid socket
Destination_IP	IP of destination site in the format AAA.BBB.CCC.DDD. The value can be written in1, 2 or 3 digits.
Destination_Port	0-65535Port of destination site. Written in decimal digits.

Example:

AT+MIPPUSH=1 //Terminal asks the Module to flush the buffer in socket 1 (was opened using the +MIPOPEN command)
+MIPPUSH: 1,0
OK

13.1.8+MIPFLUSH, Flush Data from Buffers

This command causes the Module to flush (delete) data accumulated in its accumulating buffers.

Command	Syntax	Response/Action
Set	+MIPFLUSH = <Socket_ID>	+MIPFLUSH: <Socket_ID> OK or: ERROR
Read	+MIPFLUSH?	+MIPFLUSH: [<socket_ID>] OK
Test	+MIPFLUSH=?	+MIPFLUSH=(<Socket_ID>) OK

The following table shows the +MIPFLUSH parameters.

<Parameter>	Description
Socket_ID	1,2,3,4 - Number of valid sockets

Example:

AT+MIPFLUSH=2 //Socket number 2 was previously opened using the +MIPOPEN command

+MIPFLUSH: 2

OK

AT+MIPFLUSH=5

ERROR

AT+MIPFLUSH?

+MIPFLUSH: 1, 2

OK

13.1.9+MIPRUDP, Receive Data from UDP Protocol Stack

This unsolicited event is sent by the Module to the terminal when data is received from the UDP protocol stack.

Set Command Event

+MIPRUDP: <Source_IP>,<Source_Port><socket_ID>,<Left>,<Data>

The following table shows the +MIPRUDP parameters.

<Parameter>	Description
Source_IP	IP of the source
Source_Port	Port of the source
Socket_ID	1,2,3,4 - Number of valid sockets.
Left	Size of received Data still left in protocol stack.
Data	Data string received with 0-F hexadecimal digits. String ends with a <CR>.

Example:

+MIPRUDP: 172.16.3.135,222,2,0,44444444

13.1.10 +MIPRTCP, Receive Data from TCP Protocol Stack

This unsolicited event is sent by the Module to the terminal when data is received from the TCP protocol stack.

Set Command Event

+MIPRTCP: <socket_ID>,<Left>,<Data>

The following table shows the +MIPRTCP parameters.

<Parameter>	Description
Socket_ID	1,2,3,4 - Number of valid sockets.
Left	Size of received Data still left in protocol stack.
Data	Data string received with 0-F hexadecimal digits. String ends with a <CR>.

Example:

+MIPRTCP: 3,0,7171

13.1.11+MIPDSETS, Set Size and Timeout for Output Received Data

This command causes the Module to set a max length and time span when send out data to user.

Command	Syntax	Response/Action	Remarks
Set	+MIPDSETS=<Socket_ID>,<length>[,<TimeSpan>]	OK or: ERROR +MIPDSETS: <err>	TimeSpan is defined in milliseconds.
Read	+MIPDSETS?	+MIPDSETS: [<Socket_ID>,<Current length Settings>,< TimeSpan>] OK For all ACTIVE sockets.	
Test	+MIPDSETS=?	+MIPDSETS: (1-4),(list of supported <length>s),),(list of supported <TimeSpan>s) OK	

The following table shows the +MIPDSETS parameters.

<Parameter>	Description
length	Max length when send out data:

	128< = size <= 2048 The default value is 1372.
TimeSpan	0 - 1000 mS 0 means no timeSpan is used (default).

Example:

AT+MIPDSETS=1,256,500
OK
When received 512 bytes from network, there are two +MIPRUDP message report to user:
+MIPRUDP: 172.16.3.135,222,2,256,313233……..373839 // the first 256 bytes
// time span is 500ms
+MIPRUDP: 172.16.3.135,222,2,0,313233……..373839 // the last 256 bytes

13.1.12 +MIPSTAT, Status Report

This unsolicited event is sent to the terminal indicating a change in status. Currently there are two possible sources of failure, a broken logical connection or a broken physical connection.
Syntax
+MIPSTAT: <socket_ID>,<n>[,<number_of_acknowl d_bytes >]
The following table shows the +MIP STAT parameters.

<Parameter>	**Description**
<Socket_ID>	A unique number that identifies a connection. Valid socket numbers - 1, 2, 3 and 4
<n>	0 - ACK indication 1 - Broken protocol stack 2 - Connection closed automatically due to non – fatal alert
<number_of_acknowl d_bytes>	Total number of bytes that were acknowledged

Example:

+MIPSTAT: 1,2

13.1.13 +MIPCONF - Configure Internal TCP/IP Stack

This command allows configuring TCP stack parameters, such as re-transmissions number, upper and bottoming limits of re-transmission timeout, close delay. It can be used to configure TCP socket parameters before socket activation. Configuration values will be stored in Module until power circle. This command must used under MIPCALL is enabled.

Command	Syntax	Response/Action	Remarks
Set	AT+MIPCONF=<socket_ID>[[,<retr_num>][,<min_TO>][,<max_TO>][,<max_close_delay>][,<is_nack_ind_req>]]	OK or: +CME ERROR: <err>	The Set updates TCP stack configuration parameters.
Read	+MIPCONF?	+MIPCONF: 1,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req><CR><LF> +MIPCONF: 2,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req><CR><LF> +MIPCONF: 3,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req><CR><LF> +MIPCONF: 4,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req><CR><LF> OK	The read command returns current settings of TCP stack parameters.
Test	+MIPCONF=?	+MIPCONF: (1-4),(1-12),(1-10),(10-600),(1-75),(0-2) OK	The Test command returns the possible parameters

			values. Time values can be inserted with resolution of 100 milliseconds.

Parameter	Description
<socket_ID>	Number of configured TCP socket (1 to 4)
<retr_num>	Number of re-transmissions (1 to 12) Default: 5
<min_TO>	Bottom limit to re-transmit timeout (100 ms to 1 sec.) Default: 5*100mS
<max_TO>	Upper limit to re-transmit timeout (1 sec. to 60 sec.) Default: 60
<max_close_delay>	Closing delay required by RFC 793 (100 ms to 7500 ms) Default: 75*100mS
<is_nack_ind_req>	NACK/ACK TCP indication feature. Activating this parameter enables Module to report the user, in case of losing a TCP connection, what data was received by the remote TCP layer. 0 - feature inactive. 1 - NACK indication active. 2 - ACK indication active. • Default value - 0 This parameter resets after power cycle.

Example:

```
AT+MIPCONF=2,5,10,600,75,2
OK
AT+MIPOPEN=2,0,"66.249.87.99",80,0
OK
+MIPOPEN: 2,1
AT+MIPSETS=2,10
+MIPSETS: 0
OK
```

AT+MIPSEND=2,"474554202F20485454502F312E300D0A486F73743A207777772E676F6F676C652E636F6D0D0A0D0A"

+MIPPUSH: 2,0,40

+MIPSEND: 2,0,2048

OK

+MIPXOFF: 2

AT+MIPSEND=2,"474554202F20485454502F312E300D0A486F73743A207777772E676F6F676C652E636F6D0D0A0D0A"

+MIPSEND: 2,1,1372

OK

+MIPSTAT: 2,0,30

+MIPXON: 2

+MIPSTAT: 2,0,40

+MIPRTCP: 2,530,485454502F312E312033303220466F756E640D0A4C6F636174696F6E3A20687474703A2F2F7777772E676F6F676C652E636F2E696C2F63786665723F633D505245462533443A544D2533443131313935

+MIPRTCP: 2,450,31343833323A5325334467384A637631426A5458472D30636A5926707265763D2F0D0A5365742D436F6F6B69653A20505245463D49443D3639303762623837353138626632333373A43523D313A544D3D

+MIPRTCP: 2,370,3131313935313438333233A4C4D3D3131313935313438333233A533D644F6564767A6C34765F7059475A384A3B20657870697265733D53756E2C2031372D4A616E2D323033382031393A31343A30372047

+MIPRTCP: 2,290,4D543B20706174683D2F3B20646F6D61696E3D2E676F6F676C652E636F6D0D0A436F6E74656E742D547970653A20746578742F68746D6C0D0A5365727665723A204757532F322E310D0A436F6E74656E

+MIPRTCP: 2,210,742D4C656E6774683A203231370D0A446174653A205468752C203233204A756E2032303030352030383

+MIPRTCP: 2,130,484541443E3C5449544C453E333032204D6F7665643C2F5449544C453E3C2F484541443E3C424F44593E0A3C48313E333032204D6F7665643C2F48313E0A54686520646F63756D656E7420686173206D

+MIPRTCP:

2,50,6F7665640A3C4120485245463D22687474703A2F2F7777772E676F6F676C652E636F2E696C2F63786665723F633D505245462533443A544D25334431313139353134383323A5325334467384A637631

+MIPRTCP: 2,0,426A5458472D30636A5926616D703B707265763D2F223E686572653C2F413E2E0D0A3C2F424F44593E3C2F48544D4C3E0D0A

+MIPSTAT: 2,1,40

13.1.14 +MPING, Start Ping Execution (ICMP Protocol)

This command allows verifying IP connectivity to another remote machine (computer) by sending one or more Internet Control Message Protocol (ICMP) Echo Request messages.

The receipt of corresponding Echo Reply messages are displayed, along with round trip times.

Valid IP address must be obtained using AT+MIPCALL command prior to starting ping execution.

Only one ping request execution will be allowed at any given moment.

Command	Syntax	Response/Action	Remarks
Set	+MPING=<mode>[,<"Destination_IP/hostname">[,<count>[,<size>[,<TTL>[,<TOS>[,<TimeOut>]]]]]]	OK or: +CME ERROR: <err>	The set command shall send a <count> Internet Control Message Protocol (ICMP) Echo Request messages to a target node defined by <"Destination IP/hostname"> parameter. If <mode> is equal 0, no parameters trailing <mode> parameter are allowed, otherwise ERROR message will be reported to DTE. If <mode> is equal 0, MS will abort sending Echo Request messages if ping request is in process, otherwise ERROR message will be reported to DTE.
Unsolicited Response		+MPING: <"Destination_IP">,<type>,<code> [,<RTT>]	The receipt of corresponding ICMP Echo Reply messages will be displayed within unsolicited responses, along with round trip times.
Read	+MPING?	+MPING: <count>,<size>,<TTL>,<TOS>,<TimeOut> OK	The read command displays currently selected parameters values for +MPING set command. If ping sending procedure is currently in process then user selected parameters for AT+MPING command will be

			displayed, otherwise default parameter values will be displayed
Test	+MPING=?	+MPING: <count>,<size>,<TTL>,<TOS>,<TimeOut> OK	The test command displays all supported parameters values for +MPING set command.

The following table shows the +MPING command parameters.

<Parameter>	Description
<mode>	0 - Abort current ping request execution. 1 - Launch new ping request. There is no default value - appropriate ERROR will be displayed if parameter is not supplied.
<"Destination_IP/hostname">	Specifies the target machine (computer), which is identified either by IP address 4 octets long in dotted decimal notation or by host name of maximum 255 (not including double quotes) characters long in dotted notation. Each octet of IP address has valid value range of 0 to 255. Host names are not case sensitive and can contain alphabetic or numeric letters or the hyphen. There is no default value - appropriate ERROR will be displayed if parameter is not supplied.
<count>	Specifies a number of Internet Control Message Protocol (ICMP) Echo Request messages to send. Valid value range is from 1 to 255. The default value is 4.
<size>	Specifies the length, in bytes, of the Data field in the Echo Request messages sent. The minimum size is 0.The maximum size is 1372. The default value is 32.
<TTL>	Time To Live (TTL). Specifies number of hops (hop is one step, from one router to the next, on the path of a datagram on an IP network), which the Echo Request message may be routed over. The value is set by using TTL field in IP header. Valid value range is from 1 to 255. The default value is 64.
<TOS>	The Type Of Service (TO S) is for internet service quality selection. The type of

	service is specified along the abstract parameters precedence, delay, throughput, and reliability. These abstract parameters are to be mapped into the actual service parameters of the particular networks the datagram traverses. Minimum and maximum values for TOS are 0 and 255 respectively. Refer to RFC 791 and RFC 2474 which obsoletes RFC 791 for TOS defined values. The default value is 0.
<TimeOut>	Specifies the amount of time, in milliseconds, to wait for the Echo Reply message that corresponds to a sent Echo Request message, measured after Echo Request message was sent. If the Echo Reply message is not received within the time-out, +MPINGSTAT

The following table shows the +MPING unsolicited response parameters.

<Parameter>	**Description**
<"Destination_IP">	Specifies the message sender machine (computer), which is identified by IP address 4 octets long in dotted decimal notation. Each octet of IP address has valid value range of 0 to 255. The message sender machine (computer) may be either the target of Echo Request message (if a response was an Echo Reply message) or a gateway (router) in a path of Echo Request message passage for any other ICMP response message.
<type>	The first octet of the ICMP header is a ICMP type field, which specifies the format of the ICMP message. Refer to IETF RFC 792 for <type> valid values.
<code>	The reasons for the non-delivery of a packet are described by code field value of ICMP header. Every <type> has its own defined <code> values. Refer to IETF RFC 792 for <code> valid values.
<RTT>	Specifies Round Trip Time (RTT) measured in milliseconds. This parameter will be reported in command response only if Echo Reply message was received.

Note:

Ping request is being executed from the moment the valid AT+MPING set command was received by Module until +MPINGSTAT unsolicited report with <status> equal either to 0 or 2 is sent to DTE or ping request execution was aborted with AT+MPING=0 command. Refer to description of +MPINGSTAT

unsolicited response for details.

In some cases, the reply message for an Echo Request message might be not an Echo Reply messages but rather some other ICMP message, which is reporting an error in datagram processing. For purpose of reporting an exact type of response for sent Echo Request message, unsolicited response includes <type> and <code> fields. The first octet of the data portion of the IP datagram is an ICMP <type> field. The value of this field determines the format of the remaining data. The <type> and <code> fields jointly define ICMP message type.

For example, a case when an Echo Request message encapsulated in IP datagram to be forwarded by a gateway has exceeded TTL (equal zero). In this case the gateway must discard the datagram and may return an ICMP Time Exceeded message.

Example:

```
AT+MIPCALL=1,"cmnet"
OK
+MIPCALL: 10.170.4.111
AT+MPING=1,"10.170.4.112"        // Ping remote computer using default parameters
OK
+MPING: "10.170.4.112",0,0,400      //Echo Reply message received, RTT is 400 ms.
+MPING: "10.170.4.112",0,0,420
+MPING: "10.170.4.112",0,0,440
+MPING: "10.170.4.112",0,0,410
//Ping request execution is completed. Four Echo Request messages were sent, and four
//Echo Reply messages were received. Average RTT is 417 milliseconds.
+MPINGSTAT: 0,"10.170.4.112",4,4,417
```

13.1.15 +MPINGSTAT, Status Update for +MPING Execution

This is the unsolicited response that the Module sends to the terminal to inform of ping execution status update and provides summary statistics of ping request when ping request execution is completed.

Command	Syntax	Response/Action	Remarks
Unsolicited Response		+MPINGSTAT: <status>[,<"Destination_IP">,<Sent Messages>,<Received Messages> [,<Average RTT>]]	The unsolicited response that the Module sends to the terminal to inform it with ping execution status update. This response also provides a statistics summary of ping request when ping request execution is completed.

The following table shows the +MPINGSTAT unsolicited response parameters.

<Parameter>	Description
<status>	Specifies a status of ping request execution. Defined values: 0 - The unsolicited response with this <status> will be sent to DTE upon completion of ping request. If ping request was aborted or socket connection was terminated for any reason, this unsolicited response will not be reported to DTE. 1 - The unsolicited response with this <status> will be sent to DTE if no ICMP reply message was received within timeout. 2 - The unsolicited response with this <status> will be sent to DTE if socket connection was terminated for any reason. This status essentially means that ping request execution was aborted. 3 - Flow Control OFF. The unsolicited response with this <status> will be sent to DTE if phone doesn't have enough memory to process sending an Echo Request message. 4 - Flow Control ON. The unsolicited response with this <status> will be sent to DTE if phone has enough memory to send an Echo Request message after flow control was OFF.
<"Destination_IP">	Specifies the target machine (computer) for ping request, which is identified by IP address 4 octets long in dotted decimal notation. Each octet of IP address has valid value range of 0 to 255.
<Sent Messages>	Specifies a total number of sent Echo Request messages.
<Received Messages>	Specifies a total number of received Echo Reply messages corresponding to Echo Request messages.
<Average RTT>	Specifies average Round Trip Time (RTT) for this ping request. This value will be reported if and only if <Received Messages> value is greater than zero. Calculation of this value comprises of accumulating all RTT values and dividing total accumulated RTT by <Received Messages> value. Only an integral part of a result will be reported and any digits of a fraction part will be truncated.

Example:

```
AT+MIPCALL=1,"internet"
OK
```

+MIPCALL: 10.170.4.111

//Ping host www.sohu.com 3 times with <TTL>=255. All other parameters are default.

AT+MPING=1,"www.sohu.com",3,,255 OK

//ICMP Echo Reply message received, RTT is 522 ms.

+MPING: "121.14.0.17",0,0,522

+MPINGSTAT: 1 // No corresponding reply within timeout.

+MPINGSTAT: 3 // Flow Control OFF.

+MPINGSTAT: 4 // Flow Control ON, a new Echo Request message is sent immediately.

+MPING: "121.14.0.17",0,0,638

//Ping request execution is completed. Statistics displayed to terminal. Three Echo Request messages were sent, and two Echo Reply messages were received. Average RTT is 580 milliseconds.

+MPINGSTAT: 0," 121.14.0.17",3,2,580

//Ping host www.sohu.com 1 time with <TTL>=1 and <size>=1372.

AT+MPING=1,"www.sohu.com",1,1372,1

OK

//ICMP Time Exceeded message received. TTL expired in transit.

+MPING: "192.168.252.65",11,0

//Ping request execution is completed.

+MPINGSTAT: 0," 121.14.0.17",1,0

13.1.16 +MSDNS, Set DNS IP Address

This command set/read DNS (Domain Name Server) IP address (primary/secondary) for each socket. If the user doesn't specify DNS servers by AT+MSDNS, Module will use default DNS from NW. The defined value(s) will be saved during disconnect PDP context (can be used in next PDP context), but will reset after power cycle.

Command	Syntax	Response/Action
Set	AT+MSDNS=[<Socket_ID>[,<Primary_DNS_server_IP>[,<Secondary_DNS_server_IP>]]]	OK or: +CME ERROR: <err>
Read	AT+MSDNS?	+MSDNS: 1,<Primary_DNS_server_IP>,<Secondary_DNS_server_IP><CR><LF> +MSDNS: 2,<Primary_DNS_server_IP>,<Secondary_DNS_server_I

		P><CR><LF> +MSDNS: 3,<Primary_DNS_server_IP>,<Secondary_DNS_server_IP><CR><LF> +MSDNS: 4,<Primary_DNS_server_IP>,<Secondary_DNS_server_IP><CR><LF> <CR><LF> OK
Test	AT+MSDNS=?	+MSDNS: (List of supported <Socket_id>s),(<IP>),(<IP>) OK

The following table shows the +MSDNS parameters.

<Parameter>	Description
<Socket_ID>	A unique number that identifies a connection (provided by the terminal application). 0 - Invalid socket number 1,2,3,4 - Valid socket number 5 - Valid socket number dedicated to +MPING.
<Primary_DNS_server_IP>,<Secondary_DNS_server_IP>	IP of the destination site in the format "AAA.BBB.CCC.DDD". The range of each octant is 0-255. The value can be written in 1, 2, or 3 digits.

Example:

```
AT+MSDNS=?
+MSDNS: (1-5),(<IP>),(<IP>)
OK
AT+MSDNS?                // read when MIPCALL is disconnected
+MSDNS: 1,"0.0.0.0","0.0.0.0"
+MSDNS: 2,"0.0.0.0","0.0.0.0"
+MSDNS: 3,"0.0.0.0","0.0.0.0"
+MSDNS: 4,"0.0.0.0","0.0.0.0"
```

```
+MSDNS: 5,"0.0.0.0","0.0.0.0"
OK
AT+MSDNS=2,"212.150.49.10","206.49.94.234"     //set socket 2 prim & sec DNS
OK
AT+MSDNS=4,"62.120.55.10"                      //set socket 4 prim DNS only
OK
AT+MSDNS=5,"212.150.49.10","206.49.94.234"     //set socket 5 prim & sec DNS
OK
AT+MSDNS?          // read when MIPCALL is disconnected
+MSDNS: 1,"0.0.0.0","0.0.0.0"
+MSDNS: 2,"212.150.49.10","206.49.94.234"
+MSDNS: 3,"0.0.0.0","0.0.0.0"
+MSDNS: 4,"62.120.55.10","0.0.0.0"
+MSDNS: 5,"212.150.49.10","206.49.94.234"
OK
```

13.1.17 +MIPODM, Open a Socket (UDP or TCP) in Online Data Mode

This command causes the Module to initialize a new socket that waits for a connection from a remote machine or opens a common or TCP connection with a remote side (according to received parameters) and switch it to Online (raw data transfer) Data Mode and open a connection with a remote side.

Notes: MIPxxx is a complete set of GPRS commands. This set should not be used with other GPRS commands, such as CGATT, CGACT, and so on. Online Data Mode allows the user to transfer raw data from terminal to Network and vice versa over a GPRS channel. Currently, only RS232 connection to terminal with hardware flow control is supported.

Each socket allocates an accumulating buffer whose size is 1372 bytes. When the user sends amount of data, less then buffer size, the data is being sent to Network after a spooling timeout (200 mS), otherwise the data is being sent to Network immediately. Only one socket is allowed at the same time in Online Data Mode.

The +MIPODM command returns a +MIPSTAT <Socket_ID><Error> unsolicited event if it fails. For example, if it was rejected by the remote side.

Command	Syntax	Response/Action	Remarks
Set	AT+MIPODM= <Socket_ID>, <Source Port>, <Remote IP>, <Remote Port>, <Protocol>,	OK or: +MIPODM: <Socket_ID>, <State>[, <Remote IP>, <Remote	The Set command returns <Remote IP> and <Remote Port> parameters only for sockets opened in Listen

	<Pseudo-Command Mode On/Off>	Port>] or: +MIPSTAT: <Socket_ID>,<Status> or: ERROR: <err>	mode.
Read	AT+MIPODM?	+MIPODM:[<Socket_ID>] for each socket that can be opened or: +MIPODM 0,0 if there are no free sockets.	When a socket opens in Online Data Mode, the command returns actual Socket_ID value a‘d”'1' value (active). Module will be in pseudo-command mode for receiving the command.
Test	AT+MIPODM=?	+MIPODM: (list of supported <socket_ID>s),(list of supported <source port>s),(list of support”d<"Destination”IP">s), (list of <destination port>s),(list of supported <protocol>s), (list of supported <Pseudo-Command Mode state>s)	

The following table shows the +MIPODM parameters.

<Parameter>	**Description**
Socket_ID	A unique number that identifies a connection. Valid socket number–s - 1,2,3 and 4
Source Port	Port of source site. Port range: 1-65535 (decimal digits)
Remote IP	IP of the remote site in the form“t "AAA.BBB.CCC.”DD". The range of each octet is 0-255. The value can be written in 1, 2, or 3 digits. Host-name of remote site. The host-name convention should meet the rules

	as describe in RFC-1035 section: 2.3 Conventions. Syntax is not validated, except the maximum length (255 characters).
Remote Port	Port of remote site. Port range: 1-65535 (decimal digits) for outgoing connection. Port 0 for incoming connection.
Protocol	Type of protocol stack. 0 TCP 1 UDP
State	0 Inactive 1 Active
Pseudo-Command Mode On/Off	Optional parameter enables / disables Pseudo Command Mode when ODM executed and Module is in PREMUX state. 0 Enable (default value, when Module is in PREMUX state). 1 Disable.

Notes: It does not recommend using port numbers below 1024. These numbers are defined to be reserved for operating systems.

Example:

Opening socket 1 in Online Data Mode, using TCP protocol, from port 1104, designation IP 123.245.213.012, designation port 1124:

AT+MIPODM=1,,"172.90.237.21",1124,0

OK

+MIPODM: 1,1

Enter invalid command format:

AT+MIPODM

ERROR

Check opened in Online Data Mode socket state when Module is pseudo-command mode:

AT+MIPODM?

+MIPODM: 1,1

OK

Listen socket over TCP:

AT+MIPODM=1,1104,"0,0.0.0",0,0 // Source port must confirmed in TCP mode.

OK

+MIPODM: 1,1,122.221.32.64,1200 // Remote side connected to the listen socket.

13.1.18 +MIPXOFF, Flow Control - Xoff

This command is the unsolicited response that the Module sends to the terminal to stop sending data when it does not have enough memory to process new +MIPSEND requests. The Module uses the accumulating buffer prior to pushing data into the protocol stack. This memory resource is protected by a Xoff_upper watermark.

Event:

+MIPXOFF: <Socket ID>

Example:

+MIPXOFF: //The Module detects that the accumulating buffer 1 has reached its Xoff watermark. From this point, the terminal is not allowed to send data, until it receives the +MIPXON command.

13.1.19 +MIPXON, Flow Control - Xon

This command is the unsolicited event that the Module sends to the terminal when it detects that it has free memory in the accumulating buffer and can process new +MIPSEND requests, after the +MIPXOFF event.

Event:

+MIPXON: <Socket ID>

Example:

+MIPXON: 1 //The Module pushed the data into the protocol stack on socket 1 and is able to handle more data from the terminal.

13.1.20 +MIPDNS, Resolve Domain name

This command is used to resolve the domain name.

Command	Syntax	Response/Action	Remarks
Set	+ MIPDNS =<"domain name">	+MIPDNS: <"domain name">,< IP> OK or: ERROR	The set command can resolve the domain name specified by the user. If success, It will return the corresponding IP, ERROR otherwise.

Example:

AT+MIPDNS="baidu.com"
+MIPDNS: "baidu.com",220.181.111.186
OK

13.1.21 +MIPNTP, Synchronize the local time via NTP

This command causes the Module to synchronize the local time from the NTP time server.

Command	Syntax	Response/Action
Set	+ MIPNTP=<Remote_IP>, <Remote_Port>	OK +MIPNTP: <Result> or: ERROR: <err>
Read	+MIPNTP?	+MIPNTP: <Remote_IP>,<Remote_Port>
Test	+MIPNTP=?	+MIPNTP((list of supported<”Remote_IP”>s), list of supported<Remote_Port>s)

The following table shows the +MIPNTP parameters.

<Parameter>	Description
Remote_IP	The address of the NTP time server which could be a dotted decimal IP or a domain name.
Remote_Port	The port of the NTP time server.
Result	1:Successfully synchronize the local time; 0: Fail to synchronize to local time.

Example:

```
at+mipntp="202.120.2.101",123
OK
+MIPNTP: 1
at+cclk?
+CCLK: "13/09/27, 05:28:48 +00"
OK
```

13.1.22 +MIPREAD, Receive data from buffer

Command	Syntax	Response	Remarks
Set	AT+ MIPREAD =<SocketId>, <ReadDataLen>	OK or: ERROR or: +MIPDATA:SocketID, actualReadDataLen Or: +MIPREAD:SocketID, 0	This command use for reading the data in cache. SocketId : Socket ID ReadDataLen: 2048 bytes at maximum actualReadDataLen: actual length of data in buffer +MIPREAD : no data in buffer + MIPDATA : read data successfully
Read	AT+ MIPREAD?	OK or: ERROR Or: +MIPREAD:Socketid, actualDataLen	This command is used to check whether there is data in buffer or not

Example:

```
AT+gtset="IPRFMT",5                          // open the receiving cache mode
OK
AT+MIPCALL=1,”cmnet”;                        // get the local IP address
OK
+MIPCALL: 10，76，50，12
AT+MIPOPEN=1,,”SZPGS.XICP.NET”,3000,0        // build connection
OK
+MIPOPEN: 1,1
```

AT+MIPSEND=1，“656565” // Send data

OK

+MIPSEND: 1,0,2045

AT+MIPPUSH=1 // push data

OK

+MIPPUSH: 1,0

+MIPREAD: 1,3 // in data cache mode, report data while the buffer is null before receiving data.

AT+MIPREAD? // query the bytes during connecting

+MIPREAD:1，3 //only 3 bytes in buffer

OK

AT+MIPREAD=1，100 // SOCKETID =1,data length=100bytes

+MIPDATA: 1，3 // the real data only has three bytes,

Eee

OK

AT+MIPREAD=1，100

+MIPREAD: 1，0 // there is no data in buffer

OK

13.2 HEX Mode

Base on the basic mode, Module achieve the TCP/IP stack by AT command. In additional, Module supports another mechanism to complete the TCP/IP stack in HEX mode. The data will be sending in HEX when we use +MIPSEND command.

13.2.1 +MIPSEND (Ctrl-Z)

Command	Syntax	Response/Action	Remarks
Set	+MIPSEND=<Socket_ID>	+MIPPUSH: <Socket_ID>,<Status> +MIPSEND: <Socket_ID>,<Status>,<FreeSize> or: ERROR	After command received, Module will respond "><CR><LF>". Send any data in HEX. The data buffer range is 0<buffer<=1400 bytes. <CTRL+Z> ends the prompt HEX mode and returns to regular AT command mode.

Example:

Opening socket 2 already.

AT+MIPSEND=2
>>This is the data in HEX<CTRL+Z> //<CTRL+Z> ends the prompt HEX mode and returns to regular AT command mode
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,2048
OK

13.2.2 +MIPSEND (Timeout)

Command	Syntax	Response/Action	Remarks
Set	+MIPSEND=<Socket_ID>	+MIPPUSH: <Socket_ID>,<Status>	After command received, Module will respond "><CR><LF>".

		+MIPSEND: <Socket_ID>,<Status>,<FreeSize> or: ERROR	Send any data without encode. The data buffer range is 0<buffer<=1400 bytes. After timeout, the data will be push automatic and returns to regular AT command mode. The default timeout is 12s.

Example:

Opening socket 2 already.

AT+MIPSEND=2
>>This is the data in HEX<timeout>
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,2048
OK

13.2.3+MIPSEND (Data length)

Command	Syntax	Response/Action	Remarks
Set	+MIPSEND=<Socket_ID>,<Data_len>	+MIPPUSH: <Socket_ID>,<Status> +MIPSEND: <Socket_ID>,<Status>,<FreeSize> or: ERROR	After command received, Module will respond “><CR><LF>”. Send any data in HEX. The data buffer range is 0<data_len<=1400 bytes. When Module receive the corresponding length data, the data will be push automatic and returns to regular AT command mode. Notes: The redundant data will be lost.

Example:

Opening socket 2 already.

AT+MIPSEND=2,10

>0123456789abc

OK

+MIPPUSH: 2,0

+MIPSEND: 2,0,2048

OK

13.2.4+GTSET, HEX mode configuration

Command	Syntax	Response/Action
Set	+GTSET=<future>,<value>	OK or: ERROR

The following table shows the +GTSET parameters related HEX mode.

<Parameter>	Description
<future>	"SENDTIME": Set the auto push timeout.
<value>	1-30 seconds The default value is 12.
<future>	"IPRFMT" : The format of received data.
<value>	0: Received data with “+MIPRTCP:” and the data is encoded. 1: Received data only and the data are without encoded. In received character string, Module doesn’t accede to any <CR><LF> symbol. 2: Received data with “+MIPRTCP:” and the data is without encoded. In received character string, Module will accede to <CR><LF> before “+MIPRTCP:”. 5: Data read mode The default value is 0.

Example:

Opening socket 2 already.

AT+GTSET="IPRFMT",0

OK
AT+MIPSEND=2,10

>0123456789abc
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,2048
OK

<CR><LF>+MIPRTCP: 2,0,30313233343536373839<CR><LF> //Same as basic mode.

AT+GTSET="IPRFMT",1
OK

AT+MIPSEND=2,10
>0123456789abc
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,2048
OK

0123456789 //Only data without any information.

AT+GTSET="IPRFMT",2
OK
AT+MIPSEND=2,10
>0123456789abc
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,2048
OK

<CR><LF>+MIPRTCP: 2,10,0123456789

14 Error Code

14.1 CME Error

Parameter	Description
<Err>	58 "invalid command line" 0 "phone failure" 1 "no connection to phone" 2 "phone-adapter link reserved" 3 "Operation not allowed" 4 "Operation not supported" 5 "PH-SIM PIN required" 6 "PH-FSIM PIN required" 7 "PH-FSIM PUK required" 10 "SIM not inserted" 11 "SIM PIN required" 12 "SIM PUK required" 13 "SIM failure" 14 "SIM busy" 15 "SIM wrong" 16 "Incorrect password" 17 "SIM PIN2 required" 18 "SIM PUK2 required" 20 "Memory full" 21 "invalid index" 22 "not found" 23 "Memory failure"

	24 "text string too long" 25 "invalid characters in text string" 26 "dial string too long" 27 "invalid characters in dial string" 30 "no network service" 31 "Network timeout" 32 "Network not allowed emergency calls only" 40 "Network personalization PIN required" 41 "Network personalization PUK required" 42 "Network subset personalization PIN required" 43 "Network subset personalization PUK required" 44 "service provider personalization PIN required" 45 "service provider personalization PUK required" 46 "Corporate personalization PIN required" 47 "Corporate personalization PUK required" 48 "PH-SIM PUK required (PH-SIM PUK may also be referred to as Master Phone Code. For further details" 49 "The excute command not support" 50 "Excute command failure" 51 "no memory" 52 "The command not support, check your input,pls" 53 "parameters are invalid" 54 "REG not exist in flash" 55 "SMS not exist in flash" 56 "Phone book not exist in flash" 57 "file system not exist in flash" 60 "SIM card verify failure"

	61 "Unblock SIM card fail" 62 "Condition not fulfilled" 63 "Unblock SIM card failed, no rest time" 64 "Verify SIM card failed, no rest time" 65 "Input parameter is invalid" 66 "file is inconsistent with the command" 67 "wrong instruction class given in the command" 68 "SIM returned technical problem" 69 "CHV need unblock" 70 "NO SIM EF selected" 71 "SIM file unmatched command" 72 "contradiction CHV" 73 "contradiction invalidation" 74 "SIM MAX value reached" 75 "SIM returned pattern not found" 76 "SIM file ID not found" 77 "STK busy" 78 "SIM returned UNKNOWN" 79 "SIM profile ERR" 103 "Illegal MS" 106 "Illegal ME" 107 "GPRS services not allowed" 111 "PLMN not allowed" 112 "Location area not allowed" 113 "Roaming not allowed in this location area" 132 "Service option not supported" 133 "Requested service option not subscribed" 134 "Service option temporarily out of order"

	149 "PDP authentication failure" 150 "Invalid mobile class" 148 "Unspecified GPRS error"

14.2 CMS Error

Parameter	Description
<Err>	1 "Unassigned (unallocated) number" 8 "Operator determined barring" 10 "Call barred" 21 "Short message transfer rejected" 27 "Destination out of service" 28 "Unidentified subscriber" 29 "Facility rejected" 30 "Unknown subscriber" 38 "Network out of order" 41 "Temporary failure" 42 "Congestion" 47 "Resources unavailable, unspecified" 50 "Requested facility not subscribed" 69 "Requested facility not implemented" 81 "Invalid short message transfer reference value" 95 "Invalid message, unspecified" 96 "Invalid mandatory information" 97 "Message type non-existent or not implemented" 98 "Message not compatible with short message protocol state" 99 "Information element non-existent or not implemented" 111 " Protocol error, unspecified"

	127	"Inter-working, unspecified"
	128	"Telematic inter-working not supported"
	129	"Short message Type 0 not supported"
	130	"Cannot replace short message"
	143	"Unspecified TP-PID error"
	144	"Data coding scheme (alphabet) not supported"
	145	"Message class not supported"
	159	"Unspecified TP-DCS error"
	160	"Command cannot be action "
	161	"Command unsupported"
	175	"Unspecified TP-Command error"
	176	"TPDU not supported"
	192	"SC busy"
	193	"No SC subscription"
	194	"SC system failure"
	195	"Invalid SME address"
	196	"Destination SME barred"
	197	"SM Rejected-Duplicate SM"
	198	"TP-VPF not supported"
	199	"TP-VP not supported"
	208	"D0 SIM SMS storage full"
	209	"No SMS storage capability in SIM"
	210	"Error in MS"
	211	"Memory Capacity Exceeded"
	212	"SIM Application Toolkit Busy"
	213	"SIM data download error"
	255	"Unspecified error cause"
	300	"ME failure"

	301 "SMS service of ME reserved" 302 "Operation not allowed" 303 "Operation not supported" 304 "Invalid PDU mode parameter" 305 "Invalid text mode parameter" 310 "SIM not inserted" 311 "SIM PIN required" 312 "PH-SIM PIN required" 313 "SIM failure" 314 "SIM busy" 315 "SIM wrong" 316 "SIM PUK required" 317 "SIM PIN2 required" 318 "SIM PUK2 required" 320 "Memory failure" 321 "Invalid memory index" 322 "Memory full" 330 "SMSC address unknown" 331 "no network service" 332 "Network timeout" 340 "NO +CNMA ACK EXPECTED" 500 "Unknown error" 512 "User abort" 513 "unable to store" 514 "invalid status" 515 "invalid character in address string" 516 "invalid length" 517 "invalid character in pdu"

	518 "invalid parameter" 519 "invalid length or character" 520 "invalid character in text" 512 "timer expired"}

14.3 TCP/IP Error

Parameter	Description
<Err>	600 "TCPIP Param wrong " 601 "TCPIP not supported in ppp mode" 602 "TCPIP dns convert to ip fail" 603 "TCPIP socket number limited" 604 "TCPIP invalid operation" 605 "TCPIP protol error" 606 "TCPIP send data too long" 607 "TCPIP send data memory failed" 608 "TCPIP service not in correct state " 609 "TCPIP pdp not defined " 610 "TCPIP new socket failed" 611 "TCPIP socket bind fail" 612 "TCPIP socket connect fail" 613 "TCPIP socket send fail " 614 "TCPIP socket close fail" 615 "TCPIP get socket receive buffer failed" 616 "TCPIP receive data failed" 617 "TCPIP socket used" 618 "TCPIP get send buffer size failed" 619 "TCPIP socket send data failed"

	620	"TCPIP socket send data size limited"
	621	"TCPIP socket set listening mode failed"
	622	"TCPIP socket listen fail"
	623	"TCPIP socket error"
	624	"TCPIP socket not opened "
	625	"TCPIP tcp stack configure failed"
	626	"TCPIP socket no data to send "
	627	"TCPIP socket send invalid data state"
	628	"TCPIP socket close client"
	629	"TCPIP ping error "
	630	"TCPIP ppp not connected "
	631	"TCPIP mipcall not active"
	632	"TCPIP etcpip not active"
	633	"TCPIP socket flow control"
	634	"TCPIP operation not allow"
	635	"TCPIP memory not exist"
	636	"Start timer error"