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FIBOCOM L610 AT Commands User Manual

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Applicability type

No.	Product model	Description
1	L610	NA

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Versions

Version	Author	Assessor	Approver	Update Date	Description
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1 Preface

1.1 Manual Scope

This manual introduces the AT commands set of Fibocom family products, and describes how the users can communicate with the devices using these commands. It describes the specification of syntax and parameters of the listed AT commands.

1.2 Target Audience

This manual is intended for the developers who need to communicate with the Fibocom family devices 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 Fibocom family is the modem unit 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.

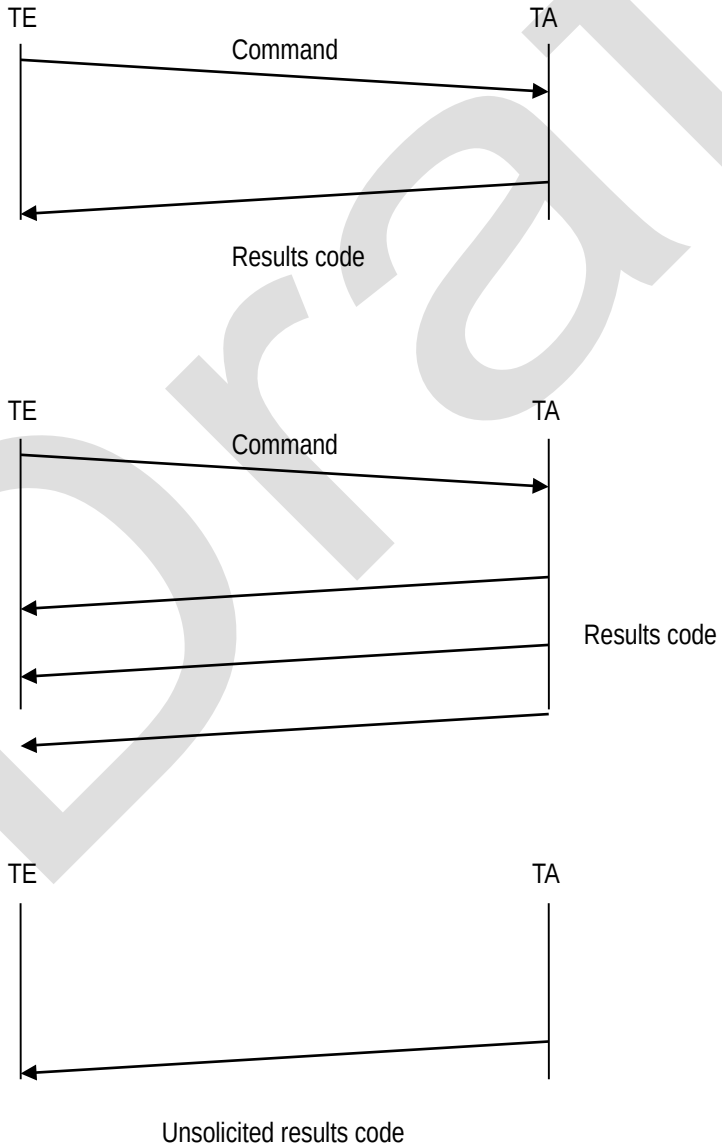
2.3 AT Commands Protocol

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 modem, "Indicator" messages are sent data asynchronously. The “indicators” can be called “Unsolicited results code”.

The Modem can echo characters received from the TE (commands) back to the TE.



2.4 AT Commands Structure

2.4.1 General Symbols Used in AT Commands Description

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 Modem 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.

Note:

- The <CR> and <LF> characters are not explicitly presented in the response format in this document.
- To reduce the print length the empty line in actual response may be removed in the examples.

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 Modem, 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 Information

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

3.1 General information

3.1.1 +CGMI, Request Manufacturer ID

Description

This command displays the manufacturer identification. The modem unit outputs a string containing manufacturer identification information

Syntax

Command	Possible response(s)
+CGMI	<manufacturer> OK
+CGMI?	+CGMI: "<manufacturer>" OK
+CGMI=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<manufacturer>: One or more lines of information text related to the manufacturer.

3.1.2 +GMI, Request Manufacturer ID

Description

This command displays manufacturer identification. The modem unit outputs a string containing manufacturer identification information.

Syntax

Command	Possible response(s)
+GMI	<manufacturer> OK
+GMI?	+GMI: "<manufacturer>" OK
+GMI=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<manufacturer>: One or more lines of information text related to the manufacturer.

3.1.3 +CGMM, Request Model ID

Description

This command requests the model identification. The modem outputs a string containing information about the specific model, including a list of the supported technology used, and the particular model number.

Syntax

Command	Possible response(s)
+CGMM	<model> OK
+CGMM?	+CGMM: "<model>","<modelabrev>" OK
+CGMM=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<model>: Information text related to the model identification.

<modelabrev>: Short name related to the model identification.

3.1.4 +GMM, Request Model ID

Description

This command requests the model identification. The modem outputs a string containing information about the specific model, including a list of the supported technology used, and the particular model number.

Syntax

Command	Possible response(s)
+GMM	<model> OK
+GMM?	+GMM: "<model>","<model abrev>" OK
+GMM=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<model>: Information text related to the model identification.

<model abrev>: Short name related to the model identification.

3.1.5 +CGMR, Request Revision

Description

This command requests the revision identification. The modem outputs a string containing the revision identification information of the software running in the device.

Syntax

Command	Possible response(s)
+CGMR	<revision> OK
+CGMR?	+CGMR: "<revision>" OK
+CGMR=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<revision>: One or more lines of information text related to the software revision.

3.1.6 +GMR, Request Revision

Description

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

Syntax

Command	Possible response(s)
+GMR	<revision> OK
+GMR?	+GMR: "<revision>"

Command	Possible response(s)
	OK
+GMR=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<revision>: One or more lines of information text related to the software revision.

3.1.7 +CGSN, Request Product Serial Number Identification

Description

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.

Syntax

Command	Possible response(s)
+CGSN[=<snt>]	**When <snt>=0 (or omitted) and command successful:** <imei> **When <snt>=1 and command successful:** +CGSN: <imei> **When <snt>=2 and command successful:** +CGSN: <imeisv> **When <snt>=3 and command successful:** +CGSN: <svn> **Or** +CME ERROR: <err>
+CGSN?	+CGSN: "<imei>" OK
+CGSN=?	**When TE supports <snt> and command successful:** +CGSN: (list of supported <snt>s)

Command	Possible response(s)
	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<snt>: integer type indicating the serial number type that has been requested.

0 returns the IMEI (International Mobile station Equipment Identity)

1 returns the IMEI (International Mobile station Equipment Identity)

2 returns the IMEISV (International Mobile station Equipment Identity and Software Version number)

3 returns the SVN (Software Version Number)

<imei>: Decimal format indicating the IMEI; IMEI is composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the Check Digit (CD) (1 digit). Character set used in <imei> is as specified by command Select TE Character Set +CSCS.

<imeisv>: Decimal format indicating the IMEISV; The 16 digits of IMEISV are composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the software version (SVN) (2 digits).

<svn>: Decimal format indicating the current SVN which is a part of IMEISV; This allows identifying different software versions of a given mobile.

3.1.8 +GSN, Request Product Serial Number Identification

Description

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.

Syntax

Command	Possible response(s)
+GSN[=<snt>]	**When <snt>=0 (or omitted) and command successful:** <imei> **When <snt>=1 and command successful:** +GSN: <imei> **When <snt>=2 and command successful:** +GSN: <imeisv> **When <snt>=3 and command successful:**

Command	Possible response(s)
	+GSN: <svn> **Or** +CME ERROR: <err>
+GSN?	+GSN: "<imei>" OK
+GSN=?	**When TE supports <snt> and command successful:** +GSN: (list of supported <snt>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<snt>: integer type indicating the serial number type that has been requested.

0 returns the IMEI (International Mobile station Equipment Identity)

1 returns the IMEI (International Mobile station Equipment Identity)

2 returns the IMEISV (International Mobile station Equipment Identity and Software Version number)

3 returns the SVN (Software Version Number)

<imei>: Decimal format indicating the IMEI; IMEI is composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the Check Digit (CD) (1 digit). Character set used in <imei> is as specified by command Select TE Character Set +CSCS.

<imeisv>: Decimal format indicating the IMEISV; The 16 digits of IMEISV are composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the software version (SVN) (2 digits).

<svn>: Decimal format indicating the current SVN which is a part of IMEISV; This allows identifying different software versions of a given mobile.

3.1.9 +CFSN, Request Factory Serial Number

Description

This command is used to read the factory serial number.

Syntax

Command	Possible response(s)
+CFSN	+CFSN: <FSN> OK or ERROR
+CFSN?	+CFSN: <FSN> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<FSN>: string type with 10-char string that can be <A-Z> or <0-9> characters or both;e,g. "1234567890"

3.1.10 +CIMI, Request IMSI

Description

This command displays the International Mobile Subscriber Identity number.

Syntax

Command	Possible response(s)
+CIMI	<IMSI> OK or: ERROR
+CIMI?	+CIMI: <IMSI> OK or: ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<IMSI>: string type; International Mobile Subscriber Identity (string without double quotes);e,g. 314566320021400

3.1.11 +CCID, Request Integrate Circuit Card Identity

Description

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

3.1.16.2 Syntax

Command	Possible response(s)
+CCID	+CCID: <ID> OK or ERROR
+CCID?	+CCID: <ID> OK or ERROR
+CCID=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<ID>: string type; Integrate Circuit Card Identity (string without double quotes); e,g, 89860018190839008096

3.1.12 +GTUSIM, Checks for USIM Card

Description

This command is used to check what the type of currently used SIM card is.

Syntax

Command	Possible response(s)
+GTUSIM	+GTUSIM: <state> OK or ERROR
+GTUSIM?	+GTUSIM: <state> OK or ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<state>: integer type

0 SIM (For GSM)

1 USIM (For WCDMA and TD-SCDMA and LTE)

3.1.13 +CLAC, List of All Available AT Commands

Description

This command prints out all AT Commands supported by the Modem.

Syntax

Command	Possible response(s)
+CLAC	<ATx> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 2s

Defined Values

<ATx>: Available AT commands; e,g ATS or ATD or ATA and so on

4 Modem Control and Status

4.1 Modem control Commands

The modem 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, Modem Response Format

Description

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.

Syntax

Command	Possible response(s)
ATV[<value>]	**If <value>=0:** <numeric code> or **If <value>=1 or without parameter:** <verbose code>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<value>: integer type

0 Transmits limited headers and trailers, and numeric text.

1 Transmits full headers and trailers, and verbose response text. Default value.

<numeric code>: integer type

0 OK

1 CONNECT

2 RING

3 NO CARRIER

4 ERROR

5 RESERVED

6 NO DIALTONE

7 BUSY

8 NO ANSWER

<verbose code>: string type; And supported verbose code as below:

OK

CONNECT

RING

NO CARRIER

ERROR

RESERVED

NO DIALTONE

BUSY

NO ANSWER

4.1.2 Q, Result Code Suppression

Description

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.

Syntax

Command	Possible response(s)
ATQ[<value>]	OK or: +CME ERROR: <err> Or No result return if <value>=1

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<value>: integer type

0 Transmit result codes. Default value.

1 Suppress result codes.

4.1.3 E, Command Echo

Description

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.

Syntax

Command	Possible response(s)
ATE<n>	OK

Command	Possible response(s)
	or: +CME ERROR: <err>
ATE?	<value> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type

0 Does not echo characters

1 Echoes characters

<value>: integer type

000 Does not echo characters

001 Echoes characters; Default value

Note:

if without parameter, it means <value>=0.

4.1.4 X, Result Code Selection and Call Progress Monitoring Control

Description

This command defines the CONNECT result code format. It determines whether or not the Modem transmits particular result codes to the user. It also controls whether the Modem verifies the presence of dial tone when it first goes off-hook to begin dialing, and whether the engaged tone (busy signal) detection is enabled.

Syntax

Command	Possible response(s)
ATX<n>	OK or:

Command	Possible response(s)
	+CME ERROR: <err>
ATX?	<value> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type;

0 CONNECT result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Disabled

1 CONNECT <text> result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Disabled

2 CONNECT <text> result code given upon entering online data state:

Dial tone detection - Enabled

Busy detection - Disabled

3 CONNECT<text> result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Enabled

4 CONNECT <text> result code given upon entering online data state;Default value.

Dial tone detection - Enabled

Busy detection – Enabled

<value>: integer type;

000 CONNECT result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Disabled

001 CONNECT <text> result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Disabled

002 CONNECT <text> result code given upon entering online data state:

Dial tone detection - Enabled

Busy detection - Disabled

003 CONNECT<text> result code given upon entering online data state:

Dial tone detection - Disabled

Busy detection - Enabled

004 CONNECT<text> result code given upon entering online data state;Default value.

Dial tone detection - Enabled

Busy detection – Enabled

<text>: string type and it is manufacturer-specific text that may specify DTE speed, line speed, error control, data compression, or other status

4.1.5 S, Bit Map Registers

Description

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

Syntax

Command	Possible response(s)
ATS<n>=<value>	OK or: +CME ERROR: <err>
ATS<n>?	current <value> of S-register n OK or: +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

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

<n>	Description	Min	Max	Default
0	Sets/gets number of rings before auto answer.	000	255	000
3	Sets/gets carriage return code character.	000	127	013
4	Sets/gets line feed code character.	000	127	010
5	Sets/gets command line editing character (Default 8=<Backspace>).	000	127	008
24	Sets/get the duration of inactivity (in units of second) to put the UART into sleep state (zero means disable the sleep for UART)	000	255	000

Note:

- - Default value 000 means disabled.
- - For ATS0,the duration time to perform expected ring should be not over the allowed time by network

4.1.6 +WRIM, RI signal width setting

Description

This command is used to set the duration timeofRI pulse with low voltage when modem receives a SMS or Call or data.

Note that the RI pin will keep on high voltage if there is no incoming SMS or call or data.

Syntax

Command	Possible response(s)
AT+WRIM=<type>,<duration>	OK or: ERROR
AT+WRIM?	+WRIM: <type>,<duration> OK or: ERROR
AT+WRIM=?	+WRIM: (list of supported <type>s),(list of supported <duration>s) OK or ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<type>: integer type

0 take effect on voice call

1 take effect on SMS

2 take effect on TCP/IP Data

<duration>: integer type; Default value is 0

0 means default setting : < type>,<duration> as (0,1000) and (1,150) and (2,0)

1 to 2000 1～2000ms

4.1.7 +GPIO, Set and Read GPIO

Description

This command intends to configure supported GPIO pins and gets value from input pin. Modem support 11 GPIO pins. All these pins can be set to output and input mode. The default configuration is input, but it’s better to set direction before use. The high voltage level is 1.8V.

Syntax

Command	Possible response(s)
AT+GPIO=<pin>,<direct>[,<value>]	When <direct> is 0 or 1: OK When <direct> is 2：<value> is omitted +GPIO: value OK Or: +CME ERROR: <err>
AT+GPIO?	OK

Command	Possible response(s)
AT+GPIO=?	+GPIO: <pin>,<direct>,<value> OK or ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<pin>: integer type;

Note: Use AT+GPIO=? to know about the supported pin before setting pin value.

<direct>: integer type;

0 Input

1 Output

2 Query output value of the single pin

<value>: integer type;

0 Low level

1 High level

4.1.8 +CBC, Battery Charger Connection

Description

This command intends to query the battery voltage level.

Syntax

Command	Possible response(s)
AT+CBC	+CBC: <bcs>,<bcl> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<bcs>: integer type

0 MT is powered by the battery (default)

<bcl>: integer type; Voltage with mV

4.1.9 +MTSM, Temperature Sensor Measurement

Description

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

This temperature is taken from a thermistor internally.

Note:

All the parameters restore to default values when Modem restart and the default value is 0.

Syntax

Command	Possible response(s)
AT+MTSM=<Report>[,<Rate>][,<Low>,<High>]	**If <Report>=0:** OK **If <Report>=1,6,7** +MTSM: <Temp> OK **If <Report>=2 or 3:** OK +MTSM: <Temp> … +MTSM: <Temp> or:

Command	Possible response(s)
	+CME ERROR: <err>
AT+MTSM?	+MTSM: <Report>[,<Rate>][,<Low>,<High>] OK
AT+MTSM=?	+MTSM: (range of <Report>),(range of <Rate>),(range of <Low>/<High>) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<Report>: integer type;

0 Deactivate unsolicited report.

1 Report once the current temperature.

2 Activate unsolicited report.

3 Activate unsolicited report only for out-off boundaries events.

6 Report the temperature of BBIC

7 Report the temperature of RF

<Rate>: integer type and range 1-255; Select the time interval in seconds between the unsolicited reports. And default value: 1

<Low>: integer type and range 0-125; The lowest boundary level of the temperature value in Celsius for unsolicited report. And Default value: 0

<High>: integer type and range 0-125; The Highest boundary level of the temperature value in Celsius for unsolicited report. And Default value: 0

Note:<Low>,<High> parameters are valid only when <Report>=3

4.1.10 +MSMPD, Enable/Disable SIM card hot plug

Description

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

Syntax

Command	Possible response(s)
AT+MSMPD=<status>	OK Or: +CME ERROR: <err>
AT+MSMPD?	+MSMPD: <status> OK
AT+MSMPD=?	+MSMPD: (list of supported <status>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	No	< 1s

4.1.14.4 Defined Values

<status>: integer type;

0 Disable the SIM card hot plug feature

1 Enable the SIM card hot plug feature. Default value.

4.1.11 +CMUX, MUX Start up Command

Description

This command is used to start the GSM MUX multiplexing protocol stack. When the Modem received a valid +CMUX command, it returns OK and changes its state to MUX-Init. If the parameters are left out, the default value is used.

Syntax

Command	Possible response(s)
AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]	OK or +CME ERROR: <err>
AT+CMUX?	+CMUX: <mode>,[<subset>],<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>,<k> OK or +CME ERROR: <err>
AT+CMUX=?	+CMUX: (list of supported <mode>s),(list of supported<subset>s),[(list of supported <port_speed>s)],(list of supported <N1>s),(list of supported <T1>s),(list of supported <N2>s),(list of supported <T2>s),(list of supported <T3>s),(list of supported <k>s)

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type; MUX mode:

0 Basic

<subset>: integer type; Defines how the MUX control channel is set up. The virtual channel is set up according to this setting.

0 UIH frames used only

<port_speed>: integer type;

1 9600 bit/sec

2 19200 bit/sec

3 38400 bit/sec

4 57600 bit/sec

5 115200 bit/sec(default)

6 230400 bit/sec

<N1>: integer type and range 1-2048; Maximum frame size. Default value is 31 in Basic mode.

<T1>: integer type and range 1-255; Acknowledgement timer (in units of 10 ms). Default value is 10

<N2>: integer type and range 0-100; Maximum number of re-transmissions. Default value is 3.

<T2>: integer type and range 2-255; Response timer for the DLC0 (in unit of 10 ms). Default value is 30

Note:<T2> must be longer than <T1>.

<T3>: integer type and range 1-255;Wake up response timer (in seconds). Default value is 10.

<k>: integer type and range 1-7;Window size,for Advanced option with Error-Recovery Mode. Default value is 2.

4.1.12 +CPWROFF, Switch off MS

Description

This command is used to switch off the Modem and make detach procedure

Syntax

Command	Possible response(s)
AT+CPWROFF	OK or +CME ERROR: <err>
AT+CPWROFF=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<2s

4.1.13 +CFUN, Set Phone Functionality

Description

This command is used to select the level of functionality <fun> in the modem.

Syntax

Command	Possible response(s)
AT+CFUN=<fun>[,<rst>]	OK Or: +CME ERROR: <err>

Command	Possible response(s)
AT+CFUN?	+CFUN: <power mode> OK or +CME ERROR: <err>
AT+CFUN=?	+CFUN: (list of supported <fun>s),(list of supported<rst>s) OK or +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<fun>: integer type;

0 Minimum functionality (Switch off MS and make detach procedure).

1 Full functionality. Enable the transmit and receive RF circuits for all supported radio access technologies (Online mode).

4 Disable both MT transmit and receive RF circuits (Airplane mode).

5 Factory Test Mode

6 Enable SIM STK and Fetching of proactive Commands.

7 Disable SIM STK and enable Fetching of proactive Commands.

8 Disable Fetching of proactive Commands.

15 Reset

Note 1: <rst> is not supported when <fun> = 15

Note 2: When <fun> value are 0 or 15, the OK response may be missed due to race condition

Note 3: The <fun> value whether is persistent or not depends on the implementation of target products.

<rst>: integer type;

0 Do not reset the MT before setting it to <fun> power level

1 Reset the MT before setting it to <fun> power level

<power_mode>: integer type;

1 MS is switched on.

2 Invalid Mode.

4 Airplane Mode.

4.1.14 +MSTART, Start message notification

Description

This command is used to enable/disable module outputting starting message when power up.

Syntax

Command	Possible response(s)
AT+MSTART=<at ready>,<sim ready>	OK Or: ERROR
AT+MSTART?	+MSTART: <at ready>,<sim ready> OK
AT+MSTART=?	+MSTART: (list of supported <at ready>s),(list of supported <sim ready>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<at ready>: integer type;

0 Do not output “AT command ready” from UART

1 Output “AT command ready” from UART (default value)

<sim ready>: integer type;

0 Do not output “+SIM READY” after phonebook initialize completely

1 Output “+SIM READY” after phonebook initialize completely (default value)

Note: “AT command ready” is not allowed to be output from USB port even if set to 1. “+SIM READY” can output from UART and USB port according to setting.

4.2 Sleep Mode Command

4.2.1 S24, Set the Time of Enter Sleep Mode

Description

This command is used to set the time of the module enter sleep mode.

Note: This command is applicable when not allow UART automatically go into sleep mode, or else it will return error.

Syntax

Command	Possible response(s)
ATS24=<value>	OK Or: ERROR
ATS24?	<value> OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<value>: integer type and in seconds

000 Disable the module enter sleep mode. Default value;

Other value Enable the module enter sleep mode after a specified time.

4.2.2 +GTWAKE, Enable waking up hostfunction

Description

This command is used to enable or disable wake up host function.

Syntax

Command	Possible response(s)
AT+GTWAKE=<mode>[,<sub_mode>]	OK Or: ERROR
AT+GTWAKE?	+GTWAKE: <mode>[,<sub_mode>] OK
AT+GTWAKE=?	+GTWAKE: (list of supported <mode>s),(list of supported<sub_mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 Disable waking up host function. Default value.

1 Enable waking up host function via WAKEUP_HOST pin

2 Enable waking up host function via UART RI pin

<sub_mode>: integer type

0 Module set WAKEUP_HOST/RI pin to high level when want host wake up. Default value.

1 Module set WAKEUP_HOST/RI pin to low level when want host wake up.

2 Module set WAKEUP_HOST pina 100ms pulse signal when want host wake up.
(RI pulse signal, according to WRIM define)

4.2.3 +GTLPMMODE，Set Wake up And Sleep Mode

Description

This command control the module how to enter sleep or wake up from sleep.

Syntax

Command	Response/Action
+GTLPMMODE=<main_mode>[,<sub_mode>]	OK or: +CME ERROR: <err>
+GTLPMMODE?	+GTLPMMODE: <main_mode>[,<sub_mode>] OK or: +CME ERROR: <err>
+GTLPMMODE=?	+GTLPMMODE: (list of supported <main_mode>s),(list of supported <sub_mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<main_mode>: integer type and range 0-2;

0 Use the command ATS24 to control module enter sleep;Default value.

1 Control module go into sleep/wakeup mode via WAKEUP pin level only.

2 Control module go into sleep/wakeup mode via UART DTRpin level only

<sub_mode>: integer type and range 0-2; It takes effect only when <main_mode>=1 or 2.

0 Module enters sleep mode when WAKEUP/DTRpin turns to high level, and wake up module in low level.Default value.

1 Module enters sleep mode when WAKEUP/DTRpin turns to low level, and wake up module in high level.

2 Module exits sleep mode when WAKEUP/DTR pin has a pulse signal

Note: ATS24 doesn't take effect when <main_mode>=1 or 2.

4.2.4 +GTPMTIME, Delay time for send data

Description

This command control the delay time for send data.

Syntax

Command	Response/Action
+GTPMTIME=<delay-out>[,<delay-in>[,<sleeptime>]]	OK or: +CME ERROR: <err>
+GTPMTIME?	+GTPMTIME: <delay-out>,<delay-in>,<sleeptime> OK
+GTPMTIME=?	+GTPMTIME: (100-1000),(100-1000),(1000-5000) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<delay-out>:integer type and range 100-1000 ms, default is 200;

Note: Module will wait thisdelay time for send data after wakeup host signal has been set.

<delay-in>:integer type and range 100-1000 ms, default is 200;

Note: Host will wait this delay time for send data after wakeup module signal has been set.

<sleeptime>: integer type and range 1000-5000 ms, default is 2000;

Note: The module will go into sleep mode after wakeup by WAKEUP/DTR pin pulse.

5 Call Control

5.1 Voice Call Control AT Commands

5.1.1 D, Dial Command

Description

This command makes a DATA/VOICE call on the current network.

Note:

If a DATA call was originated and answered by the remote side, a "OK" notification is sent to the terminal from the Modem, and it moves to the online Data state.

For more information about call failure, should use the AT+CEER command

Syntax

Command	Possible response(s)
ATD<number>[;]	**For Voice call:** OK OK or CONNECT or Nothing (depend on +MDC setting) is shown once voice call is connected. Note: First OK means successfully executing this command. **For CSD call:** OK or CONNECT or Nothing (depend on +MDC setting) is shown once CSD call is connected. If the originated call is failed, returns below causes: 1. Connection Failure - NO CARRIER or BUSY or NO ANSWER 2. General Failure - ERROR 3. Security reason (such as SIM not present) - SIM NOT INSERTED 4. Unknown reason - UNKNOWN CALLING ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 30s

Defined Values

<number>: Telephone number or Special number(e,g *99# or *99***1#)

Note:

- number with ; at the end is for voice call
- number without ; at the end is for data call(CSD call or PS call)

5.1.2 H, Hang-up Call

Description

This command hangs up call. The Modem terminates all call regardless it is a data or voice call, and whether it is an incoming, originating, waiting, or connected call.

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

Syntax

Command	Possible response(s)
ATH	OK NO CARRIER

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<30s

Defined Values

None

5.1.3 A, Answer Incoming Call

Description

This command answers an incoming VOICE/DATA call after a RING/+CRING indication is sent to the terminal.

If the incoming call is answered (CSD connected), the Modem sends a CONNECT notification to the terminal.

If the MT call fails, the possible notifications are:

☐ NO CARRIER - Connection Failure

☐ ERROR - General Failure

Syntax

Command	Possible response(s)
ATA	OK or: +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<2s

Defined Values

None

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

Description

This command controls whether or not to present the extended format of an incoming call indication. The RING/+CRING indication is sent from the Modem to the terminal when the Modem 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.

Syntax

Command	Possible response(s)
AT+CRC=<mode>	OK

Command	Possible response(s)
AT+CRC?	+CRC: <mode> OK
AT+CRC=?	+CRC: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 disables extended format. Default value.

1 enables extended format. When enabled, an incoming call is indicated to the terminal with an unsolicited result code +CRING: <type> instead of the normal RING.

<type>:string type

ASYNC [,<priority>[,<subaddr>,<satype>]] **asynchronous transparent**

SYNC [,<priority>[,<subaddr>,<satype>]] **synchronous transparent**

REL ASYNC [,<priority>[,<subaddr>,<satype>]] **asynchronous non-transparent**

REL SYNC [,<priority>[,<subaddr>,<satype>]] **synchronous non-transparent**

FAX [,<priority>[,<subaddr>,<satype>]] **facsimile (TS 62)**

VOICE [,<priority>[,<subaddr>,<satype>]] **normal voice (TS 11) (see NOTE 2)**

VOICE/VIDEO [,<ccidx>[,<priority>[,<subaddr>,<satype>]]] **voice or video call (see NOTE 2)**

VOICE/XXX [,<priority>[,<subaddr>,<satype>]] **voice followed by data (BS 81) (XXX is ASYNC, SYNC, REL ASYNC or REL SYNC)**

ALT VOICE/XXX [,<priority>[,<subaddr>,<satype>]] **alternating voice/data, voice first (BS 61)**

ALT XXX/VOICE [,<priority>[,<subaddr>,<satype>]] **alternating voice/data, data first (BS 61)**

ALT VOICE/FAX [,<priority>[,<subaddr>,<satype>]] **alternating voice/fax, voice first (TS 61)**

ALT FAX/VOICE [,<priority>[,<subaddr>,<satype>]] **alternating voice/fax, fax first (TS 61)**

GPRS <PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]] **GPRS network request for PDP context activation**

VGC <GCA>, <GId>, <ackflag> [,<priority>] **voice group call (TS 91)**

VBC <GCA>, <GId>, <ackflag> [,<priority>] **voice broadcast call (TS 92)**

NOTE 2: The <type>=VOICE/VIDEO is used for voice and/or video calls. It is implementation specific whether this type will replace the <type>=VOICE or if both the types <type>=VOICE/VIDEO and <type>=VOICE are supported.

<priority>: indicates the eMLPP priority level of the incoming call by paging, notification or setup message. The priority level values are as defined in eMLPP specification 3GPP TS 22.067 [54].

<subaddr>: string type subaddress of format specified by <satype>

<satype>: type of subaddress octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.8) or RFC 4715 [122] appendix A.

<ccidx>: integer type. Call identification number, see +CLCCS.

<PDP_type>, <PDP_addr> and <APN>: string types as defined in the Define PDP Context (+CGDCONT) command.

<L2P>: string type proposes a layer 2 protocol to use between the MT and the TE. It is defined in the Enter GPRS Data Mode (+CGDATA) command. If the MT is unable to announce to the TE the network's request (for example it is in V.250 online data state) the MT shall reject the request. No corresponding unsolicited result code shall be issued when the MT returns to a command state.

<GCA>: string type (consisting of digits only) is a part of the group call reference as specified in 3GPP TS 23.003 [7] and indicates group call area. See the commands +CAJOIN, +CAREJ and +CALCC.

<GId>: string type (consisting of digits only) is a part of the group call reference as specified in 3GPP TS 23.003 [7] and indicates group call identification. See the commands +CAJOIN, +CAREJ and +CALCC.

<ackflag>: integer type proposes that a predefined confirmation procedure is to be used after the call is ended. The value 1 indicates that a predefined confirmation procedure is to be used after the call is ended. The value 0 indicates that no confirmation procedure is required. See the parameter <ack_flag> of command +CALCC.

5.1.5 +CLIP, Calling Line Identification

Description

This command enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call.

Set command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.

When <n>=1, the presentation of the calling line identity at the TE is enabled and when the calling subscriber allows, the unsolicited result code

+CLIP: <number>,<type>[,<subaddr>,<satype>[,[<alpha>][,<CLI_validity>]]] is returned . It is manufacturer specific if this response is used when normal voice call is answered. The unsolicited result code +CLIP does not support numbers of the SIP URI format.

When <n>=0, the presentation of the calling line identity at the TE with unsolicited result code +CLIP is disabled.

Syntax

Command	Possible response(s)
AT+CLIP=[<n>]	OK or: +CME ERROR: <err>
AT+CLIP?	+CLIP: <n>,<m> OK
AT+CLIP=?	+CLIP: (0,1) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<n>: integer type (parameter sets/shows the result code presentation status to the TE)

0 disable; Default value.

1 enable

<m>: integer type (parameter shows the subscriber CLIP / OIP service status in the network).

0 CLIP / OIP not provisioned

1 CLIP / OIP provisioned

2 unknown (e.g. no network, etc.)

<number>: string type phone number of format specified by <type>

<type>: type of address octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.7)

<subaddr>: string type subaddress of format specified by <satype>

<satype>: type of subaddress octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.8)

<alpha>: optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS

<CLI_validity>: integer type. This parameter can provide details why <number> does not contain a calling party BCD

number (refer 3GPP TS 24.008 subclause 10.5.4.30).

0 CLI valid

1 CLI has been withheld by the originator (refer 3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008 code "Reject by user")

2 CLI is not available due to interworking problems or limitations of originating network (refer 3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008 code "Interaction with other service")

3 CLI is not available due to calling party being of type payphone (refer 3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008 code "Coin line/payphone")

4 CLI is not available due to other reasons (refer 3GPP TS 24.008 [8] table 10.5.135a/3GPP TS 24.008 code "Unavailable").

5.1.6 +CLIR, Calling Line Identification Restriction

Description

This command instructs the Modem 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 Modem 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 Modem to switch the default mode from A to B, and vice versa.

Syntax

Command	Possible response(s)
AT+CLIR=<n>	OK or: +CME ERROR: <err>

Command	Possible response(s)
AT+CLIR?	+CLIR: <n>,<m> OK
AT+CLIR=?	+CLIR: (list of supported<n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<n>: integer type (parameter sets the adjustment for outgoing calls).

0 presentation indicator is used according to the subscription of the CLIR / OIR service.

1 CLIR / OIR invocation

2 CLIR / OIR suppression; Default value.

<m>: integer type (parameter shows the subscriber CLIR / OIR service status in the network).

0 CLIR / OIR not provisioned

1 CLIR / OIR provisioned in permanent mode

2 unknown (e.g. no network, etc.)

3 CLIR / OIR temporary mode presentation restricted

4 CLIR / OIR temporary mode presentation allowed

5.1.7 +CMOD, Call Mode

Description

This command selects call mode of further dialing commands (D) or for next answering command (A).

Syntax

Command	Possible response(s)
AT+CMOD=[<mode>]	OK +CME ERROR: <err>

Command	Possible response(s)
AT+CMOD?	+CMOD: <mode> OK
AT+CMOD=?	+CMOD: (list supported <mode>s>) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 single mode (default)

1 alternating voice/fax

2 alternating voice/data

3 voice followed by data

4 data followed by voice(proprietary mode)

5.1.8 +CHUP, Hang Up Call

Description

This command causes the Modem to hang up the current and held call.

Syntax

Command	Possible response(s)
AT+CHUP	OK or: +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 30s

5.2.16.4 Defined Values

None

5.1.9 +MHUP, Module Hung UP call

Description

This command is used to hung up a call specified by call id or all call if not specify the call id and report a specific disconnect cause to the NW.

Syntax

Command	Possible response(s)
AT+MHUP=<cause>[,<call_id>]	OK or +CME ERROR: <err>
AT+MHUP?	+MHUP: <call_id> OK or +CME ERROR: <err>
AT+MHUP=?	+MHUP: (list of supported <cause>s),(list of supported <call_id>s)

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<30s

Defined Values

<cause>: integer type

1 Unassigned (unallocated) number

3 No route to destination

6 Channel unacceptable

8 Operator determined barring

16 Normal Call Clearing (default)

17 User Busy

18 User not responding

19 User alerting no answer

21 Call rejected

22 Number changed

25 Pre-emption

26 Non selected user clearing

27 Destination out of order

28 Invalid number format(incomplete number)

29 Facility rejected

30 Response to STATUS ENQUIRY

31 Normal , Unspecified

34 No circuit/channel available

38 Network out of order

41 Temporary failure

42 Switching equipment congestion

43 Access information discarded

44 Requested circuit/channel not available

47 Resources unavailable, unspecified

49 Quality of service unavailable

50 Requested facility not subscribed

55 Incoming calls barred within the CUG

57 Bearer capability not authorized

58 Bearer capability not presently available

63 Service or option not available, unspecified

65 Bearer service not implemented

68 ACM equal to or greater than ACMmax

69 Requested facility not implemented

70 Only restricted digital information bearer capability is available

79 Service or option not implemented, unspecified

81 Invalid transaction identifier value

87 User not member of CUG

88 Incompatible destination

91 Invalid transit network selection

95 Semantically incorrect message

96 Invalid mandatory information

97 Message type non-existent or not implemented

98 Message type not compatible with protocol state

99 Information element non-existent or not implemente

<call_id>: integer type; Index of the call id (same as <idx> in +CLCC command) and the supported indexes depends on target platform.

0 All calls (default).

Other Specific call id.

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

Description

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.

Syntax

Command	Possible response(s)
AT+MDC=<mode>	OK or: +CME ERROR: <err>
AT+MDC?	+MDC: <mode> OK
AT+MDC=?	+MDC: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	Yes	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 Show OK once voice call is connected. Default Values

1 Show CONNECT once voice call connected.

2 Show Nothing

5.2 Call Status Messages

5.2.1 +CPAS, Phone Activity Status

Description

This command displays the current activity status of the Modem; like call in progress, or ringing.

Syntax

Command	Possible response(s)
AT+CPAS	+CPAS: <pas> OK or: +CME ERROR: <err>
AT+CPAS=?	+CPAS: (list of supported <pas>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<pas>: integer type

0 Ready - The Modem allows commands from the terminal

1 Unavailable(MT does not allow commands from TA/TE)

2 Unknown - The Modem is not guaranteed to respond to instructions

3 Ringing (MT calls) - The Modem is ready for commands from the terminal, but the ringer is active

4 Call in progress - The Modem 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)

5.2.2 +CLCC, List Current Calls

Description

This command displays a list of all current Modem 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).

Syntax

Command	Possible response(s)
AT+CLCC=<state>	OK or: +CME ERROR: <err>
AT+CLCC	+CLCC: <idx>,<dir>,<stat>,<mode>,<mpty>,<number>,<type> [<CR><LF> +CLCC: <idx>,<dir>,<stat>,<mode>,<mpty>,<number>,<type> […]] OK
AT+CLCC?	+CLCC: <state> OK
AT+CLCC=?	+CLCC: (list of supported <state>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<state>: integer type , disable or enable +CLCC unsolicited report. Default value is 0.

0 disable

1 enable

<idx>: integer type. Call identification number as described in 3GPP TS 22.030 subclause 6.5.5.1. This number can be used in +CHLD command operations. Value range is from 1 to N. N, the maximum number of simultaneous call control processes is implementation specific.

<dir>: integer type

0 mobile originated (MO) call

1 mobile terminated (MT) call

<stat>: integer type (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>: integer type (bearer/teleservice)

0 voice

1 data

2 fax

3 voice followed by data, voice mode

4 alternating voice/data, voice mode

5 alternating voice/fax, voice mode

6 voice followed by data, data mode

7 alternating voice/data, data mode

8 alternating voice/fax, fax mode

9 unknown

<mpty>: integer type

0 call is not one of multiparty (conference) call parties

1 call is one of multiparty (conference) call parties

<number>: string type phone number in format specified by <type>.

<type>: type of address octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.7).

5.2.3 +CR, Service Reporting Control

Description

This command controls whether the extended format of an outgoing call is displayed or not. The unsolicited result code: +CR: <serv> indication is sent from the Modem to the terminal whenever a data call is initiated by the Modem if <mode>=1.

Syntax

Command	Possible response(s)
AT+CR=[<mode>]	OK
AT+CR?	+CR: <mode> OK
AT+CR=?	+CR: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 Extended format disabled (default)

1 Extended format enabled

<serv>：string type;Type of outgoing data calls:

ASYNC Asynchronous transparent

SYNC Synchronous transparent

REL ASYNC Asynchronous non-transparent

REL SYNC Synchronous non-transparent

6 System Date and Time Access Commands

6.1 General command

6.1.1 +CCLK, Read/Set System Date and Time

Description

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

Syntax

Command	Possible response(s)
AT+CCLK=<time>	OK or: +CME ERROR: <err>
AT+CCLK?	+CCLK: <time> OK or: +CME ERROR: <err>
AT+CCLK=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<time>: string type value; format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -96...+96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

yy 2-digit year[00-99]

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.

6.1.2 +CTZU, Automatic Time Zone Update

Description

This command enables/disables (on/off) the automatic update of the time zone via NITZ.

Syntax

Command	Possible response(s)
AT+CTZU=<onoff>	OK or: +CME ERROR: <err>
AT+CTZU?	+CTZU: <onoff> OK
AT+CTZU=?	+CTZU: (list of supported <onoff>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<onoff>: integer type value indicating

0 Disable automatic time zone update via NITZ; Default value.

1 Enable automatic time zone update via NITZ.

Note: The Default value for L810-GL-06 is 1

6.1.3 +CTZR, Time Zone Reporting

Description

This command enables/disables the time zone change event and Daylight saving time reporting. If reporting is enabled the MT returns the unsolicited result code +CTZV: <tz>, or +CTZE: <tz>,<dst>,[<time>].

Syntax

Command	Possible response(s)
AT+CTZR=[<reporting>]	OK or: +CME ERROR: <err>
AT+CTZR?	+CTZR: <reporting> OK
AT+CTZR=?	+CTZR: (list of supported <reporting>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<reporting>:integer type value indicating:

0 Disable time zone change event reporting.Default value.

1 Enable time zone change event reporting by unsolicited result code +CTZV: <tz>.

2Enable extended time zone and local time reporting by unsolicited result code +CTZE: <tz>,<dst>,[<time>].

<tz>:integer value indicating the time zone.

<time>: string type value; format is "yy/MM/dd,hh:mms" ,wherein characters indicates year,month, day, hour, minutes, seconds

<dst>:integer value;daylight savings time:

0 No adjustment for Daylight Saving Time

1 +1 hour adjustment for Daylight Saving Time

2 +2 hours adjustment for Daylight Saving Time

7 SMS

7.1 SMS Commands

Modem supports SMS PDU and SMS TEXT mode according to ETSI specifications 3GPP TS 27.005 & 3GPP TS 03.40/23.0400.

7.1.1 +CSCS, Select Terminal Character Set

Description

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

Syntax

Command	Possible response(s)
AT+CSCS=<chset>	OK or: +CME ERROR: <err>
AT+CSCS?	+CSCS: <chset> OK
AT+CSCS=?	+CSCS: (list of supported <chset>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<chset>: string type; 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" ISO-8859-1; And it only be supported in G5 series products.

7.1.2 +CSMS, Select Message Service

Description

This command handles the selection of the messaging service. It returns the types of messages that are supported by the Modem.

Syntax

Command	Possible response(s)
AT+CSMS=<service>	+CSMS: <mt>,<mo>,<bm> OK or: +CMS ERROR: <err>
AT+CSMS?	+CSMS: <service>,<mt>,<mo>,<bm> OK
AT+CSMS=?	+CSMS: (list of supported <service>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<service>:integer type;

0 SMS AT command grammar is compatible with GSM Phase 2

1 SMS AT command grammar is compatible with GSM Phase 2+

<mt>: integer type; Mobile terminated messages

0 Not supported by the Modem

1 Supported by the Modem

<mo>:integer type; Mobile originated messages

0 Not supported by the Modem

1 Supported by the Modem

<bm>:integer type; Broadcast type messages

0 Not supported by the Modem

1 Supported by the Modem

7.1.3 +CPMS, Preferred Message Storage

Description

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

Syntax

Command	Possible response(s)
AT+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> OK or: +CMS ERROR: <err>
AT+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>, <mem3>,<used3>,<total3> OK or: +CMS ERROR: <err>
AT+CPMS=?	+CPMS: (list of supported<mem1>s),(list of supported <mem2>s),(list

Command	Possible response(s)
	of supported <mem3>s) OK or: +CMS ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mem1>: string type; Memory from which messages are read and deleted.

<mem2>: string type; Memory to which writing operation is made.

<mem3>: string type; Memory to which received SMS are stored (unless forwarded directly to TE).

Note: Supported values for <mem1>,<mem2>,<mem3> may be:

"BM" Broadcast message storage

"SM" (U)SIM message storage

"ME" ME message storage

"SR" Status report storage

Note:

- <mem1>,<mem2>,<mem3>may be restored to “SM” after power cycle device
- L8 family products only support “SM” storage for<mem1>,<mem2>,<mem3>
- L7 family products support as below combinations:

  <mem1> :“BM”,“SM”,”SR”,”ME”

  <mem2> and <mem3> : “SM”, ”ME”

7.1.4 +CMGF, Message Format

Description

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 Modem 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).

Syntax

Command	Possible response(s)
AT+CMGF=<mode>	OK or: +CME ERROR: <err>
AT+CMGF?	+CMGF: <mode> OK
AT+CMGF=?	+CMGF: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type; Message format:

0 PDU mode (default)

1 Text mode

7.1.5 +CSCA, Service Center Address

Description

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

Syntax

Command	Possible response(s)
AT+CSCA=<sca>[,<tosca>]	OK or: +CME ERROR: <err>
AT+CSCA?	+CSCA: <sca>,<tosca> OK
AT+CSCA=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<sca>: string type and range is 1-20; Service Center Address."+" character prefix of <sca> indicates <tosca> of 145. 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 "1111".

<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.

7.1.6 +CSMP, Set Text Mode Parameters

Description

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

Syntax

Command	Possible response(s)
AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK or: +CME ERROR: <err>
AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs> OK
AT+CSMP=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<fo>:integer type;Depending on the command or result code: first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT(default 17), SMS-STATUS-REPORT, or SMS-COMMAND(default 2) in integer format.

<vp>:integer type; 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"). If in integer format the vp will write to SIM EF and read form SIM EF when use it.

Note: The following table shows the VP format.

<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

<pid>:integer type; Protocol-Identifier. The one octet information element by which the SM-TL either refers to the higher layer protocol being used, or indicates interworking with a certain type of telematic device.

"0 - no interworking, 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>: integer type; One octet of Data Coding Scheme, indicates the data coding scheme of the DATA, and may indicate a message class; Default value is 0

7.1.7 +CSDH, Show Text Mode Parameters

Description

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

Syntax

Command	Possible response(s)
AT+CSDH=[<show>]	OK or: +CME ERROR: <err>
AT+CSDH?	+CSDH: <show>

Command	Possible response(s)
	OK
AT+CSDH=?	+CSDH: (list of supported <show>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<show>: integer type

0 do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes 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 value.

1 show the values in result codes

7.1.8 +CNMI, New Message Indications to Terminal

Description

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

After sending an unsolicited response to the TE, the Modem will expect a +CNMA (new message acknowledgement) from the TE within a predefined timeout of 15 seconds. Within the timeout the Modem will not send another unsolicited response to the TE before the previous one is acknowledgement. If the Modem does not receive acknowledgment within the required time, CNMI parameters will NOT be reset automatically and the unsolicited response will send to the TE again.

Syntax

Command	Possible response(s)
AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK or:

Command	Possible response(s)
	+CME ERROR: <err>
AT+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK
AT+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

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type, Default value is 0.

0 Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.

1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

<mt>: integer type (the rules for storing received SMs depend on its data coding scheme (refer 3GPP TS 23.038 [2]), preferred memory storage (+CPMS) setting and this value; refer table 8.1.8-1; Default value is 0.

0 No SMS-DELIVER indications are routed to the TE.

1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CMTI: <mem>,<index>

2 SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code:

+CMT: [<alpha>],<length><CR><LF><pdu> (PDU mode enabled); or

+CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>(text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH)

If ME has its own display device then class 0 messages and messages in the message waiting indication group (discard message) may be copied to both ME display and to TE. In this case, ME shall send the acknowledgement to the network.

Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined in <mt>=1.

3 Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2.

Messages of other data coding schemes result in indication as defined in <mt>=1

Table 8.1.8-1: <mt> parameter

<mt>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038 [2])
0	no class: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory class 0: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory if message is tried to be stored class 1: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory class 2: as in 3GPP TS 23.038 [2] class 3: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory message waiting indication group (discard message): as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory if message is tried to be stored message waiting indication group (store message): as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory
1	as <mt>=0 but send indication if message stored successfully
2	no class: route message to TE class 0: as in 3GPP TS 23.038 [2], but also route message to TE and do not try to store it in memory class 1: route message to TE class 2: as <mt>=1 class 3: route message to TE message waiting indication group (discard message): as in 3GPP TS 23.038 [2], but also route message to TE and do not try to store it in memory message waiting indication group (store message): as <mt>=1
3	class 3: route message to TE others: as <mt>=1

<bm> integer type (the rules for storing received CBMs depend on its data coding scheme (refer 3GPP TS 23.038 [2]), the setting of Select CBM Types (+CSCB) and this value; refer table 8.1.8-2); Default value is 0.

0 No CBM indications are routed to the TE.

1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CBMI: <mem>,<index>

2 New CBMs are routed directly to the TE using unsolicited result code:

+CBM: <length><CR><LF><pdu> (PDU mode enabled); or

+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)

If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. (U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).

3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is

supported, messages of other classes result in indication as defined in <bm>=1.

Table 8.1.8-2: <bm> parameter

<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038 [2])
0	all schemes: as in 3GPP TS 23.038 [2]; if CBM storage is supported, store message to "BM" (or some manufacturer or data coding scheme specific memory)
1	all schemes: as<bm>=0 but send indication if message stored successfully
2	all schemes: route message to TE unless ME has detected a special routing to somewhere else (e.g. to (U)SIM; an indication may be sent if message stored successfully)
3	class 3: route message to TE others: as <bm>=1 (if CBM memory storage is supported)

<ds>: integer type; Default value is 0.

0 No SMS-STATUS-REPORTs are routed to the TE.

1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:

+CDS: <length><CR><LF><pdu> (PDU mode enabled); or

+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)

2 If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CDSI: <mem>,<index>

Table 8.1.8-3: SMS-STATUS-REPORT result code and acknowledgement summary

<ds>	result codes and commands
1	+CDS&+CNMA[1)]
2	+CDSI
1) acknowledgement command must be sent when +CSMS<service> value equals 1	

<bfr>: integer type; Default value is 0.

0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes).

1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

7.1.9 +CNMA, New Message Acknowledgment

Description

This command acknowledge the receipt of a +CMT and +CDS response from the terminal to the Modem. A +CMT response receipt confirms the correct reception of a new SMS-DELIVER message, which was routed directly to the terminal. A +CDS response receipt confirms the correct reception of a new SMS-STATUS-REPORT message, which was routed directly to the terminal.

When the Modem sends a +CDS response to the terminal, it waits a predefined timeout of 15 seconds

for the +CNMA acknowledgment. The Modem will not send another +CDS result code to the terminal before the previous one is acknowledged, or the timeout expires.

When the Modem sends a +CMT response to the terminal, it waits a predefined timeout of 15 seconds for the +CNMA acknowledgment. The Modem will not send another +CMT result code to the terminal before the previous one is acknowledged, or the timeout expires. Upon receipt of the +CNMA command, the Modem sends RP-ACK to the network. The acknowledged SMS will not be saved in message storage. If the command is executed but no acknowledgment is expected, or some other Modem related error occurs, the final result code +CMS ERROR: <err> is returned.

Syntax

Command	Possible response(s)
For text mode (+CMGF=1) AT+CNMA **For PDU mode (+CMGF=0)** AT+CNMA[=<n>[,<length>[<CR>PDU<ctrl-Z/ESC>]]]	OK or: +CME ERROR: <err>
AT+CNMA=?	OK in text mode or: +CNMA: (list of supported <n>s) in PDU mode

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<n>: integer type

0 command operates similarly as defined for the text mode

1 send RP-ACK

2 send RP-ERROR

<length>: integer type; Length of the PDU in PDU mode

7.1.10 +CMGL, List Messages

Description

These commands display a list of all SMS with the status value <stat>, from the Modem message storage <mem1> (selected using the +CPMS command). The command returns a series of responses, one per message, each item 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".

Syntax

Command	Possible response(s)

AT+CMGL[=<stat>]	if text mode (+CMGF=1), command successful and SMS-SUBMITs and/or SMS-DELIVERs:
	+CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF>
	+CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]]
	if text mode (+CMGF=1), command 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>
	[...]]
	if text mode (+CMGF=1), command successful and SMS-COMMANDs:
	+CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>
	+CMGL: <index>,<stat>,<fo>,<ct>[...]]
	if text mode (+CMGF=1), command successful and CBM storage:
	+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages>
	<CR><LF><data>[<CR><LF>

Command	Possible response(s)
	+CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <CR><LF><data>[...]] otherwise: +CMS ERROR: <err>
AT+CMGL=?	+CMGL: (list of supported <stat>s)

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<5s

Defined Values

<index> 1-352 Index of message in storage.

<stat> Status of message in memory:

PDU mode	Text mode	Description
0	“REC UNREAD”	Received unread messages (default)
1	“REC READ”	Received read messages
2	“STO UNSENT”	Stored unsent messages
3	“STO SENT”	Stored sent message
4	“ALL”	All messages

For fault tolerance, two mode can be trade off

<oa/da> Original/destination address.

<data> Message contents in text mode

<length> In PDU mode: Size of message, in octets, excluding SMSC data. InTEXT 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 SMS

<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

7.1.11 +CMGR, Read Message

Description

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".

Syntax

Command	Possible response(s)

AT+CMGR=<index>	if text mode (+CMGF=1), command 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 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 successful and SMS-STATUS-REPORT:
	+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>
	if text mode (+CMGF=1), command successful and SMS-COMMAND:
	+CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]
	if text mode (+CMGF=1), command successful and CBM storage:
	+CMGR:
	<stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><

Command	Possible response(s)
	data> otherwise: +CMS ERROR: <err>
AT+CMGR=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<2s

Defined Values

<index> Integer type and value starts from 1; Index in storage of the message to be retrieved.

<stat> Status of message in memory:

PDU mode	Text mode	Description
0	“REC UNREAD”	Received unread messages (default)
1	“REC READ”	Received read messages
2	“STO UNSENT”	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 SMS

<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

7.1.12 +CMSS, Send Message from Storage

Description

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.

Syntax

Command	Possible response(s)
AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr> or: +CMS ERROR: <err>

Command	Possible response(s)
AT+CMSS=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<60s

Defined Values

<index>:integer type; Index in storage of the message to be sent.

<da>:string type; Destination address in quoted string. This field contains a single phone number.

<toda>: string type; Type of DA. Value between 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>: integer type; Sent message reference number.

7.1.13 +CMGW, Write Message to Memory

Description

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.

Syntax

Command	Possible response(s)
If text mode (+CMGF=1): AT+CMGW[=<da>[,<toda>[,<stat>]]]<CR> text is entered<ctrl-Z/ESC>	+CMGW: <index> or: +CMS ERROR: <err>

Command	Possible response(s)
if PDU mode (+CMGF=0): AT+CMGW=<length>[,<stat>]<CR> PDU is given<ctrl-Z/ESC>	

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<2s

Defined Values

<da>:string type; destination address, string type represented in the currently selected character set.

<toda>:integer type; type of destination address.

129 number in national format

145 number in international format (contains the "+")

<stat>:string type; message status.

"REC UNREAD" new received message unread (default for DELIVER messages)

"REC READ" received message read

"STO UNSENT" message stored not yet sent (default for SUBMIT messages)

"STO SENT" message stored already sent

7.1.14 +CMGD, Delete Message

Description

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.

Syntax

Command	Possible response(s)
AT+CMGD=<index>[,<delflag>]	OK

Command	Possible response(s)
	or: +CME ERROR: <err>
AT+CMGD=?	+CMGD: (list of valid<index>s),(list of valid<delflag>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<5s

Defined Values

<index>: integer type;Index in the SMS memory of the message to be deleted.

<delflag>: integer type, indicating multiple message deletion request as follows:

0 Delete the message specified in <index>

1 Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched

2 Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched

3 Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched.

4 Delete all messages from preferred message storage including unread messages.

7.1.15 +CGSMS, Select Service for MO SMS Messages

Description

This command handles the selection of the service or service preference used by the Modem to send mobile-originated SMS messages.

Syntax

Command	Possible response(s)
AT+CGSMS=[<service>]	OK or: +CME ERROR: <err>
AT+CGSMS?	+CGSMS: <service>

Command	Possible response(s)
	OK
AT+CGSMS=?	+CGSMS: (list of currently available <service>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<service>: integer type; indicates the service or service preference to be used. The default value is manufacturer specific.

0 Packet Domain

1 Circuit switched; Note: Suggest use this one as Default setting

2 Packet Domain preferred (use circuit switched if GPRS not available)

3 Circuit switched preferred (use Packet Domain if circuit switched not available)

7.1.16 +CMGS, Send SMS to Network

Description

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

Valid <toda> will be any value between 128-255.

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

Syntax

Command	Possible response(s)

If text mode (+CMGF=1):
AT+CMGS=<da>[,<toda>]<CR>text is entered<ctrl-Z/ESC>
If PDU mode (+CMGF=0):
AT+CMGS=<length><CR>
PDU is entered<ctrl-Z/ESC>
	if text mode (+CMGF=1) and sending successful:
	+CMGS: <mr>[,<scts>]
	OK
	if PDU mode (+CMGF=0) and sending successful:
	+CMGS: <mr>
	OK
	if sending fails:

Command	Possible response(s)
	+CMS ERROR: <err>
AT+CMGS=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	<60s

Defined Values

<da>: string type;Destination address in quoted string. This field contains a single MIN number.

<toda>: integer type; Type of DA. Value between 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>: integer type; Size of message in PDU mode format, in octets, excluding SMSC data.

<mr>: integer type; Sent message reference number.

7.1.17 +CSCB, Cell Broadcast Messages

Description

This command handles the selection of cell broadcast message types and data coding schemes received by the Modem.

Syntax

Command	Possible response(s)
AT+CSCB=[<mode>[,<mids>[,<dcss>]]]	If mode=0 and <mids>is not specified, then no channels are accepted, and the Modem channel/mid list is cleared. OK or: +CMS ERROE: <err>
AT+CSCB?	+CSCB: <mode>,<mids>,<dcss> OK
AT+CSCB=?	+CSCB: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type

0 message types specified in <mids> and <dcss> are accepted

1 message types specified in <mids> and <dcss> are not accepted; Default value

<mids>: string type and range is 0-65535; all different possible combinations of CBM message identifiers (refer <mid>) (default is empty string); e.g. "0,1,5,320-478,922"

<dcss>: string type and range is 0-255; all different possible combinations of CBM data coding schemes (refer <dcs>) (default is empty string); e.g. "0-3,5"

7.1.18 +SMMFULL, Set Unsolicited Response (SMS Storage Space Full)

Description

This command handles the unsolicited response when the SMS storage space is full, if enabled the unsolicited response, we will receive a message about storage space full when received SMS.

Syntax

Command	Possible response(s)
AT+SMMFULL=<report_flag>	OK or: +CME ERROR: <err>
AT+SMMFULL?	+SMMFULL: <report_flag> OK
AT+SMMFULL=?	+SMMFULL: (list of supported <report_flag>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<report_flag>: integer type

0 disable unsolicited response, default value.

1 enable unsolicited response

Note: This command is not applicable to SG-9600-00

8 Access and security

8.1 Commands

8.1.1 A/, Repeat Last Command

Description

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

Syntax

Command	Possible response(s)
A/	Repeats last command

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

None

8.1.2 AT, Check AT Communication

Description

This command only returns OK.

Syntax

Command	Possible response(s)
AT	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

None

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

Description

Set command sends to the MT a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken towards MT and an error message, +CME ERROR, is returned to TE. Refer CME ERROR for possible <err> values.

NOTE:

SIM PIN, SIM PUK, PH-SIM PIN, PH-FSIM PIN, PH-FSIM PUK, SIM PIN2 and SIM PUK2 refer to the PIN of the selected application on the UICC. For example, in an UTRAN context, the selected application on the currently selected UICC should be a USIM and the SIM PIN then represents the PIN of the selected USIM. See 3GPP TS 31.101 [65] for further details on application selection on the UICC.

If the PIN required 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.

NOTE:

Commands which interact with MT that are accepted when MT is pending SIM PIN, SIM PUK, or PH-SIM are: +CGMI, +CGMM, +CGMR, +CGSN, D112; (emergency call), +CPAS, +CFUN, +CPIN, +CPINR, +CDIS (read and test command only), and +CIND (read and test command only). It is implementation specific whether additional commands can be accepted when MT is pending SIM PIN, SIM PUK, or PH-SIM.

Read command returns an alphanumeric string indicating whether some password is required or not.

Syntax

Command	Possible response(s)
AT+CPIN=<pin>[,<newpin>]	OK or +CME ERROR: <err>
AT+CPIN?	+CPIN: <code> OK or: +CME ERROR: <err>
AT+CPIN=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<pin>, <newpin>: string type values

<code> values reserved by the present document:

READY	MT is not pending for any password
SIM PIN	MT is waiting SIM PIN to be given
SIM PUK	MT is waiting SIM PUK to be given

PH-SIM PIN MT is waiting phone-to-SIM card password to be given

PH-FSIM PIN MT is waiting phone-to-very first SIM card password to be given

PH-FSIM PUK MT is waiting phone-to-very first SIM card unblocking password to be given

SIM PIN2 MT is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation)

SIM PUK2 MT is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)

PH-NET PIN MT is waiting network personalization password to be given

PH-NET PUK MT is waiting network personalization unblocking password to be given

PH-NETSUB PIN MT is waiting network subset personalization password to be given

PH-NETSUB PUK MT is waiting network subset personalization unblocking password to be given

PH-SP PIN MT is waiting service provider personalization password to be given

PH-SP PUK MT is waiting service provider personalization unblocking password to be given

PH-CORP PIN MT is waiting corporate personalization password to be given

PH-CORP PUK MT is waiting corporate personalization unblocking password to be given

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

Description

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 dependant. Typically it is 3 attempts for PIN, 10 attempts for PUK.

This command will return error if SIM is not inserted.

Syntax

Command	Possible response(s)
AT+TPIN?	+TPIN: <chv1>,<unb1_chv1>,<chv2>,<unb1_chv2>

Command	Possible response(s)
	or: +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<chv1>: integer ype; number of remaining PIN attempts

<chv2>: integer ype; number of remaining PIN2 attempts

<unbl_chv1>: integer ype; number of remaining PUK attempts

<unbl_chv2>: integer ype; number of remaining PUK2 attempts

8.1.5 +CPWD, Change Password

Description

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.

Syntax

Command	Possible response(s)
AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK or: +CME ERROR: <err>
AT+CPWD=?	+CPWD: list of Supported (<fac>,<pwdlength>)s OK or:

Command	Possible response(s)
	+CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<fac>: string type

"SC" SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password in MT power-up and when this lock command issued)

"AO" BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 clause 1)

"AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 [6] clause 2)

"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 clause 2)

"AB" All Barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"AG" All outGoing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"AC" All inComing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"P2" SIM PIN2

<oldpwd>, <newpwd>: string type; <oldpwd> shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD and <newpwd> is the new password; maximum length of password can be determined with <pwdlength>

<pwdlength>: integer type maximum length of the password for the facility

8.1.6 +CLCK, Facility Lock

Description

This command locks, unlocks or interrogates a Modem 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 Modem that are affected by this are 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.). For “SC”, the <passwd> is SIM PIN. For “FD”, the <passwd> is SIM PIN2.

Syntax

Command	Possible response(s)
AT+CLCK=<fac>,<mode>[,<passwd>[,<classx>]]	+CME ERROR: <err> **when <mode>=2 and command successful:** +CLCK: <status>[,<class1> [<CR><LF>+CLCK: <status>,<class2> [...]] OK
AT+CLCK=?	+CLCK: (list of supported <fac>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<fac>: string type

"SC" SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password in MT power-up and when this lock command issued)

"AO" BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OX" BOIC-exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 clause 1)

"AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 [6] clause 2)

"IR" BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 clause 2)

"AB" All Barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"AG" All outGoing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"AC" All inComing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

"PS" PH-SIM (lock PHone to SIM/UICC card installed in the currently selected card slot) (MT asks password when other than current SIM/UICC card inserted; MT may remember certain amount of previously used cards thus not requiring password when they are inserted)

"FD" SIM card or active application in the UICC (GSM or USIM) fixed dialling memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)

"PN" Network Personalization (refer 3GPP TS 22.022 [33])

"PU" network sUbset Personalization (refer 3GPP TS 22.022 [33])

"PP" service Provider Personalization (refer 3GPP TS 22.022 [33])

"PC" Corporate Personalization (refer 3GPP TS 22.022 [33])

<mode>: integer type

0 unlock

1 lock

2 query status

<status>: integer type

0 not active

1 active

<passwd>: string type; shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD

<classx> is a sum of integers each representing a class of information (default 7 - voice, data and fax):

1 voice (telephony)

2 data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)

4 fax (facsimile services)

8 short message service

16 data circuit sync

32 data circuit async

64 dedicated packet access

128 dedicated PAD access

8.1.7 +CPINR, Remaining PIN Retries

Description

Set command cause the MT to return the number of remaining PIN retries for the MTpasswords with intermediate result code +CPINR: <cod>,<retries>[,<default_retries>]for standard PINs. One line with

one intermediate result code is returned for every<cod> selected by <sel_code>. When execution command is issued without theoptional parameter <sel_code>, intermediate result codes are returned for all <cod>s. In the intermediate result codes, the parameter <default_retries> is an optional(manufacturer specific) parameter, per <cod>.

Syntax

Command	Possible response(s)
AT+CPINR[=<sel_code>]	OK Or +CME ERROR: <err>
AT+CPINR=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<retries>: integer type. Number of remaining retries per PIN.

<default_retries>: integer type. Number of default/initial retries per PIN.

<code>: Type of PIN. All values listed under the description of the AT+CPIN command, <code> parameter, except 'READY'.

<ext_code>: Extended, manufacturer specific codes.

<sel_code>: String type. Same values as for the <code> and <ext_code> parameters. These values are strings and shall be indicated within double quotes. It is optional to support wildcard match by '*', meaning match any (sub-)string.

Example: AT+CPINR="SIM*" will return the lines:

+CPINR: SIM PIN,<retries>,<default_retries>

+CPINR: SIM PUK,<retries>,<default_retries>

+CPINR: SIM PIN2,<retries>,<default_retries>

+CPINR: SIM PUK2,<retries>,<default_retries>

8.1.8 +CSIM, Generic SIM Access

Description

This command allows a direct control of the SIM by a distant application on the TE.

Syntax

Command	Possible response(s)
AT+CSIM=<length>,<command>	+CSIM: <length>,<response> OK Or +CME ERROR: <err>
AT+CSIM=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<2s

Defined Values

<length>: integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response)

<command>: String type. Command passed on by the MT to the SIM in the format as described in 3GPP TS 51.011 (hexadecimal character format; refer +CSCS)

<response>: String type. Response to the command passed on by the SIM to the MT in the format as described in 3GPP TS 51.011 (hexadecimal character format; refer +CSCS)

8.1.9 +CRSM, Restricted SIM Access

Description

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 3GPP TS 51.011(2G) and TS 31.101(3G). As response to the command, the Modem 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 of the AT+CRSM commands require PIN/PIN2 authentication.

Syntax

Command	Possible response(s)
AT+CRSM=<command>[,<file_id>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]	+CRSM: <sw1>,<sw2>[,<response>] OK or: +CME ERROR: <err>
AT+CRSM=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<2s

Defined Values

<command>: (command passed on by the MT to the SIM; refer 3GPP TS 51.011 [28]):

176 READ BINARY

178 READ RECORD

192 GET RESPONSE

214 UPDATE BINARY

220 UPDATE RECORD

242 STATUS

203 RETRIEVE DATA

219 SET DATA

all other values are reserved

NOTE 1: The MT internally executes all commands necessary for selecting the desired file, before performing the actual command.

<fileid>: integer type; this is the identifier of a elementary datafile on SIM. Mandatory for every command except STATUS

NOTE 2: The range of valid file identifiers depends on the actual SIM and is defined in 3GPP TS 51.011 [28].

Optional files may not be present at all.

<P1>, <P2>, <P3>: integer type; parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in 3GPP TS 51.011 [28]

<data>: String type. Information which shall be written to the SIM (hexadecimal character format; refer +CSCS)

<pathid>: string type; contains the path of an elementary file on the SIM/UICC in hexadecimal format as defined in ETSI TS 102 221 [60] (e.g. "7F205F70" in SIM and UICC case). The <pathid> shall only be used in the mode "select by path from MF" as defined in ETSI TS 102 221 [60].

NOTE 3: Since valid elementary file identifiers may not be unique over all valid dedicated file identifiers the <pathid> indicates the targeted UICC/SIM directory path in case of ambiguous file identifiers. For earlier versions of this specification or if <pathid> is omitted, it could be implementation specific which one will be selected.

<sw1>, <sw2>: integer type; information from the SIM about the execution of the actual command. They can be refer TS102.221

<response>: String type. Response of a successful completion of the command previously issued (hexadecimal character format; refer +CSCS). STATUS and GET RESPONSE return data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer 3GPP TS 51.011 [28]). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.

9 Network

9.1 Network Commands

9.1.1 +CSQ, Signal Strength

Description

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

Syntax

Command	Possible response(s)
AT+CSQ	+CSQ: <rssi>,<ber> OK

Command	Possible response(s)
AT+CSQ?	+CSQ: <rssi>,<ber> OK
AT+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<rssi>: integer type

0 -113 dBm or less

1 -111 dBm

2...30 -109... -53 dBm

31 -51 dBm or greater

99 not known or not detectable

<ber>: integer type; channel bit error rate (in percent)

0...7 as RXQUAL values in the table in 3GPP TS 45.008 subclause 8.2.4

99 not known or not detectable

9.1.2 +CESQ, Extended Signal Quality

Description

Execution command returns received signal quality parameters. If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.

Syntax

Command	Possible response(s)
AT+CESQ	+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp> OK or +CME ERROR: <error>
AT+CESQ=?	+CESQ: (list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<rxlev>: integer type, received signal strength level (see 3GPP TS 45.008 subclause 8.1.4).

0 rssi< -110 dBm

1 -110 dBm ≤ rssi < -109 dBm

2 -109 dBm ≤ rssi < -108 dBm

: : : :

61 -50 dBm ≤ rssi < -49 dBm

62 -49 dBm ≤ rssi < -48 dBm

63 -48 dBm ≤ rssi

99 not known or not detectable

<ber>: integer type; channel bit error rate (in percent)

0...7 as RXQUAL values in the table in 3GPP TS 45.008 subclause 8.2.4

99 not known or not detectable

<rscp>: integer type, received signal code power (see 3GPP TS 25.133 subclause 9.1.1.3 and 3GPP TS 25.123 subclause 9.1.1.1.3).

0 rscp < -120 dBm

1 -120 dBm ≤ rscp < -119 dBm

2 -119 dBm ≤ rscp < -118 dBm

: : : :

94 -27 dBm ≤ rscp < -26 dBm

95 -26 dBm ≤ rscp < -25 dBm

96 -25 dBm ≤ rscp

255 not known or not detectable

<ecno>: integer type, ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 subclause).

0 Ec/Io < -24 dB

1 -24 dB ≤ Ec/Io < -23.5 dB

2 -23.5 dB ≤ Ec/Io < -23 dB

: : : :

47 -1 dB ≤ Ec/Io < -0.5 dB

48 -0.5 dB ≤ Ec/Io < 0 dB

49 0 dB ≤ Ec/Io

255 not known or not detectable

<rsrq>: integer type, reference signal received quality (see 3GPP TS 36.133 subclause 9.1.7).

0 rsrq < -19.5 dB

1 -19.5 dB ≤ rsrq < -19 dB

2 -19 dB ≤ rsrq < -18.5 dB

: : : :

32 -4 dB ≤ rsrq < -3.5 dB

33 -3.5 dB ≤ rsrq < -3 dB

34 -3 dB ≤ rsrq

255 not known or not detectable

<rsrp>: integer type, reference signal received power (see 3GPP TS 36.133 subclause 9.1.4).

0 rsrp < -140 dBm

1 -140 dBm ≤ rsrp < -139 dBm

2 -139 dBm ≤ rsrp < -138 dBm

: : : :

95 -46 dBm ≤ rsrp < -45 dBm

96 -45 dBm ≤ rsrp < -44 dBm

97 -44 dBm ≤ rsrp

255 not known or not detectable

9.1.3 +CRLP, Radio Link Protocol

Description

This command is used to change the Radio Link Protocol(RLP) parameters used when non-transparent data calls are originated.

Syntax

Command	Possible response(s)
AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]	OK or: +CME ERROR: <err>
AT+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>[,<T4>]][<CR><LF> +CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]][...]] OK
AT+CRLP=?	+CRLP: (list of supported <iws>s),(list of supported <mws>s), (list of supported <T1>s),(list of supported <N2>s)[,<ver1> [,(list of supported <T4>s)]][<CR><LF> +CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s) [,<ver2>[,(list of supported <T4>s)]] [...]] OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<ver>, <verx>: RLP version number in integer format; when version indication is not present it shall equal 0

NOTE: Version 0 and 1 share the same parameter set. Read and test commands shall return only one line for this set(where <verx> is not present).

<iws>: integer type; IWF to MS window size. Default value is 61 when RLP<ver0> and RLP<ver1>. Default value is 240 when RLP<ver2>

<mws>: integer type; MS to IWF window size. Default value is 61 when RLP<ver0> and RLP<ver1>. Default value is 240 when RLP<ver2>

<T1>: integer type; Acknowledgement timer T1.Default value is48when RLP<ver0> and RLP<ver1>. Default value is 52 when RLP<ver2>

<N2>: integer type; Retransmission attempts N2 in integer format (refer to GSM 04.22 subclause5.4.3) . Default: 6

<T4>: integer type; re-sequencing period T4. T1 and T4 are in units of 10ms

9.1.4 +CREG, Network Registration Status

Description

Set command controls the presentation of an unsolicited result code as below:

`+CREG: <stat>` when <n>=1 and there is a change in the MT's circuit mode network registration status in GERAN/UTRAN/E-UTRAN.

or

`+CREG: <stat>[,[<lac>],[<ci>],[<AcT>]]` when <n>=2 and there is a change of the network cell in GERAN/UTRAN/E-UTRAN. The parameters `<AcT>`, `<lac>` and `<ci>` are sent only if available.

or

+CREG: <stat> [, <lac>,<ci>[,<AcT>[,<reject type>[,<reject cause>]]]] when <n>=3,when available, when the value of `<stat>` changes.

Read command returns the status of result code presentation and an integer `<stat>` which shows whether the network has currently indicated the registration of the MT. Location information elements `<lac>`, `<ci>` and `<AcT>`, if available, are returned only when <n>=2 and MT is registered in the network. The parameters `[,<cause_type>,<reject_cause>]`, if available, are returned when <n>=3.

Syntax

Command	Possible response(s)
AT+CREG=[<n>]	OK or: +CME ERROR: <err>
AT+CREG?	+CREG: <n>,<stat> [,<lac>,<ci>[,<AcT>[,<reject_type> [,<reject_cause>]]]]

Command	Possible response(s)
	OK
AT+CREG=?	+CREG: (list of supported <n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type; It is only applicable to L850 with <n>=3

0 disable network registration unsolicited result code; Default value

1 enable network registration unsolicited result code +CREG: <stat>

2 enable network registration and location information unsolicited result code +CREG: <stat>[,[<lac>],[<ci>],[<AcT>]]

3 enable network registration, location information and cause value information unsolicited result code +CREG: <stat>[,[<lac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]];

<stat>: integer type; circuit mode registration status

0 not registered, MT is not currently searching a new operator to register to

1 registered, home network

2 not registered, but MT is currently searching a new operator to register to

3 registration denied

4 unknown (e.g. out of GERAN/UTRAN/E-UTRAN coverage)

5 registered, roaming

6 registered for "SMS only", home network (applicable only when <AcT> indicates E-UTRAN)

7 registered for "SMS only", roaming (applicable only when <AcT> indicates E-UTRAN)

8 attached for emergency bearer services only(see NOTE 2) (not applicable)

9 registered for "CSFB not preferred", home network (applicable only when <AcT> indicates E-UTRAN)

10 registered for "CSFB not preferred", roaming (applicable only when <AcT> indicates E-UTRAN)

<lac>: string type; two byte location area code (when <AcT> indicates value 0 to 6), or tracking area code (when <AcT>indicates value 7). In hexadecimal format (e.g. "00C3" equals 195 in decimal).

<ci>: string type; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format.

<AcT>: integer type; access technology of the serving cell

0 GSM

1 GSM Compact

2 UTRAN

3 GSM w/EGPRS (see NOTE 3)

4 UTRAN w/HSDPA (see NOTE 4)

5 UTRAN w/HSUPA (see NOTE 4)

6 UTRAN w/HSDPA and HSUPA (see NOTE 4)

7 E-UTRAN

NOTE 3: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.

NOTE 4: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

<reject_type>: integer type; indicates the type of <reject_cause>.

0 Indicates that <reject_cause> contains an MM cause value, see 3GPP TS 24.008 [8] Annex G.

1 Indicates that <reject_cause> contains a manufacturer specific cause.

<reject_cause>: integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.

9.1.5 +CGREG, GPRS Network Registration

Description

The set command controls the presentation of an unsolicited result code `+CGREG: <stat>` when <n>=1 and there is a change in the MT's GPRS network registration status in GERAN/UTRAN, or unsolicited result code `+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>]]` when <n>=2 and there is a change of the network cell in GERAN/UTRAN. The parameters `<AcT>`, `<lac>`, `<rac>` and `<ci>` are provided only if available. The value <n>=3 further extends the unsolicited result code with `[,<cause_type>,<reject_cause>]`, when available, when the value of `<stat>` changes.

The read command returns the status of result code presentation and an integer <stat>which shows whether the network has currently indicated the registration of the MT.Location information elements <lac>, <ci>, <AcT> and <rac>, if available, are returnedonly when <n>=2 and MT is registered in the network.

Test command returns the range of supported network registration mode (i.e. <n>).

Syntax

Command	Possible response(s)
AT+CGREG=[<n>]	OK or: +CME ERROR: <err>
AT+CGREG?	+CGREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,<cause_type>,<reject_cause>]] OK
AT+CGREG=?	+CGREG: (list of supported <n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type

0 disable network registration unsolicited result code; Default value

1 enable network registration unsolicited result code +CGREG: <stat>

2 enable network registration and location information unsolicited result code
+CGREG: <stat>[,<[lac>,]<[ci>],[<AcT>],[<rac>]]

3 enable network registration, location information and GMM cause value information unsolicited result code
+CGREG: <stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,<cause_type>,<reject_cause>]]

<stat>: integer type; indicates the GPRS registration status

0 not registered, MT is not currently searching an operator to register to

1 registered, home network

2 not registered, but MT is currently trying to attach or searching an operator to register to

3 registration denied

4 unknown (e.g. out of GERAN/UTRAN coverage)

5 registered, roaming

6 registered for "SMS only", home network (not applicable)

7 registered for "SMS only", roaming (not applicable)

8 attached for emergency bearer services only (see NOTE 2) (applicable only when <AcT> indicates 2,4,5,6)

9 registered for "CSFB not preferred", home network (not applicable)

10 registered for "CSFB not preferred", roaming (not applicable)

<lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci>: string type; four byte GERAN/UTRAN cell ID in hexadecimal format

<AcT>: integer type; indicates the access technology of the serving cell

0 GSM

1 GSM Compact

2 UTRAN

3 GSM w/EGPRS (see NOTE 3)

4 UTRAN w/HSDPA (see NOTE 4)

5 UTRAN w/HSUPA (see NOTE 4)

6 UTRAN w/HSDPA and HSUPA (see NOTE 4)

7 E-UTRAN (not applicable)

NOTE 3: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.

NOTE 4: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

<rac>: string type; one byte routing area code in hexadecimal format

<cause_type>: integer type; indicates the type of <reject_cause>.

0 Indicates that <reject_cause> contains a GMM cause value, see 3GPP TS 24.008 [8] Annex G.

1 Indicates that <reject_cause> contains a manufacturer-specific cause.

<reject_cause>: integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.

9.1.6 +CEREG, EPS Network Registration status

Description

The set command controls the presentation of an unsolicited result code +CEREG:<stat> when <n>=1 and there is a change in the MT's EPS network registration status,or code +CEREG: <stat>[,<tac>,<ci>[,<AcT>]] when <n>=2 and there is a change of the network cell, code +CEREG: <stat>[,<tac>[,<ci>[,<AcT>[,<reject type>[,<reject cause>]]]]] when <n>=3.

Syntax

Command	Possible response(s)
AT+CEREG=[<n>]	OK or: +CME ERROR: <err>
AT+CEREG?	+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]] OK
AT+CEREG=?	+CEREG: (list of supported <n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type

0 disable network registration unsolicited result code; Default value

1 enable network registration unsolicited result code +CEREG: <stat>

2 enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]

3 enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]

4 For a UE that wants to apply PSM, enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]

5 For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]

<stat>: integer type; indicates the EPS registration status

0 not registered, MT is not currently searching an operator to register to

1 registered, home network

2 not registered, but MT is currently trying to attach or searching an operator to register to

3 registration denied

4 unknown (e.g. out of E-UTRAN coverage)

5 registered, roaming

6 registered for "SMS only", home network (not applicable)

7 registered for "SMS only", roaming (not applicable)

8 attached for emergency bearer services only (See NOTE 2)

9 registered for "CSFB not preferred", home network (not applicable)

10 registered for "CSFB not preferred", roaming (not applicable)

<tac>: string type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci>: string type; four byte E-UTRAN cell ID in hexadecimal format

<AcT>: integer type; indicates the access technology of the serving cell

0 GSM (not applicable)

1 GSM Compact (not applicable)

2 UTRAN (not applicable)

3 GSM w/EGPRS (see NOTE 3) (not applicable)

4 UTRAN w/HSDPA (see NOTE 4) (not applicable)

5 UTRAN w/HSUPA (see NOTE 4) (not applicable)

6 UTRAN w/HSDPA and HSUPA (see NOTE 4) (not applicable)

7 E-UTRAN

NOTE 3: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.

NOTE 4: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

<cause_type>: integer type; indicates the type of <reject_cause>.

0 Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 [83] Annex A.

1 Indicates that <reject_cause> contains a manufacturer-specific cause.

<reject_cause>: integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.

9.1.7 +COPS, Operator Selection

Description

This command enables accessories to access the network registration information, and the selection and registration of the GSM/UMTS network operator.

The Modem is registered in the Home network.

The Enhanced Operator Name String (EONS) feature enables the Modem 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.

Syntax

Command	Possible response(s)
AT+COPS=[<mode>[,<format>[,<oper>[,<AcT>]]]]	OK or: +CME ERROR: <err>
AT+COPS?	+COPS: <mode>[,<format>,<oper>[,< AcT>]] OK Or +CME ERROR: <err>
AT+COPS=?	+COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<AcT>])s][,,(list of supported <mode>s),(list of supported <format>s)] OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 3Min

Defined Values

<mode>: integer type

0 automatic (<oper> field is ignored); Default value

1 manual (<oper> field shall be present, and <AcT> optionally)

2 deregister from network

3 set only <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> and <AcT>

fields are ignored); this value is not applicable in read command response

4 manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered

<format>: integer type

0 long format alphanumeric <oper>; Default value

1 short format alphanumeric <oper>

2 numeric <oper>

<oper>: string type; <format> indicates if the format is alphanumeric or numeric; long alphanumeric format can be upto 16 characters long and short format up to 8 characters (refer GSM MoU SE.13 [9]); numeric format is the GSM Location Area Identification number (refer 3GPP TS 24.008 subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T Recommendation E.212 [10] Annex A, plus a two BCD digit network code, which is administration specific; returned <oper> shall not be in BCD format, but in IRA characters converted from BCD; hence the number has structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 3)(network code digit 2)(network code digit 1)

<stat>: integer type

0 unknown

1 available

2 current

3 forbidden

<AcT>: integer type; access technology selected

0 GSM

1 GSM Compact

2 UTRAN

3 GSM w/EGPRS (see NOTE 1)

4 UTRAN w/HSDPA (see NOTE 2)

5 UTRAN w/HSUPA (see NOTE 2)

6 UTRAN w/HSDPA and HSUPA (see NOTE 2)

7 E-UTRAN

8 CDMA

9 CDMA&EVDO

10 EVDO

11 eMTC

12 NB-IoT

NOTE 1: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about

whether the serving cell supports EGPRS.

NOTE 2: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

9.1.8 +CPLS, Selection of Preferred PLMN List

Description

This command is used to select one PLMN selector with Access Technology list in the SIM card or active application in the UICC (GSM or USIM), that is used by +CPOL command.

Syntax

Command	Possible response(s)
AT+CPLS=[<list>]	OK or: +CME ERROR: <err>
AT+CPLS?	+CPLS: <list> OK
AT+CPLS=?	+CPLS: (list of supported <list>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<list>: integer type

0 User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the SIM/UICC then PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM application selected in UICC)

1 Operator controlled PLMN selector with Access Technology EFOPLMNwAcT

2 HPLMN selector with Access Technology EFHPLMNwAcT

9.1.9 +CPOL, Preferred Operators

Description

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.

Syntax

Command	Possible response(s)
AT+CPOL=[<index>][,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>,<EUTRAN_AcT>]]]	OK or: +CME ERROR: <err>
AT+CPOL?	+CPOL: <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Compact_AcT1>,<UTRAN_AcT1>,<E-UTRAN_AcT1>] [<CR><LF>+CPOL: <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Compact_AcT2>,<UTRAN_AcT2>,<E-UTRAN_AcT2>] [...]] OK or +CME ERROR: <err>
AT+CPOL=?	+CPOL: (list of supported<index>s),(list of supported<format>s) OK or: +CME ERROR: <err>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<indexn>: integer type; the order number of operator in the SIM/USIM preferred operator list

<format>: integer type

0 long format alphanumeric <oper>; Default value

1 short format alphanumeric <oper>

2 numeric <oper>

<opern>: string type; <format> indicates if the format is alphanumeric or numeric (see +COPS)

<GSM_AcTn>: integer type; GSM access technology:

0 access technology not selected

1 access technology selected

<GSM_Compact_AcTn>: integer type; GSM compact access technology

0 access technology not selected

1 access technology selected

<UTRAN_AcTn>: integer type; UTRAN access technology

0 access technology not selected

1 access technology selected

<E-UTRAN_AcTn>: integer type; E-UTRAN access technology

0 access technology not selected

1 access technology selected

9.1.10 +GTUMODE, UTRA RAT mode switch

Description

This command forces the selection of the URAT in the protocol stack. On a later network registration (+COPS, +CGATT) this UTRA RAT is used.

This command is available for phones supporting TDS and WCDMA Mode.

In case of TDS / WCDMA Dual-Mode is selected additionally a preferred URAT can be configured, which is stored in NVRAM selecting which URAT shall be attached first.

Set command is used to set URAT and preferred URAT value used for further network registration.

Read command returns the previously set of <Act> and <mode> values.

Test command returns the range of supported <Act> values.

Syntax

Command	Possible response(s)
AT+GTUMODE=<Act>[,<mode>]	OK or: +CME ERROR: <err>
AT+GTUMODE?	+GTUMODE: <Act> [,<mode>] OK
AT+GTUMODE=?	+GTUMODE: (list of supported <Act>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<2s

Defined Values

<Act>: integer type

0 UTMS(WCDMA) mode

1 TD-SCDMA mode

2 Automatic mode

<mode> : integer type; indicates the preferred URAT mode when <Act> is ‘Automatic mode’.

0 UMTS(WCDMA) mode

1 TD-SCDMA mode

9.1.11 +GTRAT, Selection of Radio Access Technology

Description

This command is used to manually select Radio Access Technology (RAT) to register network. After you input this set command, the executed result will be returned immediately then device attempts to register specified RAT.In case of GSM / UMTS, GSM/LTE or UMTS/LTE Dual-Mode is selected additionally a preferred RAT can be configured, which is stored in NVRAM selecting which RAT shall be attached first. In case of GSM/UMTS/LTE Triple Mode is selected, additionally a first preferred RAT and a second preferred RAT can be configured to set the searching order of available RATs.

Set command is used to set RAT and preferred RAT value used for further network registration

(at+cops=0).

Read command returns the previously set of <Act> and <PreferredAct> values.

Test command returns the range of supported <Act> and <PreferredAct> values.

Syntax

Command	Possible response(s)
AT+GTRAT=<AcT> [,<PreferredAct1>[, <PreferredAct2>]]	OK or: +CME ERROR: <err>
AT+GTRAT?	+GTRAT : <Act>[,<PreferredAct1>[,<PreferredAct2>]] OK
AT+GTRAT=?	+GTRAT: (list of supported <AcT>s),(list of supported <PreferredAct1>s),(list of supported <PreferredAct2>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<AcT>: integer type; indicates the radio access technology and may be

0 GSM

1 GSM/UMTS

2 UMTS

3 LTE

4 LTE/UMTS

5 LTE/GSM

6 LTE/UMTS/GSM

7 TD-SCDMA

8 eMTC

9 NB-IoT

10 Automatic

11 CDMA

12 CDMA/EVDO

13 EVDO

<PreferredAct1>: integer type;Selected parameter must be a part of <Act>

0 GSM is preferred

1 TD-SCDMA is preferred

2 WCDMA is preferred

3 LTE is preferred

4 CDMA is preferred

5 EVDO is preferred

<PreferredAct2>: integer type;Selected parameter must be a part of <Act>

0 GSM is secondary preferred

1 TD-SCDMA is secondary preferred

2 WCDMA is secondary preferred

3 LTE is secondary preferred

4 CDMA is secondary preferred

5 EVDO is secondarypreferred

9.1.12 +GTACT, Select RAT and BAND

Description

This command allows to switch between all the allowed RATs and BANDs for air interface access. After you input this set command, the executed result will be returned immediately then device attempts to register specified RAT and bands

Syntax

Command	Possible response(s)
AT+GTACT=[<rat>[,[<PreferredAct1>],[<PreferredAct2>] [,<band_1>[,<band_2>[,.....[,<band_n>]]]]]]	OK or: +CME ERROR: <err>
AT+GTACT?	+GTACT: [<rat>[,[<PreferredAct1>],[<PreferredAct2>][,<band_1>[,<band_2>[,.....[,<band_n>]]]]]]
AT+GTACT=?	+GTACT: (list of supported <Rat>s),(list of supported <PreferredAct1>s),(list of supported <PreferredAct2>s),(list of supported <gsm_band>s),(list

Command	Possible response(s)
	of supported <umts_band>s),(list of supported <lte_band>s),(list of supported <cdma_band>s),(list of supported <evdo_band>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<rat>: integer type

0 GSM

1 UMTS

2 LTE

3 GSM/UMTS

4 LTE/UMTS

5 LTE/GSM

6 LTE/UMTS/GSM

7 TD-SCDMA

8 eMTC

9 NB-IoT

10 Automatic

11 CDMA

12 CDMA/EVDO

13 EVDO

<PreferredAct1>: integer type;Selected parameter must be a part of <Act>

0 GSM is preferred

1 TD-SCDMA is preferred

2 WCDMA is preferred

3 LTE is preferred

4 CDMA is preferred

5 EVDO is preferred

<PreferredAct2>: integer type;Selected parameter must be a part of <Act>

0 GSM is secondary preferred

1 TD-SCDMA is secondary preferred

2 WCDMA is secondary preferred

3 LTE is secondary preferred

4 CDMA is secondary preferred

5 EVDO is secondarypreferred

<Band_1>,<Band_2>....<Band_n>: integer type

0 Automatic band selection for the <rat> as mentioned in the command. If no value is mentioned for <rat> then automatic band selection is sent for all the RAT's.

<gsm_band>:

900 selection of 900 MHz band

1800 selection of 1800 MHz band

1900 selection of 1900 MHz band

850 selection of 850 MHz band

450 selection of 450 MHz band

480 selection of 480 MHz band

750 selection of 750 MHz band

380 selection of 380 MHz band

410 selection of 410 MHz band

710 selection of 710 MHz band

810 selection of 810 MHz band

<umts_band>:

1 BAND_UMTS_I

2 BAND_UMTS_II

3 BAND_UMTS_III

4 BAND_UMTS_IV

5 BAND_UMTS_V

6 BAND_UMTS_VI

7 BAND_UMTS_VII

8 BAND_UMTS_VIII

9 BAND_UMTS_IX

10 BAND_UMTS_X

11 BAND_UMTS_XI

12 BAND_UMTS_XII

13 BAND_UMTS_XIII

14 BAND_UMTS_XIV

15 BAND_UMTS_XV

16 BAND_UMTS_XVI

17 BAND_UMTS_XVII

18 BAND_UMTS_XVIII

19 BAND_UMTS_XIX

20 BAND_UMTS_XX

21 BAND_UMTS_XXI

22 BAND_UMTS_XXII

25 BAND_UMTS_XXV

For umts_tdd(TD-SCDMA):

201 BAND_UMTS_TDD_A

202 BAND_UMTS_TDD_B

203 BAND_UMTS_TDD_C

204 BAND_UMTS_TDD_D

205 BAND_UMTS_TDD_E

206 BAND_UMTS_TDD_F

<lte_band>:

101 BAND_LTE_1

102 BAND_LTE_2

103 BAND_LTE_3

104 BAND_LTE_4

105 BAND_LTE_5

106 BAND_LTE_6

107 BAND_LTE_7

108 BAND_LTE_8

109 BAND_LTE_9

110 BAND_LTE_10

111 BAND_LTE_11

112 BAND_LTE_12

113 BAND_LTE_13

114 BAND_LTE_14

115 BAND_LTE_15

116 BAND_LTE_16

117 BAND_LTE_17

118 BAND_LTE_18

119 BAND_LTE_19

120 BAND_LTE_20

121 BAND_LTE_21

122 BAND_LTE_22

123 BAND_LTE_23

124 BAND_LTE_24

125 BAND_LTE_25

126 BAND_LTE_26

127 BAND_LTE_27

128 BAND_LTE_28

129 BAND_LTE_29

130 BAND_LTE_30

131 BAND_LTE_31

132 BAND_LTE_32

133 BAND_LTE_33

134 BAND_LTE_34

135 BAND_LTE_35

136 BAND_LTE_36

137 BAND_LTE_37

138 BAND_LTE_38

139 BAND_LTE_39

140 BAND_LTE_40

141 BAND_LTE_41

142 BAND_LTE_42

143 BAND_LTE_43

144 BAND_LTE_44

145 BAND_LTE_45

146 BAND_LTE_46

147 BAND_LTE_47

148 BAND_LTE_48

149 BAND_LTE_49

150 BAND_LTE_50

151 BAND_LTE_51

152 BAND_LTE_52

153 BAND_LTE_53

154 BAND_LTE_54

155 BAND_LTE_55

156 BAND_LTE_56

157 BAND_LTE_57

158 BAND_LTE_58

159 BAND_LTE_59

160 BAND_LTE_60

161 BAND_LTE_61

162 BAND_LTE_62

163 BAND_LTE_63

164 BAND_LTE_64

<cdma_band> or <evdo_band>:

300 BAND_BC0

Note 1: This command gives a flexibility to configure Either RAT/Preferred RAT/BAND.So user can configure only RAT or Band also.

Note 2: If only Band has to be configured then first 3 parameter has to be blank. So thecommand looks like: AT+GTACT=,,,160, 155 (ex: to configure LTE band 60 and LTE band 55).

Note 3: If the RAT information is not provided then the second and third parameter will be ignored as it belongs to Preferred RAT. In case of Dual mode only one parameter (2nd param) is valid and third parameter will be ignored. Ex: AT+GTACT= 3, 0, 1 => here 1 will be ignored.

Note 4: For triple mode preferred act1 and preferred act2 will be taken as mentioned in the table below. All other combinations except these will be rejected.

Note 5: LTE parameters should be used only for the LTE platforms. In other cases the behavior is not defined.

Note 6: Band changes for one particular RAT will not affect the other RAT configuration.

Ex: Setting LTE bands will not change anything on GSM/UMTS bands.

RAT Combination Table For Triple Mode:

Preferred Act1	Preferred Act2	RAT Combination List		
Not stated	Not stated	RAT_LTE	RAT_UMTS	RAT_GSM
0	Not stated	RAT_GSM	RAT_LTE	RAT_UMTS
1	Not stated	RAT_UMTS	RAT_LTE	RAT_GSM
2	Not stated	RAT_LTE	RAT_UMTS	RAT_GSM
0	1	RAT_GSM	RAT_UMTS	RAT_LTE
0	2	RAT_GSM	RAT_LTE	RAT_UMTS
1	0	RAT_UMTS	RAT_GSM	RAT_LTE
1	2	RAT_UMTS	RAT_LTE	RAT_GSM
2	0	RAT_LTE	RAT_GSM	RAT_UMTS
2	1	RAT_LTE	RAT_UMTS	RAT_GSM

9.1.13 +GTCCINFO,Get Cell Current Information

Description

This command acquire the current information of cell.

Note: make sure execute +GTSCANSTAT command first then execute this command to get valid information

Syntax

Command	Response/Action
AT+GTCCINFO?	+GTCCINFO: 1.GSM （a maximum of ten GSM cells are supported） GSM service cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<arfcn>,<basic>,<band>,<txpwr>,<dtx_used>,<c1>,<c2>,<access_tech>,<amr_acs>,<maio>,<hsn>,<rxlevsub>,<rxlevfull>,<rxqualsub>,<rxqualfull>,<rxlev>,<rssi>,<ber_lev> GSM neighbor cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<arfcn>,<basic>,<c1>,<c2>,<c31>,<c32>,<rxlev>,<rssi>

Command	Response/Action
	2.UMTS（a maximum of ten GSM cells are supported） UMTS service cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<band>,<ecno>,<rscp>, <rac>,<rxlev>,<reserved>,<Ec/Io_lev> UMTS neighbor cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<cell_type>,<rank_pos> ,<ranking_status>,<ecno>,<pathloss>,<rxlev>,<rscp> 3.LTE/eMTC/NB-IoT（a maximum of ten LTE cells are supported） LTE/eMTC/NB-IoT service cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<band>,<ban dwidth>,<rssnr_value>,<rxlev>,<rsrp>,<rsrq> LTE/eMTC/NB-IoT neighbor cell: <IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<bandwidth>, <rxlev>,<rsrp>,<rsrq> OK 4.CDMA/EVDO（a maximum of ten GSM cells are supported） CDMA/EVDO service cell: <IsServiceCell>,<rat>,<SystemID>,<NetworkID>,<BaseID>,<ZONE_ID>,<Pilot_PN>,<Pilot _Strength>,<Channel>,<Longitude>,<Latitude> CDMA/EVDO neighbor cell: <IsServiceCell>,<rat>,<SystemID>,<NetworkID>,<BaseID>,<ZONE_ID>,<Pilot_PN>,<Pilot _Strength>,<Channel>,<Longitude>,<Latitude>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 3s

Defined Values

<IsServiceCell>: integer type

1 Service Cell

2 Not Service Cell

<rat>: integer type ; access technology

0 Invalid network

1 GSM

2 WCDMA

3 TDSCDMA

4.LTE

5 eMTC

6NB-IoT

7 CDMA

8 EVDO

<cell_id>: integer type and range is 0-0xFFFFFFFF

<mcc>: integer type ; Mobile Country Code

<mnc>: integer type ; Mobile Network Code

<lac>: integer type and range is 0-0xFFFF; Location Area Code

<arfcn>: integer type and range is 0-65535 ; Absolute Radio Frequency Channel Number

<basic>: integer type ; Base station identification code

<band>: integer type. Note: <band>= BAND_INVALID if not register network.

When register GSM:

900: 900 MHz band

1800: 1800 MHz band

1900: 1900 MHz band

850: 850 MHz band

450: 450 MHz band

480: 480 MHz band

380: 380 MHz band

410: 410 MHz band

710: 710 MHz band

810: 810 MHz band

750: 750 MHz band

When register WCDMA:

BAND_UMTS_I - BAND_UMTS_XXII.

When register TDSCDMA：

BAND_UMTS_TDD_A - BAND_UMTS_TDD_F.

When register LTE：

BAND_LTE_1 - BAND_LTE_43.

<rxlev>: integer type and range is 0-255.

For GSM:

0	less than 110 dBm.
1	110 dBm to 109 dBm.
2	109 dBm to 108 dBm.
:	
62	49 dBm to 48 dBm.
63	greater than 48 dBm.
99	not known or not detectable

For WCDMAor TDSCDMA:

0	Rscp < -120dbm
1	-120dbm <= Rscp < -119dbm
:	
96	-25dbm <= Rscp

For LTE:

0	RSRP < -140dbm
1	-140dbm <= RSRP < -139dbm
:	
96	- 45dbm <= RSRP < -44dbm
97	-44dbm <= RSRP

<txpwr>: integer type and range is 0-255; TX power

<DrxUsed>: integer type and range is 0-255;

<c1>: integer type;

<c2>: integer type;

<access_tech>: integer type and range is 0-255; Access technology

0	GSM
1	GPRS
2	EGPRS
3	EGPRS PCR

4 EGPRS EPCR

5 UMTS

6 DTM

7 EGPRS DTM

8 LTE

9 UNDEFINED.

<Maio>: integer type and range is 0-63; Mobile allocation index offset.

<amr_acs>: integer type and range is 0-255; AMR actice codec.

<hsn>: integer type and range is 0-63; Hopping sequence number

<RxlevSub>: integer type and range is 0-255;

<RxlevFull>: integer type and range is 0-255;

<RxqualSub>: integer type and range is 0-255;

<RxqualFull>: integer type and range is 0-255;

<AmrActiveCodec>: integer type and range is 0-255; Amr Active Codec

1 4.75 kbit/s codec rate

2 5.15 kbit/s codec rate

3 5.90 kbit/s codec rate

4 6.70 kbit/s codec rate

5 7.40 kbit/s codec rate

6 7.95 kbit/s codec rate

7 10.2 kbit/s codec rate

8 12.2 kbit/s codec rate

<c31>: integer type and range is 0-255;

<c32>: integer type and range is 0-255;

<dl_uarfcn>: integer type and range is 0-0xFFFF; Downlink uarfcn

<psc>: integer type and range is 0-0xFFFF; Primary scrambling code

<ecno>: integer type and range is 0-255;

<rac>: integer type and range is 0-255; Route area code

<service_qual>: integer type and range is 0-0xFFFF

<cell_type>: integer type and range is 0-255

0 Cell belongs to the Active set (CELL_DCH)

1 Cell belongs to the Virtual Active set (CELL_DCH)

2 Cells in the SIB 11/12 "BA"-list

3 Cell is a detected UMTS cell (CELL_DCH)

4 Cell is a UMTS neighbour cell in GSM mode

5 Cell is a UMTS neighbour cell (all states but CELL_DCH)

6 Cell is a UMTS neighbour cell (all states but CELL_DCH)

<rank_pos>: integer type and range is 0-255; Cell reselection ranking of the cell (0 for the best cell) and this value is used to order UMTS and GSM cells for the presentation

<ranking_value>: integer type and range is 0-255; Reason why the cell was not ranked

0 Cell is available

1 No measurement results available

2 Cell is barred

3 Wrong PLMN

4 Removed due to H criteria priority (HCS active)

5 Removed due to HCS priority

6 Removed due to cell selection criteria

<pathloss>: integer type and range is 0-0xFF and 0xFF if not Available.

<tac>: integer type and range is 0-0xFFFF; Tracking Area Code.

<earfcn>: integer type and range is 0-0xFFFFFFFF; EUTRA Absolute Radio Frequency Channel Number

<physicalcellId>: integer type and range is 0-0xFFFFFFFF; physical cell Id

<bandwidth>: integer type and range is 0-255;

<rssnr_value>: integer type and range is -100-100; Radio Signal Strength Noise Ratio

-100 : RSSNR <= -50dB;

-99 : -50dB < RSSNR <= -49.5dB;

-98 : 49.5dB < RSSNR <= -49dB;

.....

-1: -1dB < RSSNR <= -0.5dB;

0 : -0.5dB < RSSNR <= 0dB;

1 : 0dB < SSNR <= 0.5dB;

.....

98 : 49dB < RSSNR <= 49.5dB;

99 : 49.5dB < RSSNR <= 50dB;

100 : 50dB < RSSNR;

255 :Invalid value. not known or not detectable

<rsrp> : integer type and range is 0-255; Reference Signal Receive Power.

Note: 0 means less than -140 dBm or not detectable

<rsrq> : integer type and range is 0-255; Reference Signal Receive Quality

0 .. RSRQ < -19.5dB

1 .. -19.5dB <= RSRQ < -19.0dB

:

33 -3.5dB <= RSRQ < -3.0dB

34 -3.0dB <= RSRQ

<rssi>: integer type and range is 0-255; Received Signal Strength Indicator.

Note: 0 means less than -110 dBm or not detectable

<rscp>: integer type and range is 0-255; Received Signal Code Power

Note: 0 means less than -120 dBm or not detectable.

<ber_lev>: integer type and range is 0-255; bit error rate level

0 .. BER < 0,2 %

1 .. 0,2 % < BER < 0,4 %

2 .. 0,4 % < BER < 0,8 %

3 .. 0,8 % < BER < 1,6 %

4 .. 1,6 % < BER < 3,2 %

5 .. 3,2 % < BER < 6,4 %

6 .. 6,4 % < BER < 12,8 %

7 .. 12,8 % < BER

<Ec/Io_lev>: integer type and range is 0-49; CPICH Ec/Io level

0 CPICH Ec/Io < -24dB;

1 -24dB <= CPICH Ec/Io < -23.5dB;

.....

49 0dB<= CPICH Ec/Io dB;

<SystemID>:integer type and range is 0-65535;

<NetworkID>:integer type and range is 0-65535;

<BaseID>:integer type and range is 0-65535;

<ZONE_ID>:integer type and range is 0-65535;

<Pilot_PN>:integer type and range is 0-65535;

<Pilot_Strength>:integer type and range is 0-65535;

<Channel>:integer typeand range is 0-65535;

<Longitude>:integer typeand range is -648000 -- 648000, unit: second;

<Latitude>:integer typeand range is -324000 -- 324000, unit: second;

9.1.14 +COPN, Read Operator Names

Description

This Execution command returns the list of operator names from the ME. Each operator code <numeric_n> that has an alphanumeric equivalent <alpha_n> in the ME memory shall be returned.

Syntax

Command	Possible response(s)
AT+COPN	+COPN: <numeric1>,<alpha1> [<CR><LF>+COPN: <numeric2>,<alpha2> [...]] OK or +CME ERROR: <err>
AT+COPN=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	No	Yes	Yes	< 1s

Defined Values

<numericn>:string type;operator in numeric format (see +COPS)

<alphan>: string type;operator in long alphanumeric format (see +COPS)

Note : If matching PLMN name is not found then numeric PLMN id (MCCMNC) will be displayed

9.1.15 +CEMODE, UE modes of operation for EPS

Description

This command is used to set the MT to operate according to the specified mode of operation for EPS.

Syntax

Command	Possible response(s)
AT+CEMODE=[<mode>]	OK

Command	Possible response(s)
	or +CME ERROR: <err>
AT+CEMODE?	+CEMODE: <mode> OK
AT+CEMODE=?	+CEMODE: (list of supported <mode>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<mode>: integer type; indicates the mode of operation. The default value is depended on the target products.

0 PS mode 2 of operation

1 CS/PS mode 1 of operation.

2 CS/PS mode 2 of operation.

3 PS mode 1 of operation

NOTE: The definition for UE modes of operation can be found in 3GPP TS 24.301 [83]

10 Hardware Information

10.1 UART Parameter Commands

10.1.1 +IPR, Fixed DTE Rate

Description

This command specifies the data rate at which the DCE will accept commands. The full range of data rate values may be reduced dependent on HW or other criteria.

Syntax

Command	Possible response(s)
AT+IPR=<baud_rate>	OK or +CME ERROR: <err>
AT+IPR?	+IPR: <baud_rate> OK
AT+IPR=?	+IPR: (list of supported <baud_rate>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<baud_rate>: integer type; e,g, 0 (default), 2400, 4800, 9600, 19200, 38400, 57600,115200,230400, 460800, 921600.

Note: <baud_rate>=0 means automatic detection. And the supported auto baudrate detect as following:

0,2400,4800,9600,14400,19200,28800,33600,38400,57600,115200,230400,460800,921600

Note: the supported baud rate depends on the target.

10.1.2 +CBAUD, Baud Rate Regulation

Description

This command sets the uniquely UART baud rate. The baud rate of the modem will be change/set to the request value <rate>.

Specifying a value of 0 ,1 or 9 allows operation only at rates automatically detectable by the modem. The specified rate takes effect following the issuing of any result code(s) associated with the current command line.

In auto baud rate detection, an AT command must be sent to the modem firstly. After received any AT command, the module will lock on the single detected baud rate (this AT command will be lost and can not get response from the modem). A +CBAUD Read command can feedback the currently in-use baud rate.

The module can not be changed to auto baud without send AT+CBAUD=0 ,1 or 9 command or after power cycle.

The parameter can't be saved after a power cycle.

Note:

For L810-GL/L830-GL, the auto baud rate detection supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400.

Syntax

Command	Possible response(s)
AT+CBAUD=<n>	OK or: +CME ERROR: <err>
AT+CBAUD?	+CBAUD: <rate> OK
AT+CBAUD=?	+CBAUD: (list of supported <n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>	<rate>
0	Auto baud rate
1	Auto baud rate
2	1200
3	2400
4	4800
5	9600
6	14400
7	19200
8	28800
9	Auto baud rate
10	33600

11	38400
12	57600
13	115200
14	230400
15	460800
16	921600

Note: the supported baud rate and default baud rate depends on the target. Suggest use 0 as default setting.

10.1.3 &K, RTS/CTS Flow Control

Description

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

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

Syntax

Command	Possible response(s)
AT&K<param>	OK or: +CME ERROR: <err>
AT&K?	&K: <param> OK
AT&K=?	&K: (list of supported <param>s)

Command	Possible response(s)
	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<param>: integer type

0 Disable all terminal/Module control. Default value

3 Enable CTS/RTS terminal/ Module flow control

10.1.4 +IFC, RTS/CTS Flow Control

Description

This parameter controls the operation of the local flow control between the terminal and the modemduring 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 subparameters:

- <DCE_by_DTE>: Specifies the method to be used by the terminal to control the flow of received data from the modem.
- <DTE_by_DCE>: Specifies the method to be used by the modem to control the flow of transmitted data from the terminal.

Syntax

Command	Possible response(s)
+IFC=[<DCE_by_DTE>[,<DTE_by_DCE>]]	OK or: ERROR
AT+IFC?	+IFC: [<DCE_by_DTE>[,<DTE_by_DCE>]] OK
AT+IFC=?	+IFC: (list of supported <DCE_by_DTE>s,list of supported <DTE_by_DCE>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<DCE_by_DTE>: integer type

0 None

2 Circuit 133 (Ready for Receiving)

<DTE_by_DCE>: integer type

0 None

2Circuit 106 (Clear to Send/Ready for Sending)

10.1.5 &C, Circuit 109 Behavior

Description

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 modem (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. 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). DCD is activated only when the PDP context is achieved. 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, 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).

Syntax

Command	Possible response(s)
AT&C<param>	OK or: +CME ERROR: <err>
AT&C?	&C: <param> OK
AT&C=?	&C: (list of supported <param>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<param>: integer type; And the default value is 1.

0 DCD is forced ON at all times.

1 DCD is set to ON when a CSD carrier is detected or a GPRS external session is being established or the modementers PPP mode TE is about to send an LCP configure-request to the modem (GPRS connection is not yet established).

DCD is set to OFF when No CSD carrier is detected or the modem 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 the modem 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 the modem has lost its GPRS connection with the network (PDP context was deactivated and the IP address is cancelled).

10.1.6 &D, Circuit 108 (Data Terminal Ready) behaviour

Description

This parameter determines how the DCE responds when circuit 108/2 is changed from the ON to the OFF condition during online data state.

Syntax

Command	Possible response(s)
AT&D[<value>]	OK or: +CME ERROR: <err>
AT&D?	&D: <value> OK
AT&D=?	&D: (list of supported <value>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<value>: integer type

0DCE ignores circuit 108/2.Default value

1 Upon an on-to-off transition of circuit 108/2, the DCE enters online command state andissues an OK result code; The call remains connected.

2Upon an on-to-off transition of circuit 108/2, the DCE instructs the underlying DCE toperform an orderly cleardown of the call.

The disposition of any data in the DCEpending transmission to the remote DCE is controlled by the +ETBM parameter (see6.5.6) if implemented; otherwise, this data is sent before the call is cleared, unless the remote DCE clears the call first (in which case pending data is discarded). The DCEdisconnects from the line. Automatic answer is disabled while circuit 108/2 remainsoff.

For MUX and MUX_INIT case:

0-3 Ignores DTR changes

4 Drops the MUX application and returns to PRE_MUX state

11 GPRS

11.1 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, Modem-specific escape mechanism (DTR) is provided to enable the TE to switch the Modem into limited online command state.
The use of a multiplexed interface, (GSM 07.10), is not considered here (See “Multiplexer Feature”). The Modem-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 Modem-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).

11.2 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.

11.2.1 +CGCLASS, GPRS Mobile Station Class

Description

This command is used to set the Modem 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.

Syntax

Command	Possible response(s)
AT+CGCLASS=<class>	OK or: +CME ERROR: <err>
AT+CGCLASS?	+CGCLASS: <class> OK
AT+CGCLASS=?	+CGCLASS: (list of supported <class>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	No	< 1s

Defined Values

<class>: string type; indicates the mode of operation. The default value is manufacturer specific.

A Class-A mode of operation (A/Gb mode), or CS/PS mode of operation (Iu mode) (highest mode of operation)

B Class-B mode of operation (A/Gb mode), or CS/PS mode of operation (Iu mode)

CG Class-C mode of operation in PS only mode (A/Gb mode), or PS mode of operation (Iu mode)

CC Class-C mode of operation in CS only mode (A/Gb mode), or CS (Iu mode) (lowest mode of operation)

NOTE:

<class> A means that the MT would operate simultaneous PS and CS service

<class> B means that the MT would operate PS and CS services but not simultaneously in

A/Gb mode

<class> CG means that the MT would only operate PS services

<class> CC means that the MT would only operate CS services

If the MT is attached to the PS domain when the set command is issued with a <class> = CC specified, a PS detach shall be performed by the MT.

11.2.2 +CGDCONT, Define PDP Context

Description

The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>and also allows the TE to specify whether security protected transmission of ESM information is requested, because the PCO can include information that requires ciphering. There can be other reasons for the UE to use security protected transmission of ESM information, e.g. if the UE needs to transfer an APN. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

For EPS the PDN connection and its associated EPS default bearer is identified herewith.

A special form of the set command, +CGDCONT=<cid> causes the values for context number <cid> to become undefined.

The read command returns the current settings for each defined context.

The test command returns values supported as compound values. If the MT supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

Syntax

Command	Possible response(s)
+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]]]]]	OK or: +CME ERROR: <err>
AT+CGDCONT?	+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]][<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]

Command	Possible response(s)
	[...]]
AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s)[<CR><LF> +CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s)

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values is returned by the test form of the command.

NOTE 1: The <cid>s for network-initiated PDP contexts will have values outside the ranges indicated for the <cid> in the test form of the commands +CGDCONT and +CGDSCONT.

<PDP_type>: string type; specifies the type of packet data protocol. The default value is manufacturer specific.

X.25 ITU-T/CCITT X.25 layer 3 (Obsolete)

IP Internet Protocol (IETF STD 5 [103])

IPV6 Internet Protocol, version 6 (see RFC 2460 [106])

IPV4V6 Virtual <PDP_type> introduced to handle dual IP stack UE capability. (See 3GPP TS 24.301 [83])

OSPIH Internet Hosted Octect Stream Protocol (Obsolete)

PPP Point to Point Protocol (IETF STD 51 [104])

NOTE 2: Only IP, IPV6 and IPV4V6 values are supported for EPS services.

<APN>: string type; a logical name that is used to select the GGSN or the external packet data network.If the value is

null or omitted, then the subscription value will be requested.

<PDP_addr>: string type; identifies the MT in the address space applicable to the PDP.When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGDCONT.

NOTE 3: The value of this parameter is ignored with the set command. The parameter is included in the set command for backwards compatibility reasons only.

<d_comp>: integer type; controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065 [61])

0 off

1 on (manufacturer preferred compression)

2 V.42bis

3 V.44

<h_comp>: integer type; controls PDP header compression (refer 3GPP TS 44.065 [61] and 3GPP TS 25.323 [62])

0 off

1 on (manufacturer preferred compression)

2 RFC 1144 [105] (applicable for SNDCP only)

3 RFC 2507 [107]

4 RFC 3095 [108] (applicable for PDCP only)

<IPv4AddrAlloc>: integer type; controls how the MT/TA requests to get the IPv4 address information

0 IPv4 address allocation through NAS signalling

1 IPv4 address allocated through DHCP

<request_type>: integer type; indicates the type of PDP context activation request for the PDP context, see 3GPP TS 24.301 (subclause 6.5.1.2) and 3GPP TS 24.008 (subclause 10.5.6.17). According to 3GPP TS 24.008 (subclause 4.2.4.2.2 and subclause 4.2.5.1.4) and 3GPP TS 24.301 (subclause 5.2.2.3.3 and subclause 5.2.3.2.2), a separate PDP context must be established for emergency bearer services.

NOTE 4: If the PDP context for emergency bearer services is the only activated context, only emergency calls are allowed, see 3GPP TS 23.401 subclause 4.3.12.9.

0 PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific)

1 PDP context is for emergency bearer services

2 PDP context is for new PDP context establishment

3 PDP context is for handover from a non-3GPP access network

<P-CSCF_discovery>: integer type; influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 annex B and annex L.

0 Preference of P-CSCF address discovery not influenced by +CGDCONT

1 Preference of P-CSCF address discovery through NAS signalling

2 Preference of P-CSCF address discovery through DHCP

<IM_CN_Signalling_Flag_Ind>: integer type; indicates to the network whether the PDP context is for IM CN subsystem-related signalling only or not.

0 UE indicates that the PDP context is not for IM CN subsystem-related signalling only

1 UE indicates that the PDP context is for IM CN subsystem-related signalling only

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

Description

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.

Syntax

Command	Possible response(s)
AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliability.>[,<peak>[,<mean>]]]]]	OK or: +CME ERROR: <err>
AT+CGQMIN?	+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF> +CGQMIN: <cid>,<precedence>,<delay>,<reliability.>,<peak>,<mean>[...]] OK or: +CME ERROR: <err>
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>

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<PDP_type>: string type; specifies the type of packet data protocol (see the +CGDCONT command). The following parameters are defined in 3GPP TS 23.107 [46]:

<precedence>: integer type; specifies the precedence class

<delay>: integer type; specifies the delay class

<reliability>: integer type; specifies the reliability class

<peak>: integer type; specifies the peak throughput class

<mean>: integer type; specifies the mean throughput class

11.2.4 +CGQREQ, Quality of Service Profile (Requested)

Description

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.

Syntax

Command	Possible response(s)
AT+CGQREQ=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]	OK or: +CME ERROR: <err>
AT+CGQREQ?	+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> OK
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

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<PDP_type>: string type; specifies the type of packet data protocol (see the +CGDCONT command).The following parameters are defined in 3GPP TS 23.107 [46]:

<precedence>: integer type; specifies the precedence class

<delay>: integer type; specifies the delay class

<reliability>: integer type; specifies the reliability class

<peak>: integer type; specifies the peak throughput class

<mean>: integer type; specifies the mean throughput class

11.2.5 +CGATT, Packet Domain Attach or Detach

Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT 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.

Syntax

Command	Possible response(s)
AT+CGATT=<state>	OK or: +CME ERROR: <err>
AT+CGATT?	+CGATT: <state> OK
AT+CGATT=?	+CGATT: (list of supported <state>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<15s

Defined Values

<state>: integer type; indicates the state of PS attachment

0 detached

1 attached

11.2.6 D*99, Request GPRS Service "D"

Description

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) command 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 startup 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 shut down 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 knowledge, 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.

Syntax

Command	Possible response(s)
ATD*<GPRS_SC>[* [<called_address>] [*[<L2P>][*[<cid>]]]]#	CONNECT or: ERROR

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<30s

Defined Values

<GPRS_SC>: string type; GPRS Service Code to identify a request to use GPRS.

<called_address>: string type; to identify 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>: string type; [<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 type; to indicate 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) do not permit arbitrary characters in the dial string. The <L2P> and <called_address> strings are therefore specified as containing digits (0-9) only.

<cid>: integer type; to specify a particular PDP context definition (See "+CGDCONT, Define PDP Context").

11.2.7 +CGACT, PDP Context Activate or Deactivate

Description

The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in V.250 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 MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If the attach fails then the MT responds with ERROR or, if extended error responses are enabled, with the appropriate failure-to-attach error message.

For EPS, if an attempt is made to disconnect the last PDN connection, then the MT responds with ERROR or, if extended error responses are enabled, a +CME ERROR.

Syntax

Command	Possible response(s)
AT+CGACT=[<state>[,<cid>[,<cid>[,]]]]	OK or: NO CARRIER or: +CME ERROR: <err>
AT+CGACT?	+CGACT: <cid>,<state><CR><LF> +CGACT: <cid>,<state><CR><LF> +CGACT: <cid>,<state> OK
AT+CGACT=?	+CGACT: (list of supported <state>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	<30s

Defined Values

<state>: integer type; indicates the state of PDP context activation. The default value is manufacturer specific.

0 deactivated

1 activated

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

11.2.8 +CGPADDR, GPRS Addresses

Description

The execution command returns a list of PDP addresses for the specified context identifiers. If no <cid> is specified, the addresses for all defined contexts are returned.

Syntax

Command	Possible response(s)
AT+CGPADDR[=<cid>[,<cid>[,]]]	+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]] [<CR><LF>+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]][...]] OK
AT+CGPADDR=?	+CGPADDR: (list of defined <cid>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<PDP_addr_1> and <PDP_addr_2>: each is a string type 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 set by the +CGDCONT and +CGDSCONT commands when the context was defined.

For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2>are omitted if none is available. Both <PDP_addr_1> and <PDP_addr_2> are included when both IPv4 and IPv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address.

The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4. a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6.

When +CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter <PDP_addr_1> or <PDP_addr_2> returned with the execute form of +CGPADDR.

11.2.9 +GTDNS, Request DNS Addresses

Description

This command is used to obtain the primary and secondary DNS address when PDP context specified by profile id is activated.

Syntax

Command	Possible response(s)
AT+GTDNS=<cid>	+GTDNS: <cid>,<Primary_DNS_addr>,<Secondary_DNS_addr> OK
AT+GTDNS?	+GTDNS: <cid1>,<Primary_DNS_addr1>,<Secondary_DNS_addr1> +GTDNS: <cid2>,<Primary_DNS_addr2>,<Secondary_DNS_addr2> ….. +GTDNS: <cidn>,<Primary_DNS_addrn>,<Secondary_DNS_addrn> OK
AT+GTDNS=?	+GTDNS: (list of defined <cid>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<Primary_DNS_addr>: String type. Primary DNS address

<Secondary_DNS_addr>: String type. Secondary DNS address

11.2.10 +CGCMOD，PDP Context Modify

Description

This command is used to modify the specified PDP context (s) with respect to QoS profiles and TFTs.

Syntax

Command	Possible response(s)
AT+CGCMOD=[<cid>[,<cid>[,…]]]	OK Or +CME ERROR: <err>
AT+CGCMOD=?	+CGCMOD: (list of <cid>s associated with active contexts) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

11.2.11 +CGDATA，Enter Data State

Description

This execution command causes the MT to perform whatever actions are necessary to establish

communication between the TE and the network using one or more GPRS PDP types. This may include performing a GPRS attach and one or more PDP context activation. If the parameters are accepted, MT displays the intermediate result code CONNECT on TE and enters the online data state; thereafter data transfer may proceed. No other commands following +CGDATA in the command line will be processed.

Syntax

Command	Possible response(s)
AT+CGDATA=[<L2P>,[<cid>[,<cid>[,…]]]]	CONNECT It follows data transfer or +CME ERROR: <err>
AT+CGDATA=?	+CGDATA: (list of supported <L2P>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<L2P>: string type; indicates the layer 2 protocol to be used between the TE and MT

NULL none, for PDP type OSP:IHOSS (Obsolete)

PPP Point-to-point protocol for a PDP such as IP

PAD character stream for X.25 character (triple X PAD) mode (Obsolete)

X25 X.25 L2 (LAPB) for X.25 packet mode (Obsolete)

M-xxxx manufacturer-specific protocol (xxxx is an alphanumeric string)

Note: If the value is omitted, the layer 2 protocol is unspecified. Other values are reserved and will result in an ERROR response.

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

11.2.12 +MGAUTH, Set type of authentication

Description

This command is used to set the type of PPP authentication (PAP/CHAP) and username and password for the specified PDP context.

Note:

If Host has specified the authentication type when it makes a PPP connection, the setting of +MGAUTH will be not taking effect. Or else the setting of +MGAUTH will be taking effect.

Syntax

Command	Possible response(s)
AT+MGAUTH=<cid>,<auth>[,<name>,<pwd>]	OK or: +CME ERROR: <err>
AT+MGAUTH?	+MGAUTH: <cid>,<auth> … OK or OK
AT+MGAUTH=?	+MGAUTH: (list of supported <cid>s),(list of supported <auth>s),(max length of supported <name>),(max length of supported <pwd>) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	Yes	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<auth>: integer type;Authentication may be:

0 Authentication protocol is not used (NONE)

1 Password Authentication Protocol (PAP)

2Challenge-Handshake Authentication Protocol (CHAP)

3 PAP and CHAP

<name>: string type;User nameand the maximum length: 64 bytes

<pwd>: string type;Password and the maximum length: 64 bytes

11.2.13 +CGEQOS, Define EPS Quality Of Service

Description

The set command allows the TE to specify the EPS Quality of Service parameters <cid>, <QCI>, [<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>]for a PDP context or Traffic Flows(see3GPP TS 24.301 [83]and 3GPP TS 23.203 [85]). When in UMTS/GPRS the MT applies a mapping function to UTMS/GPRS Quality of Service.

A special form of the set command, +CGEQOS= <cid> causes the values for context number <cid> to become undefined.

The read command returns the current settings for each defined QoS.

The test command returns the ranges of the supported parameters as compound values.

Syntax

Command	Possible response(s)
AT+CGEQOS=[<cid>[,<QCI>[,<DL_GBR>,<UL_GBR>[,<DL_MBR>,<UL_MBR>]]]]	OK or +CME ERROR: <err>
AT+CGEQOS?	+CGEQOS: <cid>,<QCI>, [<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [<CR>>LF>+CGEQOS: <cid>,<QCI>, [<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [...]]
AT+CGEQOS=?	+CGEQOS: (range of supported <cid>s),(list of supported <QCI>s),(list of supported <DL_GBR>s),(list of supported <UL_GBR>s),(list of supported <DL_MBR>s),(list of supported <UL_MBR>s)

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<cid>: integer type; specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS (see the +CGDCONT and +CGDSCONT commands).

<QCI>: integer type; specifies a class of EPS QoS (see 3GPP TS 23.203 [85] and 3GPP TS 24.301 [83]).

0	QCI is selected by network
[1 – 4]	value range for guaranteed bit rate Traffic Flows
[5 – 9]	value range for non-guarenteed bit rate Traffic Flows
[128 – 254]	value range for Operator-specific QCIs

The QCI values 65, 66, 69 and 70 are not allowed to be requested by the UE. If the TE requests a QCI parameter 65, 66, 69 or 70, the MT responds with result code +CME ERROR: 181 (unsupported QCI value).

<DL_GBR>: integer type; indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

<UL_GBR>: integer type; indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

<DL_MBR>: integer type; indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

<UL_MBR>: integer type; indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

12 Fibocom Proprietary Commands

12.1 Set Profile Commands

12.1.1 +GTRNDIS, RNDIS Configuration

Description

This command is used to enable/disable RNDIS function with specified cid.

Note before enable RNDIS function, make sure the PDP context with this specified cid have been activated.

Syntax

Command	Possible response(s)
+GTRNDIS=<state>,<cid>	OK

Command	Possible response(s)
	or ERROR
+GTRNDIS?	+GTRNDIS: <state>,<cid>,<ip>,<pdns>,<sdns> OK or +GTRNDIS: 0
AT+ GTRNDIS=?	+GTRNDIS: (list of supported <state>s),(list of supported <cid>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
Yes	Yes	Yes	No	< 1s

Defined Values

<state>: integer type

0 deactivate RNDIS. Default value.

1 active RNDIS

<cid>: integer type; profile id used by RNDIS and specified with AT+CGDCONT

<ip>: string type; IP address assigned by network to RNDIS device via PDP context activate accept

<pdns>: string type; primary DNS assigned by network via PDP context activate accept

<sdns>: string type; secondary DNS assigned by network via PDP context activate accept

13 Error Handing and Error Code

13.1 Error Handling Commands

13.1.1 +CMEE, Report Mobile Equipment Error

Description

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 MODEM. When enabled, Modem -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 Modem. When enabled, Modem 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 modem. When enabled, modem -related errors cause a +CMS ERROR: <err> final result code instead of the regular ERROR final result.

Syntax

Command	Possible response(s)
AT+CMEE=[<n>]	OK or: +CME ERROR: <err> Note: the original setting is not changed if AT+CMEE=
AT+CMEE?	+CMEE: <n> OK
AT+CMEE=?	+CMEE: (list of supported <n>s) OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<n>: integer type

0 Disable the +CME ERROR: <err> result code and use ERROR. Default value

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.

13.1.2 +CEER, Extended Error Report

Description

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.

Syntax

Command	Possible response(s)
AT+CEER	+CEER: <category>[,<cause>,<description>] OK
AT+CEER=?	OK

Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of duration
No	No	Yes	Yes	< 1s

Defined Values

<category>: string type

“No report available”

“CC setup error”

“CC modification error”

“CC release”

“SM attach error”

“SM detach”

“SM activation error”

“SM deactivation”

“SS – network error cause”

“SS – network reject cause”

“SS – network GSM cause”

<cause>: contains a digit representing the error cause sent by network or internally

<description>:string type; contains the textual representation of the Cause

13.2 CME Error

Parameter	Description
<err>	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" 19, "incorrect PUK1" 20, "memory full" 21, "invalid index" 22, "not found" 23, "memory failure" 24, "text string too long" 25, "invalid characters in text string"

Parameter	Description
	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 personalisation PIN required" 41, "network personalisation PUK required" 42, "network subset personalisation PIN required" 43, "network subset personalisation PUK required" 44, "service provider personalisation PIN required" 45, "service provider personalisation PUK required" 46, "corporate personalisation PIN required" 47, "corporate personalisation PUK required" 48, "hidden key required" **Note:** This key is required when accessinghidden phonebook entries.) 49, "EAP method not supported" 50, "Incorrect parameters" 100, "unknown" 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" 114, "GPRS services not allowed in this PLMN" 116, "MSC temporarily not reachable" 117, "Network failure" 132, "Service not supported" 133, "Service not subscribed" 134, "service option temporarily out of order" 135, "NS-api already used" 148, "Unspecified GPRS error"

Parameter	Description
	149, "PDP authentication error" 150, "invalid mobile class" 244, "Attach failure" 257, "Invalid error mapping" 258, "APN not listed in APN Control List (ACL)" 701, "incorrect security code" 702, "max attempts reached" 1001, "Unassigned (unallocated) number" 1003, "No route to destination" 1006, "Channel unacceptable" 1008, "Operator determined barring" 1016, "Normal call clearing" 1017, "User busy" 1018, "No user responding" 1019, "User alerting, no answer" 1021, "Call rejected" 1022, "Number changed" 1026, "Non selected user clearing" 1027, "Destination out of order" 1028, "Invalid number format (incomplete number)" 1029, "Facility rejected" 1030, "Response to STATUS ENQUIRY" 1031, "Normal, unspecified" 1034, "No circuit/channel available" 1038, "Network out of order" 1041, "Temporary failure" 1042, "Switching equipment congestion" 1043, "Access information discarded" 1044, "requested circuit/channel not available" 1047, "Resources unavailable, unspecified" 1049, "Quality of service unavailable" 1050, "Requested facility not subscribed" 1055, "Incoming calls barred within the CUG"

Parameter	Description
	1057, "Bearer capability not authorized" 1058, "Bearer capability not presently available" 1063, "Service or option not available, unspecified" 1065, "Bearer service not implemented" 1068, "ACM equal to or greater than ACMmax" 1069, "Requested facility not implemented" 1070, "Only restr. digital information bearer capability" 1079, "Service or option not implemented, unspecified" 1081, "Invalid transaction identifier value" 1087, "User not member of CUG" 1088, "Incompatible destination" 1091, "Invalid transit network selection" 1095, "Semantically incorrect message" 1096, "Invalid mandatory information" 1097, "Message type non-existent or not implemented" 1098, "Message type not compatible with protocol state" 1099, "Information element non-existent or not implemented" 1100, "Conditional IE error" 1101, "Message not compatible with protocol state" 1102, "Recovery on timer expiry" 1111, "Protocol error, unspecified" 1127, "Interworking, unspecified" 1279, "Number not allowed" 1283, "CCBS possible" Note: L710、G500、G510 use respectively other error cause instead of above one with below value: 50, “Execute command failure” 100, NA

13.3 CMS Error

Parameter	Description
<err>	1, "Unassigned (unallocated) number" 8, "Operator determined barring" 10, "Call barred" 17, "Network failure" 21, "Short message transfer rejected" 22, "Memory capacity exceeded" 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 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, "Interworking unspecified" 128, "Telematic interworking 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"

Parameter	Description
	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, "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" 224, "TP_FCS_APPL_ERR_START" 254, "TP_FCS_APPL_ERR_STOP" 255, "TP_FCS_UNSPECIFIED" 300, "ME failure" 301, "SMS service of ME reserved" 302, "operation not allowed" 303, "operation not supported" 304, "Invalid PDU mode param" 305, "invalid text mode parameter" 310, "SIM not inserted" 311, "SIM PIN required" 312, "PH-SIM PIN necessary" 313, "SIM failure" 314, "SIM busy" 315, "SIM wrong"

Parameter	Description
	317, "SIM PIN2 required" 318, "SIM PUK2 required" 319, "incorrect PUK1" 320, "memory failure" 321, "invalid memory index" 322, "memory full" 330, "SMSC address unknown" 331, "no network service" 332, "network timeout" 340, "no +CNMA acknowledgement expected" 512, "MN_SMS_RP_ACK" 513, "MN_SMS_TIMER_EXPIRED" 514, "MN_SMS_FORW_AVAIL_FAILED" 515, "MN_SMS_FORW_AVAIL_ABORTED" 516, "MS invalid TP-Message-Type-Indicator" 517, "MS no TP-Status-Report in Phase 1" 518, "MS no TP-Reject-Duplicate in Phase 1" 519, "MS no TP-Reply-Path in Phase 1" 520, "MS no TP-User-Data-Header in Phase 1" 521, "MS missing TP-Validity-Period" 522, "MS invalid TP-Service-Centre-Time-Stamp" 523, "MS missing TP-Destination-Address" 524, "MS invalid TP-Destination-Address" 525, "MS missing Service-Centre-Address" 526, "MS invalid Service-Centre-Address" 527, "MS invalid alphabet" 528, "MS invalid TP-User-Data-Length" 529, "MS missing TP-User-Data" 530, "MS TP-User-Data too long" 531, "MS no Command-Request in Phase 1" 532, "MS Cmd-Req invalid TP-Destination-Address" 533, "MS Cmd-Req invalid TP-User-Data-Length" 534, "MS Cmd-Req invalid TP-User-Data"

Parameter	Description
	535, "MS Cmd-Req invalid TP-Command-Type" 536, "MN MNR creation failed" 537, "MS CMM creation failed" 538, "MS network connection lost" 539, "MS pending MO SM transfer" 540, "RP-Error OK" 541, "RP-Error OK no icon display" 542, "SMS-PP Unspecified" 543, "SMS rejected By SMS CONTROL" Note: L710、G500、G510 use respectively other error cause instead of above one with below value: 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”