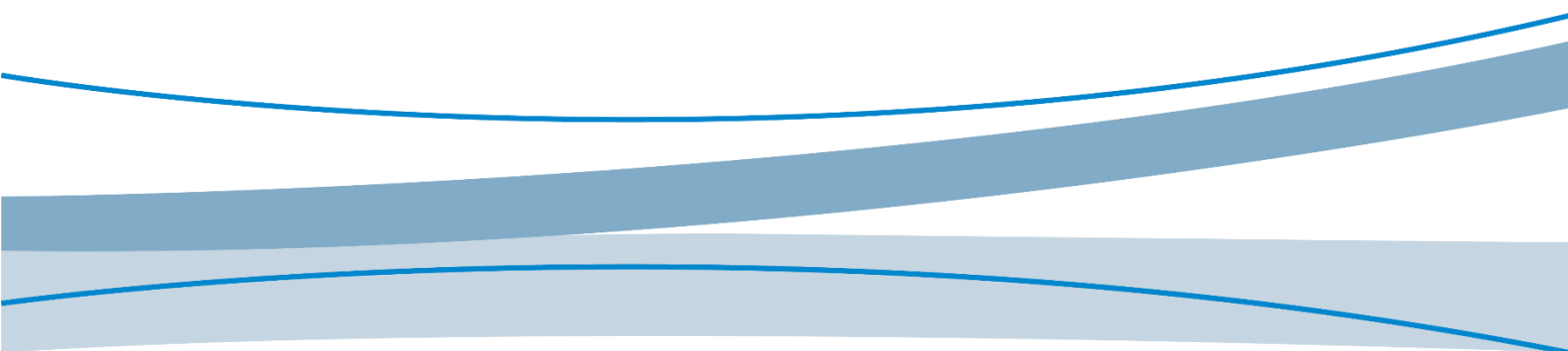




AT Commands User Manual_MBB

V2.4



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Applicable Models

No.	Applicable Model	Description
1	FM190 Series &FG190 Series FG190B Series &FG190W Series &FM190W Series	Qualcomm SDX75 platform
2	FG131 Series	Qualcomm SDX35 platform
3	FG370 Series	MTK platform

Change History

V2.4 (2024-06-28)	Add +MAI2SY description of the X35 product
V2.3 (2024-06-25)	Fixed +CLCC Mo alerting is not supported on the Qualcomm platform
V2.2 (2024-06-14)	Increase +MAVOL=? description of the X75 product Add +MAI2SY=? description of the X75 product Add +CHLD=? description of the X75/X12/X62 product Add +VTA=? description of the X75/X62 product
V2.1 (2024-06-03)	Fixed +GTGPSCFG X35 Default parameter SUPL 2.0.4 Del +GTAUDMODE Fixed +COPS param act value
V2.0 (2024-04-20)	Update AT+CTZU to the drop point save AT+ GTGPSCFG adds GQGSV, GQGSA Fixed +GTACT saving for power failure Fixed +GTCELLSCAN instruction function description Fixed +GTCCINFO parameter description Fixed +GTGPSCFG X35 Default parameter SUPL 2.0.4
V1.9 (2024-03-14)	Remarks Added AT+GTCELLLOCK=1 does not support locked cell Remarks Added FG190 Series, FM190 series, FM190W Series, FG190W series and FG190B series are not support MBIM
V1.8 (2024-03-07)	Add parameter SUPL2.0.4 for AT+GTGPSCFG command.
V1.7 (2024-01-29)	1. Add remarks to the AT commands that are not supported by the X35 project, and add remarks to the AT+CHLD parameters supported by the X35 project are (0,1,1x,2,2x,3,4). 2. Fix the +CESQ directive<ss-sinr>,<ss_rsrp><ss_rsrq>.
V1.6 (2024-01-16)	Add +MMAD.
V1.5 (2023-12-06)	Update Applicable Model.
V1.4 (2023-11-21)	Corrected the parameter descriptions of GTUSBMODE and GTGPSCERT.
V1.3 (2023-10-08)	Remarks Added the description of "AT+CGAUTH on MTK platform Persistent parameter is No."
V1.2 (2023-09-25)	Remarks Added the description of "AT+GTCELLLOCK on MTK platform does not support scs and nrband parameters".

V1.1 (2023-08-09)	Add AT+GTSEN RDTEMP command return parameter sensor_name; Adjust the interpretation of sensor_id in Define Values.
V1.0 (2023-02-03)	Initial version.

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.

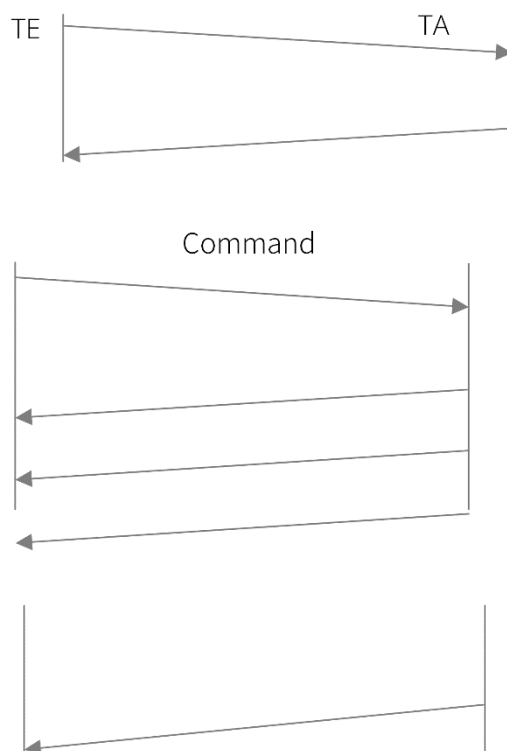
2.3 AT Commands Protocol

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.

Syntax	Definition
//	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>
```

```
ATI<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:

```
ATD1000;<CR>
```

```
AT+CFUN=0,0;+CFUN=0,1;+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.



- 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

3.1.1.1 Description

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

3.1.1.2 Syntax

Command	Possible Response
+CGMI	<manufacturer> OK
+CGMI?	+CGMI: "<manufacturer>" OK
+CGMI=?	OK

3.1.1.3 Attributes

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

3.1.1.4 Defined Value

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

3.1.2 +CGMM, Request Model ID

3.1.2.1 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.

3.1.2.2 Syntax

Command	Possible Response
+CGMM	<model> OK
+CGMM?	+CGMM: "<model>","<model abbrev>" OK
+CGMM=?	OK

3.1.2.3 Attributes

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

3.1.2.4 Defined Values

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

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

3.1.3 +CGMR, Request Revision

3.1.3.1 Description

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

3.1.3.2 Syntax

Command	Possible Response
+CGMR	<revision>

	OK
+CGMR?	+CGMR: "<revision>"
	OK
+CGMR=?	OK

3.1.3.3 Attributes

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

3.1.3.4 Defined Values

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

3.1.4 +CGSN, Request Product Serial Number Identification

3.1.4.1 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.

3.1.4.2 Syntax

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

Command	Possible Response
	OK

3.1.4.3 Attributes

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

3.1.4.4 Defined Values

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

- 0 returns the IMEI (International Mobile Equipment Identity)
- 1 returns the IMEI (International Mobile Equipment Identity)
- 2 returns the IMEISV (International Mobile 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 "+CSCS, Select TE Character Set."

<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.

3.1.5 +CFSN, Request Factory Serial Number

3.1.5.1 Description

This command is used to read the factory serial number.

3.1.5.2 Syntax

Command	Possible Response
+CFSN	+CFSN: <FSN> OK or

Command	Possible Response
	ERROR
+CFSN?	+CFSN: <FSN> OK

3.1.5.3 Attributes

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

3.1.5.4 Defined Values

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

3.1.6 +CIMI, Request IMSI

3.1.6.1 Description

This command displays the International Mobile Subscriber Identity number.

3.1.6.2 Syntax

Command	Possible Response
+CIMI	<IMSI> OK or: ERROR
+CIMI?	+CIMI: <IMSI> OK or: ERROR

3.1.6.3 Attributes

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

3.1.6.4 Defined Values

<IMSI>: string type; IMSI (string without double quotes), for example, 314566320021400.

3.1.7 +CNUM, Request MSISDN(s)

3.1.7.1 Description

This command displays up to 2 strings of text information that identify the modem. The output string contains double quotes. On SIM cards that have EFmsisdn file, the strings returned are the MSISDN numbers and their associated data. On SIM cards that do not have EFmsisdn file, the strings returned are the MSISDN numbers and their associated data stored in Modem NVM.

3.1.7.2 Syntax

Command	Possible Response
+CNUM	+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF>+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] or ERROR
+CNUM?	+CNUM: [<alpha1>],<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF>+CNUM: [<alpha2>],<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] or ERROR
+CNUM=?	OK

3.1.7.3 Attributes

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

3.1.7.4 Defined Values

<alphax>: optional alphanumeric string associated with <numberx>. The used character set should be the one selected with command "+CSCS, Select TE Character Set".

<numberx>: string type; phone number of format specified by <typex>, for example, 19912345011.

<typex>: integer type;

- 129: ISDN/telephony numbering plan, national/international unknown
- 145: ISDN/telephony numbering plan, international number
- 161: ISDN/telephony numbering plan, national number

<speed>: integer type, same as <speed> defined in CBST commands.

<service>: integer type (service related to the phone number);

- 0 asynchronous modem
- 1 synchronous modem
- 2 PAD Access (asynchronous)
- 3 Packet Access (synchronous)
- 4 voice
- 5 fax

All other values below 128 are reserved by the present document.

<itc>: integer type (information transfer capability)

- 0 3,1 kHz
- 1 UDI

3.1.8 +CCID, Request Integrate Circuit Card Identity

3.1.8.1 Description

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

3.1.8.2 Syntax

Command	Possible Response
+CCID	+CCID: <ID> OK or ERROR
+CCID?	+CCID: <ID>

Command	Possible Response
	OK or ERROR
+CCID=?	OK

3.1.8.3 Attributes

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

3.1.8.4 Defined Values

<ID>: string type; Integrate Circuit Card Identity (string without double quotes), for example, 89860018190839008096.

3.1.9 I, Query identification information

3.1.9.1 Description

This command is used to query version, manufacturer and model information.

3.1.9.2 Syntax

Command	Possible Response
I[<n>]	<information for item [<n>]> OK or: +CME ERROR: <err>

3.1.9.3 Attributes

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

3.1.9.4 Defined Values

<n>: integer type

- omitted Displays various modem informations. Default value.
- 0 Version build time
- 1 Reserve
- 2 Reserve
- 3 Product description, such as "FG101"
- 4 Reserve
- 5 Reserve
- 6 Reserve
- 7 Product description, such as "FG101-NA-00"
- 8 Software version
- 9 Hardware version

3.1.10 +GTLWM2MEN, Controls the LWM2M process switch.

3.1.10.1 Description

This command is used to controls the start and stop of LWM2M process.

3.1.10.2 Syntax

Command	Possible Response
+GTLWM2MEN=<state>	OK or: +CME ERROR: <err>
+GTLWM2MEN?	+GTLWM2MEN: <state> OK or: +GTLWM2MEN: 0
+GTLWM2MEN=?	+GTLWM2MEN: (0,1) OK

3.1.10.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
Yes	Yes	Yes	Yes	continued

3.1.10.4 Defined Values

<state>: integer type

0 close the LWM2M process

1 Open the LWM2M process

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 E, Command Echo

4.1.1.1 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.

4.1.1.2 Syntax

Command	Possible Response
ATE<n>	OK or: +CME ERROR: <err>
ATE?	<value> OK

4.1.1.3 Attributes

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

4.1.1.4 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



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

4.1.2 +CBC, Battery Charger Connection

4.1.2.1 Description

This command intends to query the battery voltage level.

4.1.2.2 Syntax

Command	Possible Response
AT+CBC	+CBC: <bcs>,<bcl> OK

4.1.2.3 Attributes

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

4.1.2.4 Defined Values

<bcs>: integer type

0 MT is powered by the battery (default).

<bcl>: integer type; voltage with mV

4.1.3 +MTSM, Temperature Sensor Measurement

4.1.3.1 Description

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

This temperature is taken from a thermistor internally.



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

4.1.3.2 Syntax

Command	Possible Response
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: +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

4.1.3.3 Attributes

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

4.1.3.4 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-of-boundaries events.
- 6 Report the temperature of BBIC.
- 7 Report the temperature of RF.

<Rate>: integer type and ranges from 1–255; select the time interval in seconds between the unsolicited reports. The default value is 1

<Low>: integer type and range 1–125. The lowest boundary level of the temperature value in Celsius for unsolicited report. The default value is 0.

<High>: integer type and range 1–125. The Highest boundary level of the temperature value in Celsius for unsolicited report. The default value is 0.

<Temp>: integer type, Current module temperature



<Low> and <High> parameters are valid only when <Report>=3.

4.1.4 +MSMPD, Enable/Disable SIM Card Hot Plug

4.1.4.1 Description

This command can enable or disable SIM card hot plug feature. The default status is enabling this feature. The parameter will be saved in NVM and can be restored at power cycle.

4.1.4.2 Syntax

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

Command	Possible Response
	ERROR

4.1.4.3 Attributes

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

4.1.4.4 Defined Values

<status>: integer type;

- 0 Disable the SIM card hot plug feature.
- 1 Enable the SIM card hot plug feature. Default value.

4.1.5 +CPWROFF, Switch off MS

4.1.5.1 Description

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

4.1.5.2 Syntax

Command	Possible Response
AT+CPWROFF	OK or +CME ERROR: <err>
AT+CPWROFF=?	OK

4.1.5.3 Attributes

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

4.1.6 +CFUN, Set Phone Functionality

4.1.6.1 Description

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

4.1.6.2 Syntax

Command	Possible Response
AT+CFUN=<fun>[,<rst>]	OK Or: +CME ERROR: <err>
AT+CFUN?	+CFUN: <fun>,<rst> OK or +CME ERROR: <err>
AT+CFUN=?	+CFUN: (list of supported <fun>s),(list of supported<rst>s) OK or +CME ERROR: <err>

4.1.6.3 Attributes

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

4.1.6.4 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.
- 15 Reset.



<rst> is not supported when <fun> = 15.

When <fun> value is 0 or 15, the OK response may be missed due to race condition.

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

4.1.7 +GTDUALSIM, Dual SIM Switching

4.1.7.1 Description

This command is used to switch operate SIM card.

AT+GTDUALSIM? is used to read the current operate SIM card information.

AT+GTDUALSIM is used to read all the available operate SIM card information, if device is configured as Dual SIM mode, return two sim information, else if device is configured as Single SIM mode, return one sim information.

4.1.7.2 Syntax

Command		Possible Response		
AT+GTDUALSIM=<sim_app>		OK		
		or:		
		ERROR		
AT+GTDUALSIM?		+GTDUALSIM:<sim_app>,<sub_app>,<sys_mode>		
		OK		
AT+GTDUALSIM		+GTDUALSIM: <sim_app>,<sub_app>,<sys_mode>[<CR><LF>		
		+GTDUALSIM:<sim_app>,<sub_app>,<sys_mode>]		
		OK		
AT+GTDUALSIM=?		+GTDUALSIM:(list of support <sim_app>)		
		OK		
Attributes				
Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
No	Yes	Yes	Yes	< 1s

4.1.7.3 Defined Values

<sim_app>: integer type; operate sim card id, Parameter range is (0,1).

- 0 SIM1(default)
- 1 SIM2

<sub_app>: string type; display the subscribe app id.

- SUB1 subscribe id 1
- SUB2 subscribe id 2

<sys_mode>: string type, display the current system mode.

- No no service
- N NR service (only used for 5G project)
- L LTE service
- W WCDMA service

4.2 Sleep Mode Command

4.2.1 +SLPMODE, Config Enable or Disable Enter into Sleep Mode

4.2.1.1 Description

This command is used to control whether the module enters into sleep mode.

4.2.1.2 Syntax

Command	Possible Response
+SLPMODE=<mode>	OK
	or:
	ERROR
+SLPMODE?	+ SLPMODE: <mode>

Command	Possible Response
	OK
	or:
	ERROR
+SLPMODE=?	+ SLPMODE: (0-1)
	OK
	or:
	ERROR

4.2.1.3 Attributes

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

4.2.1.4 Defined Values

- <mode>: integer type and range 0-1
- 0 Disable entering sleep mode, default.
- 1 Enable entering sleep mode

5 Call Control

5.1 Voice/Data Call Control AT Commands

5.1.1 +GTECC, Write Emergency Number

5.1.1.1 Description

This command is used to write and read emergency number.

5.1.1.2 Syntax

Command	Possible Response
AT+GTECC=<index>,<ecc_num>	OK or: +CME ERROR: <err>
AT+GTECC?	[+GTECC: <index1>,<ecc_num>[<CR><LF>+GTECC: <index2>,<ecc_num>][...]] OK or: +CME ERROR: <err>
AT+GTECC=?	+GTECC: (list of supported <index>s),<max_ecc_length> OK

5.1.1.3 Attributes

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

5.1.1.4 Defined Values

<index>: integer type and ranges from 1-5; emergency number index.

<ecc_num>: string type and the maximum length is 15. Emergency number, e.g: 0123456789*#

<max_ecc_length>: integer type; the maximum length of <ecc_num>.

5.1.2 D, Dial Command

5.1.2.1 Description

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



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

5.1.2.2 Syntax

Command	Possible Response
ATD<number>[;]	<p>For Voice call:</p> <p>OK</p> <p>OK or CONNECT or Nothing (depend on +MDC setting) is shown once voice call is connected.</p> <p>First OK means successfully executing this command.</p> <p>For CSD call:</p> <p>OK or CONNECT or Nothing (depend on +MDC setting) is shown once CSD call is connected.</p> <p>If the originated call is failed, returns below causes:</p> <ol style="list-style-type: none">1. Connection Failure - NO CARRIER or BUSY or NO ANSWER2. General Failure - ERROR3. Security reason (such as SIM not present) - SIM NOT INSERTED4. Unknown reason - UNKNOWN CALLING ERROR

5.1.2.3 Attributes

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

5.1.2.4 Defined Values

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



Number with ";" at the end is for voice call.

Number without ";" at the end is for data call (CSD call or PS call).

5.1.3 DL, Dial Last Number

5.1.3.1 Description

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

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

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

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

5.1.3.2 Syntax

Command	Possible Response
ATDL[;]	ATDL[;] OK

5.1.3.3 Attributes

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

5.1.3.4 Defined Values

None



The X35 project does not support this command.

5.1.4 H, Hang-up Call

5.1.4.1 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.

5.1.4.2 Syntax

Command	Possible Response
ATH	OK NO CARRIER

5.1.4.3 Attributes

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

5.1.4.4 Defined Values

None

5.1.5 A, Answer Incoming Call

5.1.5.1 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

5.1.5.2 Syntax

Command	Possible Response
ATA	OK or: +CME ERROR: <err>

5.1.5.3 Attributes

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

5.1.5.4 Defined Values

None

5.1.6 +CLIP, Calling Line Identification

5.1.6.1 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.

5.1.6.2 Syntax

Command	Possible Response
---------	-------------------

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

5.1.6.3 Attributes

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

5.1.6.4 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 formats 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 "+CSCS, Select TE Character Set".

<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").

5.1.7 +CCWA, Call Waiting Command

5.1.7.1 Description

This command controls the Call Waiting supplementary service, including the settings and the queries of the Modem and the network.

Parameter <n> is used to disable/enable the presentation of an unsolicited result code +CCWA: <number>,<type>,<class>,[<alpha>],[<CLI_validity>] to the TE when call waiting service is enabled. The unsolicited result code +CCWA does not support numbers of the SIP URI format.

5.1.7.2 Syntax

Command	Possible Response
AT+CCWA=[<n>,<mode>,<class>]]	OK
	If <mode>=2 and the command succeeds:
	+CCWA: <status>,<class>[<CR><LF>
	+CCWA: <status>,<class>
	[...]]
	OK
AT+CCWA?	+CCWA: <n>

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

5.1.7.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
Yes	No	Yes	Yes	< 10s

5.1.7.4 Defined Values

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

- 0 Disable; default value
- 1 Enable

<mode>: integer type (when <mode> parameter is not given; network is not interrogated)

- 0 Disable
- 1 Enable
- 2 Query status

<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

- 7 voice, data, and fax (The default)

<status>: integer type

- 0 Not active
- 1 Active

<number>: string type phone number of calling address in format specified by <type>

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

<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 "+CSCS, Select TE Character Set".

<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")

5.1.8 +CHLD, Call Related Supplementary Services Command

5.1.8.1 Description

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

Call HOLD: A call can be temporarily disconnected from the Modem, but the connection is retained by the network.

MTPY (Multi party) Conversation: conference calls.

The network does not reserve more than one traffic channel for a mobile station, therefore the Modem

can have only one call on hold at a time.

5.1.8.2 Syntax

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

5.1.8.3 Attributes

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

5.1.8.4 Defined Values

<n>: integer type;

- 0: Release all held calls or set User Determined User Busy (UDUB) for a waiting call.



For Intel device, it sets UDUB for waiting call and incoming call. And if both waiting call and incoming call coexist then only rejects the waiting call.

- 1: Releases all active calls and accepts the held or waiting call.
- 1x: Release a specific call (x specific call number as indicated by +CLCC).
- 2: Places all active calls (if any exist) on hold and accepts the other (held or waiting) call.



For Intel device, it accepts the incoming caller held call or waiting call. Besides if only one call exists and it is active, place it on hold; if only held call exists then make it active call.

- 2x: Places all active calls on hold except call X with which communication shall be supported.
- 3 Adds a held call to the conversation.

- 4 Connects the two calls and disconnects the subscriber from both calls (Explicit Call Transfer).



X35 project support command parameters range: (0,1,1x,2,2x,3,4).

- 5: Activate call completion for busy user requests.
- 6: A call in hold is kept or a call in hold is changed to active when another call is waiting.
- 7: Disconnect multiple users without accepting incoming calls.
- 8: Release all calls.



X12/X35/X62/X75 projects support command parameter range of (0,1,1x,2,2x,3,4).

5.1.9 +CCFC, Call Forwarding Number and Conditions

5.1.9.1 Description

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

5.1.9.2 Syntax

Command	Possible Response
AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	+CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]] [<CR><LF>+CCFC: <status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]] [...] OK
AT+CCFC=?	+CCFC: (list of supported <reason>s) OK

5.1.9.3 Attributes

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

5.1.9.4 Defined Values

<reason>: integer type

- 0 Unconditional
- 1 Mobile busy
- 2 No reply
- 3 Not reachable
- 4 All call forwarding (refer 3GPP TS 22.030 [19])
- 5 All conditional call forwarding (refer 3GPP TS 22.030 [19])

<mode>: integer type

- 0 Disable
- 1 Enable
- 2 Query status
- 3 Registration
- 4 Erasure

<number>: string type phone number of forwarding address in format specified by <type>

<type>: type of address octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.7); default 145 when dialling string includes international access code character "+", otherwise 129

<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); default 128

<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

<time>: integer type

1...30 when "no reply", "all call forwarding" or "all conditional call forwarding" is enabled or queried, this gives the time in seconds to wait before call is forwarded, default value 20

<status>: integer type

- 0 Not active
- 1 Active

5.1.10 +CLIR, Calling Line Identification Restriction

5.1.10.1 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.

5.1.10.2 Syntax

Command	Possible Response
AT+CLIR=<n>	OK

	or: +CME ERROR: <err>
AT+CLIR?	+CLIR: <n>,<m> OK
AT+CLIR=?	+CLIR: (list of supported<n>s) OK

5.1.10.3 Attributes

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

5.1.10.4 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

5.1.11 +CHUP, Hang Up Call

5.1.11.1 Description

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

5.1.11.2 Syntax

Command	Possible Response
AT+CHUP	OK or: +CME ERROR: <err>

5.1.11.3 Attributes

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

5.1.11.4 Defined Values

None



NO CARRIER will report after hung up and return OK.

5.1.12 +CSTA, Select Type of Address

5.1.12.1 Description

This set command selects the type of number for further dialing commands (D) according to GSM specifications.

5.1.12.2 Syntax

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

5.1.12.3 Attributes

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

5.1.12.4 Defined Values

<type>: integer type

- 145 Dialing string shall include international access code character "+"
- 129 Dial string begins with a digit or it is a local number (default)

5.1.13 +CAVIMS, Availability for Voice Calls with IMS

5.1.13.1 Description

This set command informs the MT whether the UE is currently available for voice calls with the IMS. Read command returns the UEs IMS voice call availability status stored in the MT.

5.1.13.2 Syntax

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

5.1.13.3 Attributes

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

5.1.13.4 Defined Values

<state>: integer type. The UEs IMS voice call availability status.

- 0 Voice calls with the IMS are not available
- 1 Voice calls with the IMS are available

5.2 Call Status Messages

5.2.1 +CLCC, List Current Calls

5.2.1.1 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).

5.2.1.2 Syntax

Command	Possible Response
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

5.2.1.3 Attributes

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

5.2.1.4 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).



Mo alerting is not supported on the Qualcomm platform

5.3 Supplementary Services

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

5.3.1 +CSSN, Supplementary Service Notifications

5.3.1.1 Description

This command refers to supplementary service related network-initiated notifications. The set command enables/disables the presentation of notification result codes from TA to TE.

When $\langle n \rangle = 1$ and a supplementary service notification is received after a mobile originated call setup, intermediate result code +CSSI: $\langle \text{code1} \rangle [\langle \text{index} \rangle] [\langle \text{SS_code} \rangle]$ is sent to TE before any other MO call setup result codes.

When $\langle m \rangle = 1$ and a supplementary service notification is received during a mobile terminated call setup or during a call, or when a forward check supplementary service notification is received, unsolicited result code +CSSU: $\langle \text{code2} \rangle [\langle \text{index} \rangle] [\langle \text{number} \rangle] [\langle \text{type} \rangle] [\langle \text{subaddr} \rangle] [\langle \text{satype} \rangle] [\langle \text{SS_code} \rangle]$ is sent to TE.

5.3.1.2 Syntax

Command	Possible Response
AT+CSSN=[$\langle n \rangle$],[$\langle m \rangle$]]	OK or: +CME ERROR: $\langle \text{err} \rangle$
AT+CSSN?	+CSSN: $\langle n \rangle$, $\langle m \rangle$ OK
AT+CSSN=?	+CSSN: (list of supported $\langle n \rangle$ s),(list of supported $\langle m \rangle$ s) OK

5.3.1.3 Attributes

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

5.3.1.4 Defined Values

<n>: integer type; sets/displays the +CSSI result code presentation status. This value must be specified.

- 0 Disable (default)
- 1 Enable

<m>: integer type; sets/displays the +CSSU result code presentation status. This value is optional, but cannot be specified without <n>.

- 0 Disable (default)
- 1 Enable

5.3.2 +CUSD, Unstructured Supplementary Service Data

5.3.2.1 Description

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

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

5.3.2.2 Syntax

Command	Possible Response
AT+CUSD=[<n>[,<str>,<dc>]]	OK or: +CME ERROR: <err> Unsolicited Report: +CUSD: <m>[,<str>,<dc>]
AT+CUSD?	+CUSD: <n> OK

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

5.3.2.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
Yes	No	Yes	Yes	< 10s

5.3.2.4 Defined Values

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

- 0 Disable the result code presentation to the TE
- 1 Enable the result code presentation to the TE
- 2 Cancel session (not applicable to read command response)

<str>: string type USSD-string (when <str> parameter is not given; network is not interrogated):

- if <dc> indicates that 3GPP TS 23.038 [25] 7-bit default alphabet is used:
- if TE character set other than "HEX" (refer command Select TE Character Set +CSCS): MT/TA converts GSM alphabet into current TE character set according to rules of 3GPP TS 27.005 [24] Annex A
- if TE character set is "HEX": MT/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number (e.g. character II (GSM 23) is presented as 17 (IRA 49 and 55))
- -if<dc> indicates that 8-bit data coding scheme is used: MT/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))
- -if<dc> indicates that 16-bit data coding scheme (UCS2) is used: MT/TA splits the 16 bits into two 8-bit octets. Each of those octets are converted as per the 8-bit data coding scheme, with the most significant octet first (e.g. decimal value 4906 is presented to TE as four characters 132A (IRA 49, 51, 50 and 65))

<dc>: integer type (shows Cell Broadcast Data Coding Scheme, see 3GPP TS 23.038 [25]). Default value is 15.

<m>: integer type (shows the USSD response from the network or the network-initiated operation)

- 0 No further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)
- 1 Further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)
- 2 USSD terminated by network
- 3 Other local clients have responded
- 4 Operation not supported

- 5 Network time out

CUSD Termination Cause Table Index:

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PARAMETER_ERROR	2
INVALID_NUMBER	3
OUTGOING_CALL_BARRED	4
TOO_MANY_CALLS_ON_HOLD	5
NORMAL	6
DROPPED	10
NETWORK	12
INVALID_CALL_ID	13
NORMAL_CLEARING	14
TOO_MANY_ACTIVE_CALLS	16
UNASSIGNED_NUMBER	17
NO_ROUTE_TO_DEST	18
RESOURCE_UNAVAILABLE	19
CALL_BARRED	20
USER_BUSY	21
NO_ANSWER	22
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DEST_OUT_OF_ORDER	25
SIGNALING_ERROR	26
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NETWORK_BUSY	28
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SERVICE_UNAVAILABLE	31

Termination Cause	Index
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PREPAY_LIMIT_REACHED	33
INCOMPATIBLE_DEST	35
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SS_NOT_AVAILABLE	54
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INCORRECT_PASSWORD	56
TOO_MANY_PASSWORD_ATTEMPTS	57
PASSWORD_REGISTRATION_FAILURE	58
ILLEGAL_EQUIPMENT	59
UNKNOWN_SUBSCRIBER	60
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NBR_USER_EXCEEDED	74
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NOT_ALLOWED_BY_CC	75
MODIFIED_TO_SS_BY_CC	76
MODIFIED_TO_CALL_BY_CC	77
CALL_MODIFIED_BY_CC	78
App. Cause	
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5.3.3 +COLP, Connected Line Identification Presentation

5.3.3.1 Description

This command relates to the GSM supplementary service called COLP (Connected Line Identification Presentation), which enables a calling subscriber to obtain the connected line identity (COL) of the called party after setting up a mobile-originated call with the Modem. For example, after setting up a mobile-originated call to one number that is forwarded to another number, the calling party will see the number of that third party. When this command is enabled (and the called subscriber permits it), the following intermediate result code is returned: +COLP: <number>,<type>[,<subaddr>,<satype>].

5.3.3.2 Syntax

Command	Possible Response
AT+COLP=[<n>]	OK or: +CME ERROR: <err>
AT+COLP?	+COLP: <n>,<m> OK
AT+COLP=?	+COLP: (list of supported <n>s) OK

5.3.3.3 Attributes

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

5.3.3.4 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 COLP service status in the network).

- 0 COLP / TIP not provisioned; Default value.
- 1 COLP / TIP provisioned
- 2 Unknown (e.g. no network, etc.)

<number>, <type>, <subaddr>, <satype>, <alpha>: refer +CLIP

6 System Date and Time Access Commands

6.1 General Command

6.1.1 +CCLK, Read/Set System Date and Time

6.1.1.1 Description

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

6.1.1.2 Syntax

Command	Possible Response
AT+CCLK=<time>	OK or: +CME ERROR: <err>
AT+CCLK?	+CCLK: <time> OK or: +CME ERROR: <err>
AT+CCLK=?	OK

6.1.1.3 Attributes

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

6.1.1.4 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). 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

6.1.2.1 Description

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

6.1.2.2 Syntax

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

6.1.2.3 Attributes

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

6.1.2.4 Defined Values

<onoff>: integer type value indicating

- 0 Disable automatic time zone update via NITZ;
- 1 Enable automatic time zone update via NITZ; default value.

6.1.3 +CTZR, Time Zone Reporting

6.1.3.1 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>].

6.1.3.2 Syntax

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

6.1.3.3 Attributes

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

6.1.3.4 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>.
- 2 Enable 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:mm:ss", 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

7.1.1.1 Description

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

7.1.1.2 Syntax

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

7.1.1.3 Attributes

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

7.1.1.4 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

7.1.2.1 Description

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

7.1.2.2 Syntax

Command	Possible Response
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

7.1.2.3 Attributes

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

7.1.2.4 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

7.1.3.1 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.

7.1.3.2 Syntax

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

7.1.3.3 Attributes

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

7.1.3.4 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).

<usedx>: integer type ; The number of used SMS messages in memory <memx>

<totalx> : integer type ; The total SMS capacity of memory <memx>



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

- "SM" (U)SIM message storage
- "ME" ME message storage

<mem1>,<mem2>,<mem3> may be restored to "SM" after power cycle device

7.1.4 +CMGF, Message Format

7.1.4.1 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).

7.1.4.2 Syntax

Command	Possible Response
AT+CMGF=<mode>	OK or: +CME ERROR: <err>
AT+CMGF?	+CMGF: <mode> OK

AT+CMGF=?	+CMGF: (list of supported <mode>s) OK
-----------	--

7.1.4.3 Attributes

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

7.1.4.4 Defined Values

<mode>: integer type; message format:

- 0 PDU mode (default)
- 1 Text mode

7.1.5 +CSCA, Service Center Address

7.1.5.1 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.

7.1.5.2 Syntax

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

7.1.5.3 Attributes

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

7.1.5.4 Defined Values

<sca>: string type and ranges from 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

7.1.6.1 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.

7.1.6.2 Syntax

Command	Possible Response
AT+CSMP=[<fo>[,<vp>[,<pid>[,<dc>]]]]	OK or: +CME ERROR: <err>
AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dc> OK
AT+CSMP=?	OK

7.1.6.3 Attributes

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

7.1.6.4 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 from SIM EF when use it.

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

7.1.7.1 Description

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

codes.

7.1.7.2 Syntax

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

7.1.7.3 Attributes

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

7.1.7.4 Defined Values

<show>: integer type

- 0 Do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dc>) nor <length>, <toda> or <too> 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

7.1.8.1 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.

7.1.8.2 Syntax

Command	Possible Response
AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK or: +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

7.1.8.3 Attributes

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

7.1.8.4 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 SMSs 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>,<dcsc>,<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.
- 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 1. <mt> parameter

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

<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>,<dc>,<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 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>

Note: this platform is not supported, the effect is the same as 1.

Table 3. SMS-STATUS-REPORT Result Code and Acknowledgement Summary

<ds>	Result code and Command
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

7.1.9.1 Description

This command acknowledges 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.

7.1.9.2 Syntax

Command	Possible Response
For text mode (+CMGF=1)	OK

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

7.1.9.3 Attributes

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

7.1.9.4 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

7.1.10.1 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".

7.1.10.2 Syntax

Command	Possible Response
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>,<

Command	Possible Response
	<p><length>]<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>,<alpha>],[<scts>],[<tooa/toda>, <length>]<CR><LF><data>[...]]</p> <p>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> [...]]</p> <p>if text mode (+CMGF=1), command successful and SMS-COMMANDS: +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]]</p> <p>if text mode (+CMGF=1), command successful and CBM storage: +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <CR><LF><data>[...]]</p> <p>otherwise: +CMS ERROR: <err></p>
AT+CMGL=?	+CMGL: (list of supported <stat>s)

7.1.10.3 Attributes

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

7.1.10.4 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 modes 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. In TEXT mode: number of characters included in <data>.

<pdu> Message header and contents in PDU mode format. See description in "+CMGR, Read Message".

<tooa/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

<alpha>: string type; An optional alphanumeric string associated with < number x >,

The character set used is the one selected by the AT+CSCS command

7.1.11 +CMGR, Read Message

7.1.11.1 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".

7.1.11.2 Syntax

Command	Possible Response
AT+CMGR=<index>	<p>if text mode (+CMGF=1), command successful and SMS-DELIVER:</p> <p>+CMGR:</p> <p><stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcsc>,<sc a>,<tosca>,<length>]<CR><LF><data></p> <p>if text mode (+CMGF=1), command successful and SMS-SUBMIT:</p> <p>+CMGR:</p> <p><stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcsc>,[<vp>],<sc a>,<tosca>,<length>]<CR><LF><data></p> <p>if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:</p> <p>+CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st></p> <p>if text mode (+CMGF=1), command successful and SMS-COMMAND:</p> <p>+CMGR:</p> <p><stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>]<CR><LF><data>]</p> <p>if text mode (+CMGF=1), command successful and CBM storage:</p>

Command	Possible Response
	+CMGR: <stat>,<sn>,<mid>,<dc>,<page>,<pages><CR><LF><data> otherwise: +CMS ERROR: <err>
AT+CMGR=?	OK

7.1.11.3 Attributes

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

7.1.11.4 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

<tooa/toda> Type of origination address / destination address

<fo>	First octet of the SMS
<pid>	Protocol Identifier
<dc>	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

7.1.12.1 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 <dc> will be set according the incoming message parameters.
- If <da> and/or <toda> are not given by the command, the <oa> and <toa> will be set instead.

7.1.12.2 Syntax

Command	Possible Response
AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr> or: +CMS ERROR: <err>
AT+CMSS=?	OK

7.1.12.3 Attributes

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

7.1.12.4 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

7.1.13.1 Description

This command sends a pre-stored message, written previously using the +CMGW command. The <da>, <toa> 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 <dc> will be set according the incoming message parameters.
- If <da> and/or <toa> are not given by the command, the <oa> and <tooa> will be set instead.

7.1.13.2 Syntax

Command	Possible Response
If text mode (+CMGF=1): AT+CMGW[=<da>[,<toa>[,<stat>]]]<C R>text is entered<ctrl-Z/ESC>	+CMGW: <index> or: +CMS ERROR: <err>
if PDU mode (+CMGF=0): AT+CMGW=<length>[,<stat>]<CR> PDU is given<ctrl-Z/ESC>	

7.1.13.3 Attributes

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

7.1.13.4 Defined Values

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

<toa>: 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

<length>: Length of PDU data to send short message

<index>: The index number of the short message

7.1.14 +CMGD, Delete Message

7.1.14.1 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.

7.1.14.2 Syntax

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

7.1.14.3 Attributes

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

7.1.14.4 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

7.1.15.1 Description

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

7.1.15.2 Syntax

Command	Possible Response
AT+CGSMS=[<service>]	OK or: +CME ERROR: <err>
AT+CGSMS?	+CGSMS: <service> OK
AT+CGSMS=?	+CGSMS: (list of currently available <service>s) OK

7.1.15.3 Attributes

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

7.1.15.4 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; it is recommended to 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)



The X35 project does not support this command.

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7.1.16 +CMGS, Send SMS to Network

7.1.16.1 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 <tda> will be any value between 128-255.

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

7.1.16.2 Syntax

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

7.1.16.3 Attributes

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

7.1.16.4 Defined Values

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

<tda>: 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 '+', <tda> 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.

<scts>: SMS submission timestamp

7.1.17 +CSCB, Cell Broadcast Messages

7.1.17.1 Description

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

7.1.17.2 Syntax

Command	Possible Response
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

7.1.17.3 Attributes

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

7.1.17.4 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 ranges from 0-65535; all different possible combinations of CBM message identifiers (refer <mid>); 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 <dc>); e.g. "0-3,5"

Note1: Some value in <mids> can't be deleted and is mandatory.

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

7.1.18.1 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.

7.1.18.2 Syntax

Command	Possible Response
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

7.1.18.3 Attributes

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

7.1.18.4 Defined Values

<report_flag>: integer type

- 0 Disable unsolicited response, default value.
- 1 Enable unsolicited response



This command is not applicable to SG-9600-00

8 Access and Security

8.1 Commands

8.1.1 AT, Check AT Communication

8.1.1.1 Description

This command only returns OK.

8.1.1.2 Syntax

Command	Possible Response
AT	OK

8.1.1.3 Attributes

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

8.1.1.4 Defined Values

None

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

8.1.2.1 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.



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.



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.

8.1.2.2 Syntax

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

8.1.2.3 Attributes

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

8.1.2.4 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

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

8.1.3.1 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 (unlock CHV1) and PUK2 (unlock CHV2).

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

This command will return error if SIM is not inserted.

8.1.3.2 Syntax

Command	Possible Response
AT+TPIN?	+TPIN: <chv1>,<unb1_chv1>,<chv2>,<unb1_chv2> or: +CME ERROR: <err>

8.1.3.3 Attributes

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

8.1.3.4 Defined Values

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

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

<unb1_chv1>: integer type; number of remaining PUK attempts

<unb1_chv2>: integer type; number of remaining PUK2 attempts

8.1.4 +CPWD, Change Password

8.1.4.1 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.

8.1.4.2 Syntax

Command	Possible Response
AT+CPWD=<fac>,<oldpwd>,<newpwd>	OK or: +CME ERROR: <err>

AT+CPWD=?	+CPWD: list of Supported (<fac>,<pwdlength>)s OK or: +CME ERROR: <err>
-----------	---

8.1.4.3 Attributes

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

8.1.4.4 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 "+CPWD, Change Password" 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

8.1.5 +CLCK, Facility Lock

8.1.5.1 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.

8.1.5.2 Syntax

Command	Possible Response
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

8.1.5.3 Attributes

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

8.1.5.4 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 "+CPWD, Change Password".

<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

8.1.6 +CPINR, Remaining PIN Retries

8.1.6.1 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>.

8.1.6.2 Syntax

Command	Possible Response
AT+CPINR[=<sel_code>]	OK Or +CME ERROR: <err>
AT+CPINR=?	OK

8.1.6.3 Attributes

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

8.1.6.4 Defined Values

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

<default_retries>: integer type. Number of default/initials 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>

8.1.7 +CSIM, Generic SIM Access

8.1.7.1 Description

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

8.1.7.2 Syntax

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

8.1.7.3 Attributes

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

8.1.7.4 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)

8.1.8 +CRSM, Restricted SIM Access

8.1.8.1 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.

8.1.8.2 Syntax

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

8.1.8.3 Attributes

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

8.1.8.4 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



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

<file_id>: integer type; this is the identifier of an elementary data file on SIM. Mandatory for every command except STATUS.



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].



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 referring 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 data field. 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.

8.1.9 +CCHO, Generic eSIM Access

8.1.9.1 Description

This command causes the MT to return <sessionid> to allow the TE to identify a channel that is being allocated by the currently selected UICC, which is attached to ME. The currently selected UICC will open a new logical channel; select the application identified by the <dfname> received with this command and return a session Id as the response. The ME shall restrict the communication between the TE and the UICC to this logical channel.

8.1.9.2 Syntax

Command	Possible Response
AT+CCHO=<dfname>	+CCHO: <sessionid > OK Or +CME ERROR: <err>
AT+CCHO=?	OK

8.1.9.3 Attributes

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

8.1.9.4 Defined Values

<dfname>: Integer type; all selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes

<sessionid>: String type; a session Id to be used in order to target a specific application on the SIM using logical channels mechanism

8.1.10 +CCHC, Generic eSIM Access

8.1.10.1 Description

This command is used to close a communication session with the active UICC. The ME shall close the previously opened logical channel. The TE will no longer be able to send commands on this logical channel. The UICC will close the logical channel when receiving this command.

8.1.10.2 Syntax

Command	Possible Response
AT+CCHC=<sessionid>	OK Or +CME ERROR: <err>
AT+CCHC=?	OK

8.1.10.3 Attributes

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

8.1.10.4 Defined Values

<sessionid>: String type; a session Id to be used in order to target a specific application on the SIM using logical channels mechanism

8.1.11 +CGLA, Generic eSIM Access

8.1.11.1 Description

This command allows a direct control of the currently selected UICC by a distant application on the TE.

8.1.11.2 Syntax

Command	Possible Response
AT+CGLA=<sessionid>,<length>,<command>	+CSIM: <length>,<response> OK Or +CME ERROR: <err>
AT+CGLA=?	OK

8.1.11.3 Attributes

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

8.1.11.4 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)

<sessionid>: Integer type. The Session ID assigned by the SIM card previously, described in 3GPP TS 27.007

9 Network

9.1 Network Commands

9.1.1 +CSQ, Signal Strength

9.1.1.1 Description

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

9.1.1.2 Syntax

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

9.1.1.3 Attributes

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

9.1.1.4 Defined Values

<rss>: 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



The default display parameter is rssi (0-31). When act=11 or 13, and set AT+GTC SQNREN=1, the rssi replaced by ss_rsrp (0-126).

9.1.2 +CESQ, Extended Signal Quality

9.1.2.1 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. If the current serving cell is not a NR cell, <ss_rsrq>, <ss_rsrp> and <ss-sinr> are set to 255.

9.1.2.2 Syntax

Command	Possible Response
AT+CESQ	+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>,<ss_rsrq>,<ss_rsrp>,<ss_sinr> 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),(list of supported <ss_rsrq>s),(list of supported <ss_rsrp>s),(list of supported <ss_sinr>s) OK

9.1.2.3 Attributes

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

9.1.2.4 Defined Values

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

- 0 $\text{rssi} < -110 \text{ dBm}$
- 1 $-110 \text{ dBm} \leq \text{rssi} < -109 \text{ dBm}$
- 2 $-109 \text{ dBm} \leq \text{rssi} < -108 \text{ dBm}$
- ...
- 61 $-50 \text{ dBm} \leq \text{rssi} < -49 \text{ dBm}$
- 62 $-49 \text{ dBm} \leq \text{rssi} < -48 \text{ dBm}$
- 63 $-48 \text{ dBm} \leq \text{rssi}$
- 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 $\text{rscp} < -120 \text{ dBm}$
- 1 $-120 \text{ dBm} \leq \text{rscp} < -119 \text{ dBm}$
- 2 $-119 \text{ dBm} \leq \text{rscp} < -118 \text{ dBm}$
- ...
- 94 $-27 \text{ dBm} \leq \text{rscp} < -26 \text{ dBm}$
- 95 $-26 \text{ dBm} \leq \text{rscp} < -25 \text{ dBm}$
- 96 $-25 \text{ dBm} \leq \text{rscp}$
- 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 $\text{Ec/Io} < -24 \text{ dB}$
- 1 $-24 \text{ dB} \leq \text{Ec/Io} < -23.5 \text{ dB}$
- 2 $-23.5 \text{ dB} \leq \text{Ec/Io} < -23 \text{ dB}$
- ...
- 47 $-1 \text{ dB} \leq \text{Ec/Io} < -0.5 \text{ dB}$
- 48 $-0.5 \text{ dB} \leq \text{Ec/Io} < 0 \text{ dB}$
- 49 $0 \text{ dB} \leq \text{Ec/Io}$
- 255 Not known or not detectable

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

- 0 $\text{rsrq} < -19.5 \text{ dB}$

- 1 $-19.5 \text{ dB} \leq \text{rsrq} < -19 \text{ dB}$
- 2 $-19 \text{ dB} \leq \text{rsrq} < -18.5 \text{ dB}$
- ...
- 32 $-4 \text{ dB} \leq \text{rsrq} < -3.5 \text{ dB}$
- 33 $-3.5 \text{ dB} \leq \text{rsrq} < -3 \text{ dB}$
- 34 $-3 \text{ dB} \leq \text{rsrq}$
- 255 Not known or not detectable

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

- 0 $\text{rsrp} < -140 \text{ dBm}$
- 1 $-140 \text{ dBm} \leq \text{rsrp} < -139 \text{ dBm}$
- 2 $-139 \text{ dBm} \leq \text{rsrp} < -138 \text{ dBm}$
- ...
- 95 $-46 \text{ dBm} \leq \text{rsrp} < -45 \text{ dBm}$
- 96 $-45 \text{ dBm} \leq \text{rsrp} < -44 \text{ dBm}$
- 97 $-44 \text{ dBm} \leq \text{rsrp}$
- 255 Not known or not detectable
- <ss_rsrq>: integer type, synchronization signal-based reference signal received quality (see 3GPP TS 38.133 [169] subclause 10.1.11).
- 0 $\text{ss_rsrq} < -43 \text{ dB}$
- 1 $-43 \text{ dB} \leq \text{ss_rsrq} < -42.5 \text{ dB}$
- 2 $-42.5 \text{ dB} \leq \text{ss_rsrq} < -42 \text{ dB}$
- ...
- 124 $18.5 \text{ dB} \leq \text{ss_rsrq} < 19 \text{ dB}$
- 125 $19 \text{ dB} \leq \text{ss_rsrq} < 19.5 \text{ dB}$
- 126 $19.5 \text{ dB} \leq \text{ss_rsrq} < 20 \text{ dB}$
- 255 Not known or not detectable
- <ss_rsrp>: integer type, synchronization signal based reference signal received power (see 3GPP TS 38.133 [169] subclause 10.1.6).
- 0 $\text{ss_rsrp} < -156 \text{ dBm}$
- 1 $-156 \text{ dBm} \leq \text{ss_rsrp} < -155 \text{ dBm}$
- 2 $-155 \text{ dBm} \leq \text{ss_rsrp} < -154 \text{ dBm}$
- ...
- 125 $-32 \text{ dBm} \leq \text{ss_rsrp} < -31 \text{ dBm}$
- 126 $-31 \text{ dBm} \leq \text{ss_rsrp}$
- 255 Not known or not detectable
- <ss_sinr>: integer type, synchronization signal based signal to noise and interference ratio (see 3GPP TS 38.133 [169] subclause 10.1.16).
- 0 $\text{ss_sinr} < -23 \text{ dB}$

- 1 -23 dB ≤ ss_sinr < -22.5 dB
- 2 -22.5 dB ≤ ss_sinr < -22 dB
- ...
- 125 39 dB ≤ ss_sinr < 39.5 dBm
- 126 39.5 dB ≤ ss_sinr < 40 dB
- 127 40 dB ≤ ss_sinr
- 255 Not known or not detectable

9.1.3 +CREG, Network Registration Status

9.1.3.1 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>,<cause_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.

9.1.3.2 Syntax

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

OK

9.1.3.3 Attributes

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

9.1.3.4 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) (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 (not applicable)
- 1 GSM Compact (not applicable)
- 2 UTRAN

- 3 GSM w/EGPRS (see NOTE) (not applicable)
- 4 UTRAN w/HSDPA (see NOTE)
- 5 UTRAN w/HSUPA (see NOTE)
- 6 UTRAN w/HSDPA and HSUPA (see NOTE)
- 7 E-UTRAN



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

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

3GPP TS 36.331 [86] specifies the System Information blocks which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).

This command is not applicable to UEs in NG-RAN.

<cause_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>.

9.1.4 +CGREG, GPRS Network Registration

9.1.4.1 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 returned only when <n>=2 and MT is registered in the network.

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

9.1.4.2 Syntax

Command	Possible Response
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

9.1.4.3 Attributes

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

9.1.4.4 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) (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 (not applicable)
- 1 GSM Compact (not applicable)
- 2 UTRAN
- 3 GSM w/EGPRS (see NOTE) (not applicable)
- 4 UTRAN w/HSDPA (see NOTE)
- 5 UTRAN w/HSUPA (see NOTE)
- 6 UTRAN w/HSDPA and HSUPA (see NOTE)
- 7 E-UTRAN (not applicable)



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

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

3GPP TS 44.018 [156] specifies the EC-SCH INFORMATION message which, if present, indicates that the serving cell supports EC-GSM-IoT.

3GPP TS 36.331 [86] specifies the System Information blocks which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).

3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is connected to a 5GCN.

3GPP TS 38.331 [160] specifies the information which, if present, indicates that the

serving cell is supporting dual connectivity of E-UTRA with NR and is connected to an EPS core.

This command is not applicable to UEs in E-UTRAN or NG-RAN.

<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>.

9.1.5 +CEREG, EPS Network Registration Status

9.1.5.1 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>,<cause_type>,<reject_cause>]]]] when <n>=3.

9.1.5.2 Syntax

Command	Possible Response
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

9.1.5.3 Attributes

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

9.1.5.4 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)
- 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) (not applicable)
- 4 UTRAN w/HSDPA (see NOTE) (not applicable)

- 5 UTRAN w/HSUPA (see NOTE) (not applicable)
- 6 UTRAN w/HSDPA and HSUPA (see NOTE) (not applicable)
- 7 E-UTRAN



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

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

3GPP TS 44.018 [156] specifies the EC-SCH INFORMATION message which, if present, indicates that the serving cell supports EC-GSM-IoT.

3GPP TS 36.331 [86] specifies the System Information blocks which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).

3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is connected to a 5GCN.

3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is supporting dual connectivity of E-UTRA with NR and is connected to an EPS core.

This command is only applicable to UEs in E-UTRAN.

<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>.

9.1.6 +C5GREG, NR Network Registration Status

9.1.6.1 Description

The set command controls the presentation of an unsolicited result code +C5GREG: <stat> when <n>=1

and there is a change in the MT's network registration status in 5GS, or unsolicited result code +C5GREG: <stat>[,<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]] when <n>=2 and there is a change of the network cell in 5GS or the network provided an Allowed NSSAI. The parameters <AcT>, <tac>, <ci>, <Allowed_NSSAI_length> and <Allowed_NSSAI> 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

9.1.6.2 Syntax

Command	Possible Response
AT+C5GREG=[<n>]	OK or: +CME ERROR: <err>
AT+C5GREG?	when <n>=0, 1, 2 or 3 and command successful: +C5GREG: <n>,<stat>[,<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>],[<cause_type>,<reject_cause>]] OK
AT+C5GREG=?	+CEREG: (list of supported <n>s) OK

9.1.6.3 Attributes

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

9.1.6.4 Defined Values

<n>: integer type

- 0 Disable network registration unsolicited result code; default value
- 1 Enable network registration unsolicited result code +C5GREG: <stat>
- 2 Enable network registration and location information unsolicited result code +C5GREG: <stat>[,<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>]]
- 3 Enable network registration, location information and EMM cause value information unsolicited result code +C5GREG: <stat>[,<tac>],[<ci>],[<AcT>],[<Allowed_NSSAI_length>],[<Allowed_NSSAI>],[<cause_type>,<reject_cause>]]

<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)
- 9 Registered for "CSFB not preferred", home network (not applicable)
- 10 Registered for "CSFB not preferred", roaming (not applicable)
- 11 Attached for access to RLOS (See NOTE 2a) (not applicable)

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

<ci>: string type; five byte NR cell ID in hexadecimal format.

<Allowed_NSSAI_length>: integer type; indicates the number of octets of the <Allowed_NSSAI> information element.

<Allowed_NSSAI>: string type in hexadecimal format. Dependent of the form, the string can be separated by dot(s), semicolon(s) and colon(s). This parameter indicates the list of allowed S-NSSAIs received from the network. The <Allowed_NSSAI> is coded as a list of <S-NSSAI>s separated by colons. Refer parameter <S-NSSAI> in subclause 10.1.1. This parameter shall not be subject to conventional character conversion as per +CSCS.

<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 (not applicable)
- 4 UTRAN w/HSDPA (not applicable)
- 5 UTRAN w/HSUPA (not applicable)
- 6 UTRAN w/HSDPA and HSUPA (not applicable)
- 7 E-UTRAN (not applicable)
- 8 EC-GSM-IoT (A/Gb mode) (not applicable)
- 9 E-UTRAN (NB-S1 mode) (not applicable)
- 10 E-UTRA connected to a 5GCN (not applicable)
- 11 NR connected to a 5G CN (not applicable)
- 12 NG-RAN
- 13 E-UTRA-NR dual connectivity



Optional. This command is only applicable to UEs supporting 5GS

<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

9.1.7.1 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.

9.1.7.2 Syntax

Command	Possible Response
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

9.1.7.3 Attributes

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

9.1.7.4 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
- 5 Asynchronous mode for network scan and manual registration

<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 (not applicable)
- 1 GSM Compact (not applicable)
- 2 UTRAN
- 4 UTRAN w/HSDPA (see NOTE)
- 5 UTRAN w/HSUPA (see NOTE)
- 6 UTRAN w/HSDPA and HSUPA (see NOTE)
- 7 E-UTRAN
- 8 EC-GSM-IoT (A/Gb mode) (not applicable)
- 9 E-UTRAN (NB-S1 mode)
- 10 E-UTRA connected to a 5GCN (see NOTE)
- 11 NR connected to a 5GCN (see NOTE)
- 12 NG-RAN
- 13 E-UTRA-NR dual connectivity (see NOTE)



3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is connected to a 5G CN. This value is not applicable in set command.

3GPP TS 38.331 [160] specifies the information which, if present, indicates that the serving cell is supporting dual connectivity of E-UTRA with NR and is connected to an EPS core.

The async cops mode usage is AT+COPS=[5,<oper> ,< AcT>],and the numeric format only support numeric type.

9.1.8 +CPLS, Selection of Preferred PLMN List

9.1.8.1 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.

9.1.8.2 Syntax

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

9.1.8.3 Attributes

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

9.1.8.4 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

9.1.9.1 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.

9.1.9.2 Syntax

Command	Possible Response
AT+CPOL=[<index>][,<format>[,<oper>[,<GSM_Act>,<GSM_Compact_Act>,<UTRAN_Act>,<EUTRAN_Act>,<NG-RAN_Act>]]]	OK or: +CME ERROR: <err>
AT+CPOL?	+CPOL: <index1>,<format>,<oper1>[,<GSM_Act1>,<GSM_Compact_Act1>,<UTRAN_Act1>,<E-UTRAN_Act1>,<NG-RAN_Act1>][<CR><LF>+CPOL: <index2>,<format>,<oper2>[,<GSM_Act2>,<GSM_Compact_Act2>,<UTRAN_Act2>,<E-UTRAN_Act2>,<NG-RAN_Act2>] [...]] OK or +CME ERROR: <err>
AT+CPOL=?	+CPOL: (list of supported<index>s),(list of supported<format>s) OK or: +CME ERROR: <err>

9.1.9.3 Attributes

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

9.1.9.4 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

<NG-RAN_AcTn>: integer type; NG-RAN access technology

- 0 Access technology not selected
- 1 Access technology selected



The X35 project does not support this command.

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9.1.10 +CEMODE, UE Modes of Operation for EPS

9.1.10.1 Description

This command is used to set the MT to operate according to the specified mode of operation for EPS.

9.1.10.2 Syntax

Command	Possible Response
AT+CEMODE=[<mode>]	OK or +CME ERROR: <err>
AT+CEMODE?	+CEMODE: <mode>

	OK
AT+CEMODE=?	+CEMODE: (list of supported <mode>s)
	OK

9.1.10.3 Attributes

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

9.1.10.4 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



The definition for UE modes of operation can be found in 3GPP TS 24.301 [83].

9.1.11 +GTRAT, Selection of Radio Access Technology

9.1.11.1 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.

9.1.11.2 Syntax

Command	Possible Response
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

9.1.11.3 Attributes

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

9.1.11.4 Defined Values

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

- 2 UMTS
- 3 LTE
- 4 LTE/UMTS
- 10 Automatic
- 14 NR-RAN
- 16 NR-RAN/WCDMA
- 17 NR-RAN/LTE
- 20 NR-RAN/WCDMA/LTE

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

- 2 WCDMA is preferred
- 3 LTE is preferred
- 6 NR-RAN is preferred

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

- 2 WCDMA is secondary preferred
- 3 LTE is secondary preferred
- 6 NR-RAN is preferred



If user setting ACT value is 10, the value of first parameter is 20 when running query command.

9.1.12 +GTACT, Select RAT and BAND

9.1.12.1 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

9.1.12.2 Syntax

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

9.1.12.3 Attributes

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

9.1.12.4 Defined Values

<rat>: integer type

- 1 UMTS
- 2 LTE
- 4 LTE/UMTS
- 10 Auto
- 14 NR-RAN
- 16 NR-RAN/WCDMA
- 17 NR-RAN/LTE
- 20 NR-RAN/WCDMA/LTE

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

- 2 WCDMA is preferred
- 3 LTE is preferred
- 6 NR-RAN is preferred

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

- 2 WCDMA is secondary preferred
- 3 LTE is secondary preferred
- 6 NR-RAN is preferred

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

- 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.
- FM160-EAU-01-00 supports bands.

<cdma_band>: integer type, cdma band

<evdo_band>: integer type, evdo band

<gsm_band>:

- 900: selection of 900 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
- 1800: selection of 1800 MHz band

1900: selection of 1900 MHz band

<umts_band>:

- 1 BAND_UMTS_I
- 2 BAND_UMTS_II
- 3 BAND_UMTS_III
- 4 BAND_UMTS_IV
- ...
- 25 BAND_UMTS_XXV

<lte_band>:

- 101 BAND_LTE_1
- 102 BAND_LTE_2
- 103 BAND_LTE_3
- ...
- 171 BAND_LTE_71

<nr_band>:

- 501 BAND_NR_1
- 502 BAND_NR_2
- ...
- 509 BAND_NR_9
- 5010 BAND_NR_10
- ...
- 50512 BAND_NR_512



This command gives a flexibility to configure RAT/Preferred RAT/BAND. So, user can configure RATs and Bands combinations. For specific frequency bands, please refer to the hardware manual of the corresponding model.

If only Band has to be configured then first 3 parameter has to be blank. So, the command looks like:

AT+GTACT=,,,101,103 (ex: to configure LTE band 1 and LTE band 3 and force to LTE only);

AT+GTACT=,,,103, 5078 (ex: to configure LTE band 3 and NR band 78 and force to LTE&NR).

For Dual mode, it only supports the 2nd parameter, the third parameter is not supported. Ex:

AT+GTACT= 4, 2, 3 => ERROR.

AT+GTACT= 4, 2 => OK.

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.

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

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

AT+GTACT=17,,,120 => LTE B20 & NR full band.

If user setting ACT value is 10, the value of first parameter is 20 when running query command.

AT+GTACT=10,,,120 => LTE B20 & UMTS full band & NR full band

9.1.13 +GTCCINFO, Get Cell Current Information

9.1.13.1 Description

This command acquires the current information of cell.

9.1.13.2 Syntax

Command	Response/Action
AT+GTCCINFO?	<p>+GTCCINFO:</p> <p>1.UMTS (a maximum of ten UMTS cells are supported)</p> <p>UMTS service cell:</p> <p><IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<band>,<ecno>,<rsrp>,<rac>,<rxlev>,<reserved>,<Ec/Io_lev></p> <p>UMTS neighbor cell:</p> <p><IsServiceCell>,<rat>,<mcc>,<mnc>,<lac>,<cellid>,<uarfcn>,<psc>,<cell_type>,<rank_pos>,<ranking_status>,<ecno>,<pathloss>,<rxlev>,<rsrp></p> <p>2.LTE (a maximum of ten LTE cells are supported)</p>

Command	Response/Action
	<p>LTE service cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<band>,<bandwidth>,<rssnr_value>,<rxlev>,<rsrp>,<rsrq></pre> <p>LTE neighbor cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<bandwidth>,<rxlev>,<rsrp>,<rsrq></pre> <p>OK</p> <p>3.NR Cell (a maximum of ten NR cells are supported)</p> <p>NR service cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<narfcn>,<physicalcellId>,<band>,<bandwidth>,<ss-sinr>,<rxlev>,<ss_rsrp>,<ss_rsrq></pre> <p>NR neighbor cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<narfcn>,<physicalcellId>,<ss-sinr>,<rxlev>,<ss_rsrp>,<ss_rsrq></pre> <p>OK</p> <p>4.LTE-NR ENDC (a maximum of ten LTE cells are supported)</p> <p>LTE-NR EN-DC service cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<band>,<bandwidth>,<rssnr_value>,<rxlev>,<rsrp>,<rsrq></pre> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<narfcn>,<physicalcellId>,<band>,<bandwidth>,<ss-sinr>,<rxlev>,<ss_rsrp>,<ss_rsrq></pre> <p>LTE neighbor cell:</p> <pre><IsServiceCell>,<rat>,<mcc>,<mnc>,<tac>,<cellid>,<earfcn>,<physicalcellId>,<bandwidth>,<rxlev>,<rsrp>,<rsrq></pre> <p>OK</p>

9.1.13.3 Attributes

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

9.1.13.4 Defined Values

<IsServiceCell>: integer type

- 1 Service Cell
- 2 Not Service Cell

<rat>: integer type; access technology

- 0 Invalid network
- 2 WCDMA
- 4 LTE
- 9 NR-RAN

<cellid>: integer type and range is: 0-0xFFFFFFFF (36bit) for SA and 0-0xFFFF (28 bit) for LTE and WCDMA

<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 0-0xFFFF; Absolute Radio Frequency Channel Number

<narfcn> integer type and range is 0-2229167; NR5G Radio Frequency Channel Number

<Reserved>: Reserved fields (may be empty fields or reserved tags)

<ranking_status>: Rank status of the neighboring cell (may indicate the status of the neighboring cell in the ranking, e.g., high priority, low priority, etc.)

<basic>: integer type; Base station identification code

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

When register WCDMA:

BAND_UMTS_I - BAND_UMTS_XXII.

When register LTE:

BAND_LTE_1 - BAND_LTE_43.

When register NR:

BAND_NR_1 - BAND_NR_512.



For specific frequency bands, please refer to the hardware manual of the corresponding model.

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

For WCDMA:

- 0 $R_{scp} < -120\text{dbm}$
- 1 $-120\text{dbm} \leq R_{scp} < -119\text{dbm}$
- ...
- 96 $-25\text{dbm} \leq R_{scp}$

For LTE:

- 0 $RSRP < -140\text{dbm}$
- 1 $-140\text{dbm} \leq RSRP < -139\text{dbm}$
- ...
- 96 $-45\text{dbm} \leq RSRP < -44\text{dbm}$
- 97 $-44\text{dbm} \leq RSRP$
- For NR:
 - $SS_RSRP < -156\text{ dBm}$
- 1 $-156\text{ dBm} \leq SS_RSRP < -155\text{ dBm}$
- 2 $-155\text{ dBm} \leq SS_RSRP < -154\text{ dBm}$
-
- 125 $-32\text{ dBm} \leq SS_RSRP < -31\text{ dBm}$
- 126 $-31\text{ dBm} \leq SS_RSRP$
- 255 Not known or not detectable

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

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

<c1>: integer type and range is 0-255;

<c2>: integer type and range is 0-255;

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

- 5 UMTS
- 8 LTE
- 9 NR
- 10 UNDEFINED.

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

<amr_acs>: integer type and range is 0-255; AMR active 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 for LTE and 0-0xFFFFFFFF for NR; 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;

For LTE, it is used RB number to indicate bandwidth, integer type and range is 0-100.

- 6 1.4 MHz
- 15 3 MHz
- 25 5 MHz
- 50 10 MHz

- 75 15 MHz
- 100 20 MHz

For NR, it cannot indicate bandwidth using RB number due to different SCS, integer type and range is 0-400.

- 0 5MHz
- 10 10MHz
- 15 15MHz
- 20 20MHz
- 25 25MHz
- 30 30MHz
- 40 40MHz
- 50 50MHz
- 60 60MHz
- 80 80MHz
- 90 90MHz
- 100 100MHz
- 200 200MHz
- 400 400MHz

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

- -100 $\text{RSSNR} \leq -50 \text{ dB}$;
- -99 $-50\text{dB} < \text{RSSNR} \leq -49.5 \text{ dB}$;
- -98 $49.5\text{dB} < \text{RSSNR} \leq -49 \text{ dB}$;
- ...
- -1 $-1\text{dB} < \text{RSSNR} \leq -0.5 \text{ dB}$;
- 0 $-0.5\text{dB} < \text{RSSNR} \leq 0 \text{ dB}$;
- 1 $0\text{dB} < \text{SSNR} \leq 0.5 \text{ dB}$;
- ...
- 98 $49\text{dB} < \text{RSSNR} \leq 49.5 \text{ dB}$;
- 99 $49.5\text{dB} < \text{RSSNR} \leq 50 \text{ dB}$;
- 100 $50\text{dB} < \text{RSSNR}$;
- 255 Invalid value. not known or not detectable

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

- 0: $\text{rsrp} < -140 \text{ dBm}$
- 1: $-140 \text{ dBm} \leq \text{rsrp} < -139 \text{ dBm}$
- 2: $-139 \text{ dBm} \leq \text{rsrp} < -138 \text{ dBm}$

...

- 95: $-46 \text{ dBm} \leq \text{rsrp} < -45 \text{ dBm}$
- 96: $-45 \text{ dBm} \leq \text{rsrp} < -44 \text{ dBm}$
- 97: $-44 \text{ dBm} \leq \text{rsrp}$

<rsrq> integer type and range is 0-255;

0: $\text{RSRQ} < -19.5 \text{ dB}$

1: $-19.5 \text{ dB} \leq \text{RSRQ} < -19.0 \text{ dB}$

...

33: $-3.5 \text{ dB} \leq \text{RSRQ} < -3.0 \text{ dB}$

34: $-3.0 \text{ dB} \leq \text{RSRQ}$

<ss_rsrq>: integer type, synchronization signal-based reference signal received quality (see 3GPP TS 38.133 [169] subclause 10.1.11).

- $\text{ss_rsrq} < -43 \text{ dB}$
- $-43 \text{ dB} \leq \text{ss_rsrq} < -42.5 \text{ dB}$
- $-42.5 \text{ dB} \leq \text{ss_rsrq} < -42 \text{ dB}$
-
- 124 $18.5 \text{ dB} \leq \text{ss_rsrq} < 19 \text{ dB}$
- 125 $19 \text{ dB} \leq \text{ss_rsrq} < 19.5 \text{ dB}$
- 126 $19.5 \text{ dB} \leq \text{ss_rsrq} < 20 \text{ dB}$
- 255 Not known or not detectable

<ss_sinr>: integer type, synchronization signal-based signal to noise and interference ratio (see 3GPP TS 38.133 [169] subclause 10.1.16).

- 0 $\text{ss_sinr} < -23 \text{ dB}$
- 1 $-23 \text{ dB} \leq \text{ss_sinr} < -22.5 \text{ dB}$
- 2 $-22.5 \text{ dB} \leq \text{ss_sinr} < -22 \text{ dB}$
- : : :
- 125 $39 \text{ dB} \leq \text{ss_sinr} < 39.5 \text{ dBm}$
- 126 $39.5 \text{ dB} \leq \text{ss_sinr} < 40 \text{ dB}$
- 127 $40 \text{ dB} \leq \text{ss_sinr}$
- 255 not known or not detectable

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



0 means less than -110 dBm or not detectable

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



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;

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

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

<Base ID>: 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 type and range is 0-65535;

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

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

Note: We did not support to get SA neighbour cell information currently.

9.1.14 +GTCELLLOCK, Configure Cell Lock Information

9.1.14.1 Description

GTCELLLOCK command is used to force UE to register on the specified cell. (Fixed cell and frequency)

9.1.14.2 Syntax

Command	Possible Response
AT+GTCELLLOCK=<mode>[,<rat>,<type>,<earfcn>[,<PCI>][,<scs>[,<nrband>]]]	OK or: +CME ERROR: <err>
AT+GTCELLLOCK?	+GTCELLLOCK: <mode>[,<rat>,<type>,<earfcn>[,<PCI>][,<scs>[,<nrband>]]] OK
AT+GTCELLLOCK=?	+GTCELLLOCK: (list of supported <mode>s), (list of supported <rat>s), (list of supported <type>s), (list of supported <earfcn>s), (list of supported <PCI>s) , (list of supported <scs>s) , (list of supported <nrband>s) OK

9.1.14.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
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Yes	Yes	Yes	No	< 10s
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9.1.14.4 Defined Values

< mode >: integer type;

- 0 Disable this function
- 1 Enable this function
- 2 Lock 10 PCIs in LTE

<rat>: integer type;

- 0 LTE
- 1 NR
- 2 UMTS

<type>: integer type;

- 0 Lock PCI
- 1 Lock frequency

<earfcn>: integer type;

- the range is 0-4294967295.

<PCI>: integer type;

- If second parameter value is 0, the range is 0-503 for LTE
- If second parameter value is 1, the rang is 0-1007 for NR

<scs>: integer type;

- 0 15kHz
- 1 30kHz

<nrband>: integer type;

- 501 BAND_NR_N1
- 502 BAND_NR_N2
- 503 BAND_NR_N3
-
- 5038 BAND_NR_N38
- 5041 BAND_NR_N41
- 5048 BAND_NR_N48

-
- 5077 BAND_NR_N77
- 5078 BAND_NR_N78
- 5079 BAND_NR_N79
-

For specific frequency bands, please refer to the hardware manual of the corresponding model.

If User want to lock the LTE/SA PCI registered before powering off, please input AT+GTCELLLOCK=1

If user want to change different SIM card, please disable this feature first.

After input this command, user must reset UE because EFS file take effect when rebooting UE.

After locked a cell by input this command, user should disable this function before change RAT by send COPS command.



Please do not use this command

with GTFREQLOCK/COPS/GTACT/GTCELLLOCK/GTRAT.

Do not switch sim cards after frequency locking with GTCELLLOCK.

GTCELLLOCK not support lock PCI of 3G.

The parameter (list of supported <PCI>s) of AT+GTCELLLOCK=? is set to 1007 for NR as default value. However, for LTE, its range is from 0 to 503.

The parameter (list of supported <nrband>s) of AT+GTCELLLOCK=? is representative of NR supported bands rather than the module supported bands.

MTK platform AT+GTCELLLOCK does not support scs and nrband parameters.

AT+GTCELLLOCK=1 does not support locked cell

AT+GTCELLLOCK=0 clear all cell locked information.

AT+GTCELLLOCK=1 Restore the last locked information

Locking frequency for 5G:

AT+GTCELLLOCK=1,1,1,504990,,1

1st parameter:1, AT enable <mode>

2nd parameter:1, 5G

3rd parameter:1, Locking frequency

4th parameter: 504990,frequency.

5th parameter: Null.

6th parameter:1,scs 30khz.

Locking PCI for 5G:

AT+GTCELLLOCK=1,1,0,504990,347,1,5041

1st parameter:1, AT enable <mode>

2nd parameter:1 5G

3rd parameter:0, Locking PCI

4th parameter: 504990,frequency.

5th parameter: 347,PCI.

6th parameter:1,scs 30khz.

7th parameter: 5041,NR band N41.

Locking frequency for 4G:

AT+GTCELLLOCK=1,0,1,2452

1st parameter:1,AT enable <mode>

2nd parameter:0,4G.

3rd parameter:1,Locking frequency

4th parameter: 2452,frequency.

Locking PCI for 4G:

AT+GTCELLLOCK=1,0,0,2452,221

1st parameter:1,AT enable <mode>

2nd parameter:0,4G.

3rd parameter:0,Locking PCI

4th parameter: 2452,frequency.

5th parameter: 221,PCI.

After input this command, user must reset UE.

9.1.15 +GTCAINFO, Display of CA information

9.1.15.1 Description

This command is used to query and return the current PCC Band, SCC Band, secondary cell activation status, BW and Earfcn, etc.

AT+GTCAINFO? is used to read the current CA information.

9.1.15.2 Syntax

Command	Possible Response
	+GTCAINFO: 1. LTE PCC: <band>,<physical cellId>,<earfcn>,<dl_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<ul_modulation>,<rsrp> [SCC1:<scell_state>,<ul_configured>,<band>,<physical cellId>,<earfcn>,<dl_bandwidth>,<ul_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<ul_modulation>,<rsrp> SCC2:<scell_state>,<ul_configured>,<band>,<physical cellId>,<earfcn>,<dl_bandwidth>,<ul_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<ul_modulation>,<rsrp> ...]
AT+GTCAINFO?	2. NR PCC: <band>,<physical cellId>,<narfcn>,<nr_dl_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<ul_modulation>,<nr_rsrp> [SCC1:<scell_state>,<ul_configured>,<band>,<physical cellId>,<narfcn>,<nr_dl_bandwidth>,<nr_ul_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<nr_rsrp> SCC2:<scell_state>,<ul_configured>,<band>,<physical cellId>,<narfcn>,<nr_dl_bandwidth>,<nr_ul_bandwidth>,<dl_mimo>,<ul_mimo>,<dl_modulation>,<nr_rsrp> ...]
	3. Other
	OK

Command	Possible Response
AT+GTCAINFO=?	OK

9.1.15.3 Attributes

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

9.1.15.4 Defined Values

<band>: integer type; LTE/NR band, Parameter range is (0-50512).

When register LTE:

- 101 BAND_LTE_1
- 102 BAND_LTE_2
- 103 BAND_LTE_3
- ...
- 171 BAND_LTE_71
- When register NR:
- 501 BAND_NR_1
- 502 BAND_NR_2
- ...
- 509 BAND_NR_9
- 5010 BAND_NR_10
- ...
- 50512 BAND_NR_512

<cell_state>: integer type; State of the secondary cell

- 1 Configured and deactivated
- 2 Configured and activated

<physical cellId>: integer type and range is 0-503; physical cell Id

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

<narfcn> integer type and range is 0-2229167; NR5G Radio Frequency Channel Number

<dl_bandwidth>, <ul_bandwidth>: integer type and range is 0-100;

- 6 1.4 MHz bandwidth
- 15 3 MHz bandwidth
- 25 5 MHz bandwidth
- 50 10 MHz bandwidth
- 75 15 MHz bandwidth
- 100 20 MHz bandwidth

<nr_dl_bandwidth> NR5G bandwidth ,integer type and range is 0-400;

<nr_ul_bandwidth>: NR5G bandwidth ,integer type and range is 0-400;

- 0 5MHz bandwidth
- 10 10MHz bandwidth
- 15 15MHz bandwidth
- 20 20MHz bandwidth
- 25 25MHz bandwidth
- 30 30MHz bandwidth
- 40 40MHz bandwidth
- 50 50MHz bandwidth
- 60 60MHz bandwidth
- 80 80MHz bandwidth
- 90 90MHz bandwidth
- 100 100MHz bandwidth
- 200 200MHz bandwidth
- 400 400MHz bandwidth

<ul_mimo>: number of MIMO layers: integer type and range is 1-4

<dl_mimo>: number of MIMO layers: integer type and range is 1-4

<ul_configured>: Indicated whether UL CA is enabled on this cell or not

- 0: disabled
- 1: enabled

<dl_modulation>, <ul_modulation>: integer type and range is 0-6;

- 0 BPSK

- 1 QPSK,
- 2 16QAM,
- 3 64QAM,
- 4 256QAM,
- 5 1024QAM
- 6 UNKNOWN

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



For specific frequency bands, please refer to the hardware manual of the corresponding model.

Because of the code baseline upgrading, some parameters may not be get correctly.

9.1.16 +GTPLMNLOCK, Configure PLMN lock information

9.1.16.1 Description

GTPLMNLOCK command is used to force UE to register on the specified PLMN.

9.1.16.2 Syntax

Command	Possible Response
AT+GTPLMNLOCK=<mode>[,<PLMN List>]	OK or: +CME ERROR: <err>
AT+GTPLMNLOCK?	+GTPLMNLOCK: <mode>[,<PLMN List>] OK

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

9.1.16.3 Attributes

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

9.1.16.4 Defined Values

< mode >: integer type;

0 Disable this function (Default)

1 Enable this function

< PLMN List >: string type.

NOTE 1: If the mode is 1, PLMN list is a mandatory parameter;

NOTE 2: If PLMN is locked, +COPS will not change the PLMN setting.

9.1.17 +GTCELLSCAN, Scan the cell information of the current environment set

9.1.17.1 Description

Scan the cell information of the current environment set.

9.1.17.2 Syntax

Command	Possible Response
AT+GTCELLSCAN	OK

Command	Possible Response
	+GTCELLSCAN: 4,<mcc>,<mnc>,<freq>,<pci>,<tac>,<cellid>,<rsrp>,<rsrq>,<band_LTE>,<srxlev>,<squal><CR><LF> +GTCELLSCAN: 4,<mcc>,<mnc>,<freq>,<pci>,<tac>,<cellid>,<rsrp>,<rsrq>,<band_LTE>,<srxlev>,<squal><CR><LF> +GTCELLSCAN: 5,<mcc>,<mnc>,<freq>,<pci>,<tac>,<cellid>,<ss_rsrp>,<ss_rsrq>,<band_NR>,<srxlev>,<squal><CR><LF> +GTCELLSCAN: 5,<mcc>,<mnc>,<freq>,<pci>,<tac>,<cellid>,<ss_rsrp>,<ss_rsrq>,<band_NR>,<srxlev>,<squal><CR><LF> or For 4G, +GTCELLSCAN: 4, There is no SIB1 to decode. For 5G: +GTCELLSCAN: 5, There is no SIB1 to decode.

9.1.17.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
No	No	Yes	Yes	< 180s

9.1.17.4 Defined Values

<rat>: integer type; network mode.

4 4G network

5 5G network

<mcc>: integer type; Mobile Country Code.

<mnc>: integer type; Mobile Network Code.

<freq>: integer type; Earfcn or Narfcn.

<pci>: integer type; Physical Cell Id.

<tac>: integer type; Tracking Area Code.

<cellid>: integer type; Cell Identity.

<rsrp>: integer type; Reference Signal Receiving Power. Its range is -140 — -44.

<rsrq>: integer type; Reference Signal Receiving Quality. Its range is -19.5 — -3.

<ss_rsrp>: integer type; Reference Signal Receiving Power. Its range is -156 — -31.

<ss_rsrq>: integer type; Reference Signal Receiving Quality. Its range is -43 — 20.

<band_LTE>: integer type. It depends on the bands contained in SIB1 which is transmitted by eNB.

<band_NR>: integer type. It depends on the bands contained in SIB1 which is transmitted by gNB.

<srxlev>: integer type. Cell selection/reselection level.

<squal>: integer type. Cell selection/reselection quality.



Note1: This command can be used in SIM card inserted or not.

Note2: This command can be used after AT+GTACT=2/14. Therefore, it will not report 5G (AT+GTACT=2) or 4G (AT+GTACT=14).

Note3: If there is no SIB1 captured when executing this AT command, only the result OK is returned.

Note4: This is an asynchronous command which means that the SIB1 delivered during system scan will be parsed but the SIB1 delivered after system scan will not be parsed.

10 GPRS

10.1 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).

10.2 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.

10.2.1 +CGCLASS, GPRS Mobile Station Class

10.2.1.1 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.

10.2.1.2 Syntax

Command	Possible Response
AT+CGCLASS=<class>	OK or: +CME ERROR: <err>
AT+CGCLASS?	+CGCLASS: <class> OK
AT+CGCLASS=?	+CGCLASS: (list of supported <class>s) OK

10.2.1.3 Attributes

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

10.2.1.4 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)



<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.

10.2.2 +CGDCONT, Define PDP Context

10.2.2.1 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.

10.2.2.2 Syntax

Command	Possible Response
+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signaling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]]]]	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_Signaling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]][<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signaling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>[,<Reliable_Data_Service>[,<SSC_mode>[,<S-NSSAI>[,<Pref_access_type>[,<RQoS_ind>[,<MH6-PDU>[,<Always-on_req>]]]]]]]]]]]]]]]]] [...]]
AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of

Command	Possible Response
	<p>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_Signaling_Flag_Ind>s),(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IP_MTU_discovery>s),(list of supported <Reliable_Data_Service>s),(list of supported <SSC_mode>s),(list of supported <Pref_access_type>s),(list of supported <RQoS_ind>s),(list of supported <MH6-PDU>s),(list of supported <Always-on_req>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_Signaling_Flag_Ind>s),(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IP_MTU_discovery>s),(list of supported <Reliable_Data_Service>s),(list of supported <SSC_mode>s),(list of supported <Pref_access_type>s),(list of supported <RQoS_ind>s),(list of supported <MH6-PDU>s),(list of supported <Always-on_req>s)</p> <p>[...]]</p>

10.2.2.3 Attributes

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

10.2.2.4 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.



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.

The cid max value is 23.

<PDP_type>: string type; specifies the type of packet data protocol. The default value is manufacturer specific.

- 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])
- PPP Point to Point Protocol (IETF STD 51 [104])



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.



Note 1: The maximum length of this value is 62 bytes.

Note 2: Symbols other than "." are not allowed.

<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.



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 SDCP 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 signaling
- 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.



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
- 4 PDP context is for handover of emergency (bearer) services from a non-3GPP access network



A PDP context established for handover of emergency (bearer) services from a non-3GPP access network has the same status as a PDP context for emergency (bearer) services.

<P-CSCF_discovery>: integer type; influences how the MT/TA requests to get the P-CSCF address.

- 0 Preference of P-CSCF address discovery not influenced by +CGDCONT
- 1 Preference of P-CSCF address discovery through NAS signaling
- 2 Preference of P-CSCF address discovery through DHCP

<IM_CN_Signaling_Flag_Ind>: integer type; indicates to the network whether the PDP context is for IM CN subsystem-related signaling only or not.

- 0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only
- 1 UE indicates that the PDP context is for IM CN subsystem-related signaling only

<NSLPI>: integer type; indicates the NAS signaling priority requested for this PDP context:

- 0 indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT.
- 1 indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signaling low priority".

<securePCO>: integer type. Specifies if security protected transmission of PCO is requested or not (applicable for EPS only).

- 0 Security protected transmission of PCO is not requested
- 1 Security protected transmission of PCO is requested

<IPv4_MTU_discovery>: integer type; influences how the MT/TA requests to get the IPv4 MTU size.

- 0 Preference of IPv4 MTU size discovery not influenced by +CGDCONT
- 1 Preference of IPv4 MTU size discovery through NAS signaling

<Local_Addr_Ind>: integer type; indicates to the network whether or not the MS supports local IP address in TFTs.

- 0 Indicates that the MS does not support local IP address in TFTs
- 1 Indicates that the MS supports local IP address in TFTs

<Non-IP_MTU_discovery>: integer type; influences how the MT/TA requests to get the Non-IP MTU size.

- 0 Preference of Non-IP MTU size discovery not influenced by +CGDCONT
- 1 Preference of Non-IP MTU size discovery through NAS signaling

<Reliable_Data_Service>: integer type; indicates whether the UE is using Reliable Data Service for a PDN connection or not.

- 0 Reliable Data Service is not being used for the PDN connection
- 1 Reliable Data Service is being used for the PDN connection

<SSC_mode>: integer type; indicates the session and service continuity (SSC) mode for the PDU session in 5GS.

- 0 Indicates that the PDU session is associated with SSC mode 1
- 1 Indicates that the PDU session is associated with SSC mode 2
- 2 Indicates that the PDU session is associated with SSC mode 3

<S-NSSAI>: string type in hexadecimal character format. Dependent of the form, the string can be separated by dot(s) and semicolon(s). The S-NSSAI is associated with the PDU session for identifying a network slice in 5GS. For the

format and the encoding of S-NSSAI. This parameter shall not be subject to conventional character conversion as per +CSCS. The <S-NSSAI> has one of the forms:

sst	only slice/service type (SST) is present
sst;mapped_sst	SST and mapped configured SST are present
sst.sd	SST and slice differentiator (SD) are present
sst.sd;mapped_sst	SST, SD and mapped configured SST are present
sst.sd;mapped_sst.mapped_sd	SST, SD, mapped configured SST and mapped configured SD are present

<Pref_access_type>: integer type; indicates the preferred access type for the PDU session in 5GS.

- 0 Indicates that the preferred access type is 3GPP access
- 1 Indicates that the preferred access type is non-3GPP access

<RQoS_ind>: integer type; indicates whether the UE supports reflective QoS for the PDU session.

- 0 Indicates that reflective QoS is not supported for the PDU session
- 1 Indicates that reflective QoS is supported for the PDU session

<MH6-PDU>: integer type; indicates whether the UE supports IPv6 multi-homing for the PDU session.

- 0 Indicates that IPv6 multi-homing is not supported for the PDU session
- 1 Indicates that IPv6 multi-homing is supported for the PDU session

<Always-on_req>: integer type; indicates whether the UE requests to establish the PDU session as an always-on PDU session.

- 0 Always-on PDU session is not requested
- 1 Always-on PDU session is requested

Notes: Please do not change IMS and SOS APN which will lead UE cannot register IMS and establishing SOS bearer

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

10.2.3.1 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.

10.2.3.2 Syntax

Command	Possible Response
AT+CGQMIN=<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]	OK or:

Command	Possible Response
	+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>

10.2.3.3 Attributes

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

10.2.3.4 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



The X35 project does not support this command.

10.2.4 +CGQREQ, Quality of Service Profile (Requested)

10.2.4.1 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.

10.2.4.2 Syntax

Command	Possible Response
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

10.2.4.3 Attributes

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

10.2.4.4 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



The X35 project does not support this command.

10.2.5 +CGATT, Packet Domain Attach or Detach

10.2.5.1 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.

10.2.5.2 Syntax

Command	Possible Response
AT+CGATT=<state>	OK or: +CME ERROR: <err> OK
AT+CGATT?	+CGATT: <state>

	OK
AT+CGATT=?	+CGATT: (list of supported <state>s)
	OK

10.2.5.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
No	No	Yes	Yes	< 15s

10.2.5.4 Defined Values

<state>: integer type; indicates the state of PS attachment

- 0 Detached
- 1 Attached

10.2.6 +CGACT, PDP Context Activate or Deactivate

10.2.6.1 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.

10.2.6.2 Syntax

Command	Possible Response
AT+CGACT=[<state>[,<cid>[,<cid>[,]]]]	OK

Command	Possible Response
	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

10.2.6.3 Attributes

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

10.2.6.4 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).

10.2.7 +CGPADDR, PDP Addresses

10.2.7.1 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.

10.2.7.2 Syntax

Command	Possible Response
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

10.2.7.3 Attributes

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

10.2.7.4 Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

<PDP_addr_1>:

<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.

10.2.8 +CGEQMIN, 3G Quality of Service Profile (Minimum Acceptable)

10.2.8.1 Description

This command allows the TE to specify a minimum acceptable profile, which is checked by the MT against the negotiated profile returned in the PDP context establishment and PDP context modification procedures.

10.2.8.2 Syntax

Command	Possible Response
AT+CGEQMIN=[<cid>[,<Traffic class>[,<Maximum Bit rate UL>[,<Maximum bitrate DL>[,<Guaranteed Bitrate UL>[,<Guaranteed bitrate DL>[,<Delivery order>[,<Maximum SDU size>[,<SDU error ratio>[,<Residual bit error ratio>[,<Delivery of erroneous SDUs>[,<Transfer delay>[,<Traffic handling priority>[,<Source statistics descriptor>[,<Signaling indication>]]]]]]]]]]]]]]]]]]	OK Or +CME ERROR: <err>
AT+CGEQMIN?	+CGEQMIN: <cid>,<Traffic class>,<Maximum bit rate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority> [,<Source statistics descriptor>,<Signaling indication>] [<CR><LF>+CGEQMIN: <cid>,<Traffic class>,<Maximum bit rate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority> [,<Source statistics descriptor>,<Signaling indication>] [...]]
AT+CGEQMIN=?	+CGEQMIN: <PDP_type>,(list of supported <Traffic class>s),(list of supported <Maximum bit rate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL>s),(list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery

Command	Possible Response
	<p>order>s),(list of supported <Maximum SDU size>s),(list of supported <SDU error ratio>s),(list of supported <Residual bit error ratio>s),(list of supported<Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s)[,(list of supported <Source statistics descriptor>s),(list of supported <Signaling indication>s)] [[<CR><LF>+CGEQMIN: <PDP_type>,(list of supported <Traffic class>s),(list of supported <Maximum bit rate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL >s),(list of supported<Guaranteed bitrate DL >s),(list of supported <Delivery order>s),(list of supported <Maximum SDU size>s),(list of supported <SDU error ratio>s),(list of supported <Residual bit error ratio>s),(list of supported<Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s)[,(list of supported <Source statistics descriptor>s),(list of supported <Signaling indication>s)] [...]]</p>

10.2.8.3 Attributes

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

10.2.8.4 Defined Values

<cid>: integer type; specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands).

<PDP_type>: string type; specifies the type of packet data protocol (see the +CGDCONT command).

For the following parameters, see also 3GPP TS 23.107 [46].

<Traffic class>: integer type; indicates the type of application for which the UMTS bearer service is optimised (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 Conversational
- 1 Streaming
- 2 Interactive

- 3 Background

<Maximum bit rate UL>: integer type; indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Maximum bitrate DL>: integer type; indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Guaranteed bitrate UL>: integer type; indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Guaranteed bitrate DL>: integer type; indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Delivery order>: integer type; indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 No
- 1 Yes

<Maximum SDU size>: integer type; (1,2,3,...) indicates the maximum allowed SDU size in octets (refer 3GPP TS 24.008 subclause 10.5.6.5).

<SDU error ratio>: string type; indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example a target SDU error ratio of $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQMIN=..., "5E3", ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Residual bit error ratio>: string type; indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQMIN=..., "5E3", ...) (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Delivery of erroneous SDUs>: integer type; indicates whether SDUs detected as erroneous shall be delivered or not (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 No
- 1 Yes
- 2 No detect

<Transfer delay>: integer type; (0,1,2,...) indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Traffic handling priority>: integer type; (1,2,3,...) specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Source Statistics Descriptor>: integer type; specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 Characteristics of SDUs is unknown
- 1 Characteristics of SDUs corresponds to a speech source

<Signaling Indication>: integer type; indicates signaling content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 PDP context is not optimized for signaling
- 1 PDP context is optimized for signaling



The X35 project does not support this command.

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10.2.9 +CGEQREQ, 3G Quality of Service Profile (Requested)

10.2.9.1 Description

This command allows the TE to specify a UMTS Quality of Service Profile that is used when the MT activates a PDP context.

10.2.9.2 Syntax

Command	Possible Response
AT+CGEQREQ=[<cid>,<Traffic class>,<Maximum bit rate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Signaling indication>]]]]]]]]]]]]]]]]	OK or ERROR
AT+CGEQREQ?	+CGEQREQ: <cid>,<Traffic class>,<Maximum bit rate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source statistics descriptor>,<Signaling indication>] [<CR><LF>+CGEQREQ: <cid>,<Traffic class>,<Maximum bit rate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling priority>,<Source Statistics Descriptor>,<Signaling Indication>] [...]]
AT+CGEQREQ=?	+CGEQREQ: <PDP_type>,(list of supported <Traffic class>s),(list of supported <Maximum bit rate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL>s),(list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s),(list of supported <Maximum SDU size>s),(list of supported <SDU error ratio>s),(list of supported <Residual bit error ratio>s),(list of supported <Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s),(list of supported <Source statistics descriptor>s),(list of supported <Signaling indication>s)] [<CR><LF>+CGEQREQ: <PDP_type>,(list of supported <Traffic class>s),(list of supported <Maximum bit rate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL>s),(list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s),(list of supported <Maximum SDU size>s),(list of supported <SDU error ratio>s),(list of supported <Residual bit error ratio>s),(list of

Command	Possible Response
	supported <Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s)] [(list of supported <Source statistics descriptor>s),(list of supported <Signaling indication>s)]

10.2.9.3 Attributes

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

10.2.9.4 Defined Values

<cid>: integer type; specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands).

<PDP_type>: string type; specifies the type of packet data protocol (see the +CGDCONT command).

For the following parameters, see also 3GPP TS 23.107 [46].

<Traffic class>: integer type; indicates the type of application for which the UMTS bearer service is optimised (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 Conversational
- 1 Streaming
- 2 Interactive
- 3 Background

If the Traffic class is specified as conversational or streaming, then the Guaranteed and Maximum bitrate parameters should also be provided.

<Maximum bit rate UL>: integer type; indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...). This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Maximum bitrate DL>: integer type; indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example, a bitrate of 32kbit/s would be specified as '32' (e.g.

AT+CGEQREQ=...,32, ...). If the parameter is set to '0' the subscribed value will be requested. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Guaranteed bitrate UL>: integer type; indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...). If the parameter is set to '0' the subscribed value will be requested. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Guaranteed bitrate DL>: integer type; indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example, a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQREQ=...,32, ...). If the parameter is set to '0' the subscribed value will be requested. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Delivery order>: integer type; indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 No
- 1 Yes

<Maximum SDU size>: integer type; (1,2,3,...) indicates the maximum allowed SDU size in octets. If the parameter is set to '0' the subscribed value will be requested (refer 3GPP TS 24.008 subclause 10.5.6.5).

<SDU error ratio>: string type; indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQREQ=..., "5E3", ...). "0E0" means subscribed value (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Residual bit error ratio>: string type; indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of $5 \cdot 10^{-3}$ would be specified as "5E3" (e.g. AT+CGEQREQ=..., "5E3", ...). "0E0" means subscribed value (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Delivery of erroneous SDUs>: integer type; indicates whether SDUs detected as erroneous shall be delivered or not (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 No
- 1 Yes
- 2 No detect

<Transfer delay>: integer type; (0,1,2,...) indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds. If the parameter is set to '0' the subscribed value will be requested (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Traffic handling priority>: integer type; (1,2,3,...) specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers. If the parameter is set to '0' the subscribed value will be requested (refer 3GPP TS 24.008 subclause 10.5.6.5).

<Source Statistics Descriptor>: integer type; specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 Characteristics of SDUs is unknown
- 1 Characteristics of SDUs corresponds to a speech source

<Signaling Indication>: integer type; indicates signaling content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive (refer 3GPP TS 24.008 subclause 10.5.6.5).

- 0 PDP context is not optimized for signaling
- 1 PDP context is optimized for signaling<PDP_type> (see +CGDCONT and +CGDSCONT commands).



The X35 project does not support this command.

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10.2.10 +CGCMOD, PDP Context Modify

10.2.10.1 Description

This command is used to modify the specified PDP context (s) with respect to QoS profiles and TFTs.

10.2.10.2 Syntax

Command	Possible Response
AT+CGCMOD=[<cid>[,<cid>[,...]]]	OK Or +CME ERROR: <err>
AT+CGCMOD=?	+CGCMOD: (list of <cid>s associated with active contexts) OK

10.2.10.3 Attributes

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

10.2.10.4 Defined Values

<cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).



The X35 project does not support this command.

10.2.11 +CGDSCONT, Define Secondary PDP Context

10.2.11.1 Description

This command is used to define a secondary PDP context by specifying the PDP context parameter values for a <cid> (local context identification parameter). If the command is used only with the one parameter <cid>, it means that the corresponding PDP context becomes undefined.

10.2.11.2 Syntax

Command	Possible Response
AT+CGDSCONT=[<cid>,<p_cid> [,<d_comp>[,<h_comp>]	OK Or ERROR

Command	Possible Response
[,<IM_CN_Signaling_Flag_Ind>]]]]	
AT+CGDSCONT?	+CGDSCONT: <cid>,<p_cid>,<d_comp>,<h_comp> [,<IM_CN_Signaling_Flag_Ind>] [<CR><LF>+CGDSCONT: <cid>,<p_cid>,<d_comp>,<h_comp> [,<IM_CN_Signaling_Flag_Ind>] [...]] OK
AT+CGDSCONT=?	+CGDSCONT: (range of supported <cid>s),(list of <p_cid>s for active primary contexts),(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IM_CN_Signaling_Flag_Ind>s) OK

10.2.11.3 Attributes

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

10.2.11.4 Defined Values

<cid>: integer type; which 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 (minimum value = 1) is returned by the test form of the command.



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 +CGDSCONT and +CGDSCONT.

<p_cid>: integer type; specifies a particular PDP context definition which has been specified by use of the +CGDSCONT command. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test form of the command.

<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)

<IM_CN_Signaling_Flag_Ind>: integer type; indicates to the network whether the PDP context is for IM CN subsystem-related signaling only or not.

- 0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only
- 1 UE indicates that the PDP context is for IM CN subsystem-related signaling only



The X35 project does not support this command.

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10.2.12 +CGEREP, Packet Domain Event Reporting

10.2.12.1 Description

This command is used to enable or disable sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of events occurring in the Packet Domain.

10.2.12.2 Syntax

Command	Possible Response
AT+CGEREP=[<mode>[,<bfr>]]	OK
AT+CGEREP?	+CGEREP: <mode>,<bfr>

Command	Possible Response
	OK
AT+CGEREP=?	+CGEREP: (list of supported <mode>s),(list of supported <bfr>s) OK

10.2.12.3 Attributes

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

10.2.12.4 Defined Values

<mode>: integer type

- 0 Buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
- 1 Discard unsolicited result codes when MT-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 MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE

<bfr>: integer type

- 0 MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered
- 1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)

10.2.12.5 Defined Events

The events are valid for GPRS/UMTS and LTE unless explicitly mentioned.

For network attachment, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]

The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT

+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]

The mobile termination has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

+CGEV: NW DETACH

The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately. ETSI 3GPP TS 27.007 version 7.6.0 Release 7 147 ETSI TS 127 007 V7.6.0 (2010-04)

+CGEV: ME DETACH

The mobile termination has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: NW CLASS <class>

The network has forced a change of MT class. The highest available <class> is reported (see +CGCLASS).

+CGEV: ME CLASS <class>

The mobile termination has forced a change of MT class. The highest available <class> is reported (see +CGCLASS).

+CGEV: ME PDN ACT <cid>[,<reason>[,<cid_other>]]

The mobile termination has activated a context. The context represents a PDN connection in LTE or a primary PDP context in GSM/UMTS. The <cid> for this context is provided to the TE. This event is sent either in result of explicit context activation request (+CGACT), or in result of implicit context activation request associated to attach request (+CGATT=1). The format of the parameters <cid>, <cid_other> are found in command +CGDCONT.

<reason> integer type parameter indicates the reason why the context activation request for PDP type

IPv4v6

was

not granted. This parameter is only included if the requested PDP type associated with <cid> is IPv4v6, and the PDP type assigned by the network for <cid> is either IPv4 or IPv6.

- 0 IPv4 only allowed
- 1 IPv6 only allowed
- 2 Single address bearers only allowed.
- 3 Single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful.

10.2.13 +CGTFT, Traffic Flow Template

10.2.13.1 Description

This command allows the TE to specify a Packet Filter–PF for a Traffic Flow Template–TFT that is used in the GGSN for routing of down-link packets onto different QoS flows towards the TE.

10.2.13.2 Syntax

Command	Possible Response
+CGTFT=[<cid>,<packet filter identifier>,<evaluation precedence index> [<source address and subnet mask> [<protocol number (ipv4) / next header (ipv6)> [<destination port range> [<source port range> [<ipsec security parameter index (spi)> [<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [<flow label (ipv6)> [<direction>]]]]]]]]]	OK or ERROR
AT+CGTFT?	+CGTFT: <cid>,<packet filter identifier>,<evaluation precedence index>,<source address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<destination port range>,<source port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction> [<CR><LF> +CGTFT: <cid>,<packet filter identifier>,<evaluation precedence index>,<source address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<destination port range>,<source port range>,<ipsec security parameter index (spi)>,<type of service (tos)

Command	Possible Response
	(ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction> [...]]
AT+CGTFT=?	<p>+CGTFT: <PDP_type>,(list of supported <packet filter identifier>s),(list of supported <evaluation precedence index>s),(list of supported <source address and subnet mask>s),(list of supported <protocol number (ipv4) / next header (ipv6)>s),(list of supported <destination port range>s),(list of supported <source port range>s),(list of supported <ipsec security parameter index (spi)>s),(list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s),(list of supported <flow label (ipv6)>s),(list of supported <direction>s)</p> <p>[<CR><LF>+CGTFT: <PDP_type>,(list of supported <packet filter identifier>s),(list of supported <evaluation precedence index>s),(list of supported <source address and subnet mask>s),(list of supported <protocol number (ipv4) / next header (ipv6)>s),(list of supported <destination port range>s),(list of supported <source port range>s),(list of supported <ipsec security parameter index (spi)>s),(list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s),(list of supported <flow label (ipv6)>s),(list of supported <direction>s)</p> <p>[...]]</p>

10.2.13.3 Attributes

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

10.2.13.4 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).

<packet filter identifier>: integer type. Value range is from 1 to 16.

<evaluation precedence index>: integer type. The value range is from 1 to 255.

<remote address and subnet mask>: string type. The string is given as dot-separated numeric (0-255)

parameters on the form:"a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGTFT.

<protocol number (ipv4) / next header (ipv6)>: integer type. Value range is from 0 to 255.

<local port range>: string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<remote port range>: string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<ipsec security parameter index (spi)>: numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>: string type. The string is given as dot-separated numeric (0-255) parameters on the form "t.m".

<flow label (ipv6)>: numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.

<direction>: integer type. Specifies the transmission direction in which the packet filter shall be applied.

- 0 Pre-Release 7 TFT filter (see 3GPP TS 24.008 [8], table 10.5.162)
- 1 Uplink
- 2 Downlink
- 3 Bidirectional (Up & Downlink); Default value if not set

<source port range>: Source port range, which specifies the range of the source port

<destination port range>: Target port range, which specifies the range of the target port

<source address and subnet mask>: Source address and subnet mask, which specifies the source address and subnet mask of the packet



The X35 project does not support this command.

10.2.14 +CGPIAF, Printing IP Address Format

10.2.14.1 Description

This command decides what format to print IPV6 address parameters of other AT commands. See RFC 4291 [88] for details of the IPV6 address format.

The +CGPIAF parameters <IPv6_AddressFormat>, <IPv6_SubnetNotation>, <IPv6_LeadingZeros> and <IPv6_CompressedZeros> affect the following commands and parameters:

- in +CGTFT and +CGTFTTRDP, the <remote address and subnet mask >;
- in +CGDCONT, the <PDP_addr>;
- in +CGPADDR, the <PDP_addr_1> and <PDP_addr_2>;
- in +CGCONTRDP, the <local address and subnet mask>, <DNS_prim_addr>, <DNS_sec_addr>, <P_CSCF_prim_addr> and <P_CSCF_sec_addr>;
- in +CRC, the <PDP_addr> of unsolicited result code GPRS <PDP_type>, <PDP_addr>[,<L2P>] [,<APN>]].
- in +XDNS, the <primary_DNS>, <secondary_DNS> of XDNS Read response.

10.2.14.2 Syntax

Command	Possible Response
AT+CGPIAF=[<IPv6_AddressFormat>,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_CompressZeros>]]]]	OK or: +CME ERROR: <err>
AT+CGPIAF?	+CGPIAF: <IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>,<IPv6_CompressZeros>
AT+CGPIAF=?	+CGPIAF: (list of supported <IPv6_AddressFormat>s),(list of supported <IPv6_SubnetNotation>s),(list of supported <IPv6_LeadingZeros>s),(list of supported <IPv6_CompressZeros>s)

10.2.14.3 Attributes

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

10.2.14.4 Defined Values

<IPv6_AddressFormat>: integer type, decides the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address.

- 0 Use IPv4-like dot-notation. IP address, and subnetwork mask if applicable, are dot-separated.
Example: For <remote address and subnet mask>: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.255.255.255.255.255.255.240.0.0.0.0.0.0."
For other IP address parameters: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0"
- 1 Use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space.
Example: For <remote address and subnet mask>: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000"
For other IP address parameters: "2001:0DB8:0000:CD30:0000:0000:0000:0000"

<IPv6_SubnetNotation>: integer type, decides the subnet-notation for <remote address and subnet mask>. Setting does not apply if <IPv6_AddressFormat> = 0.

- 0 Both IP Address and subnet mask are stated explicitly, separated by a space.
Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000"
- 1 The printout format is applying / (forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation. Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000/60"

<IPv6_LeadingZeros>: integer type, decides whether leading zeros are omitted or not. Setting does not apply if <IPv6_AddressFormat> = 0.

- 0 Leading zeros are omitted. Example: "2001:DB8:0:CD30:0:0:0:0"
- 1 Leading zeros are included. Example: "2001:0DB8:0000:CD30:0000:0000:0000:0000"

<IPv6_CompressZeros>: integer type, decides whether 1-n instances of 16-bit zero-values are replaced by only '::'. This applies only once. Setting does not apply if <IPv6_AddressFormat> = 0.

- 0 No zero compression. Example: "2001:DB8:0:CD30:0:0:0:0"
- 1 Use zero compression. Example: "2001:DB8:0:CD30::"

10.2.15 +CGCONTRDP, PDP Context Read Dynamic Parameters

10.2.15.1 Description

The execution command returns the relevant information <bearer_id>, <apn>, <local_addr and subnet_mask>, <gw_addr>, <DNS_prim_addr>, <DNS_sec_addr>, <P-CSCF_prim_addr>, <P-CSCF_sec_addr>, <IM_CN_Signaling_Flag>, <LIPA_indication>, <IPv4_MTU> and <WLAN_Offload> for an active non secondary PDP context with the context identifier <cid>.

If the MT indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple lines of information per <cid> will be returned.

If the MT has dual stack capabilities, at least one pair of lines with information is returned per <cid>. First one line with the IPv4 parameters followed by one line with the IPv6 parameters. If this MT with dual stack capabilities indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple of such pairs of lines are returned.



If the MT doesn't have all the IP addresses to be included in a line, e.g. in case the UE received four IP addresses of DNS servers and two IP addresses of P-CSCF servers, the parameter value representing an IP address that cannot be populated is set to an empty string or an absent string.

If the parameter <cid> is omitted, the relevant information for all active non-secondary PDP contexts is returned.

The test command returns a list of <cid>s associated with active non-secondary contexts.

10.2.15.2 Syntax

Command	Possible Response
AT+CGCONTRDP=[<cid>]	+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<source_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P_CSCF_prim_addr>[,<P_CSCF_sec_addr>[,<IM_CN_Signaling_Flag>]]]]]]] [<CR><LF>+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<source_addr and subnet

Command	Possible Response
	mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P_CSCF_sec_addr>[,<IM_CN_Signaling_Flag>]]]]]] [...]]
AT+CGCONTRDP=?	+CGCONTRDP: (list of <cid>s associated with active contexts)

10.2.15.3 Attributes

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

10.2.15.4 Defined Values

<cid>: integer type; specifies a particular non-secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the +CGDCONT and +CGDSCONT commands).

<bearer_id>: integer type; identifies the bearer, i.e. the EPS bearer in EPS and the NSAPI in UMTS/GPRS.

<apn>: string type; a logical name that was used to select the GGSN or the external packet data network.

<local_addr and subnet_mask>: string type; shows the IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

<gw_addr>: string type; shows the Gateway Address of the MT. The string is given as dot-separated numeric (0-255) parameters. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

<DNS_prim_addr>: string type; shows the IP address of the primary DNS server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the

execute form of +CGCONTRDP.

<DNS_sec_addr>: string type; shows the IP address of the secondary DNS server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

<P_CSCF_prim_addr>: string type; shows the IP address of the primary P-CSCF server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

<P_CSCF_sec_addr>: string type; shows the IP address of the secondary P-CSCF server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

<IM_CN_Signaling_Flag>: integer type; shows whether the PDP context is for IM CN subsystem-related signaling only or not.

- 0 PDP context is not for IM CN subsystem-related signaling only
- 1 PDP context is for IM CN subsystem-related signaling only

<source_addr and subnet_mask>: String type,Source address and subnet mask

10.2.16 +CGSCONTRDP, Secondary PDP Context Read Dynamic Parameters

10.2.16.1 Description

The execution command returns <p_cid>, <bearer_id>, <IM_CN_Signaling_Flag> and <WLAN_Offload> for an active secondary PDP context with the context identifier <cid>.

If the parameter <cid> is omitted, the <cid>, <p_cid>, <bearer_id> and <IM_CN_Signaling_Flag> are returned for all active secondary PDP contexts.

In EPS, the Traffic Flow parameters are returned.



Parameters for UE initiated and network-initiated PDP contexts are returned.

The test command returns a list of <cid>s associated with active secondary PDP contexts.

10.2.16.2 Syntax

Command	Possible Response
AT+CGSCONTRDP=[<cid>]	+CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signaling_Flag>][<CR><LF>+CGS CONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signaling_Flag>][...]]
AT+CGSCONTRDP=?	+CGSCONTRDP: (list of <cid>s associated with active contexts)

10.2.16.3 Attributes

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

10.2.16.4 Defined Values

<cid>: integer type; specifies a particular active secondary PDP context or Traffic Flows definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the +CGDCONT and +CGDSCONT commands).

<p_cid>: integer type; specifies a particular PDP context definition or default EPS context Identifier which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface (see the +CGDSCONT command).

<bearer_id>: integer type; identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.

<IM_CN_Signaling_Flag>: integer type; shows whether the PDP context is for IM CN subsystem-related signaling only or not.

- 0 PDP context is not for IM CN subsystem-related signaling only
- 1 PDP context is for IM CN subsystem-related signaling only



The X35 project does not support this command.

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10.2.17 +CGTFTRDP, Traffic Flow Template Read Dynamic Parameters

10.2.17.1 Description

This command returns the relevant information about Traffic Flow Template of <cid> together with the additional network assigned values when established by the network.

10.2.17.2 Syntax

Command	Possible Response
AT+CGTFTRDP=[<cid>]	+CGTFTRDP: <cid>,<packet filter identifier>,<evaluation available index>,<source address and vaila mask>,<protocol vaila (ipv4) / next header(ipv6)>,<destination port range>,<source port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<NW packet filter Identifier>[<CR><LF>+CGTFTRDP: <cid>,<packet filter identifier>,<evaluation available index>,<source address and vaila mask>,<protocol vaila (ipv4) / next header (ipv6)>,<destination port range>,<source port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<NW packet filter Identifier> [...]]
AT+CGTFTRDP=?	+CGTFTRDP: (list of <cid>s associated with active contexts)

10.2.17.3 Attributes

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

10.2.17.4 Defined Values

<cid>: integer type; Specifies a particular secondary or non-secondary PDP context definition or Traffic Flows definition (see +CGDCONT and +CGDSCONT commands).

For the following parameters, see also 3GPP TS 23.060 [47]

<packet filter identifier>: integer type. The value range is from 1 to 16.

<evaluation available index>: integer type. The value range is from 0 to 255.

<source address and vaila mask>: String type Remote address and subnet mask

<protocol vaila (ipv4) / next header (ipv6)>: ipv4 protocol number /ipv6 header protocol number

<local port range>: string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<remote port range>: string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<ipsec security parameter index (spi)>: numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>: string type. The string is given as dot-separated numeric (0-255) parameters on the form "t.m".

<flow label (ipv6)>: numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.

<direction> integer type. Specifies the transmission direction in which the Packet Filter shall be applied.

- 0 Pre-Release 7 TFT Filter (see 3GPP TS 24.008 [8], table 10.5.162)
- 1 Uplink
- 2 Downlink
- 3 Bidirectional (Used for Uplink and Downlink)

<NW packet filter Identifier> integer type. The value range is from 1 to 16. In EPS the value is assigned by the network when established

<destination port range>: Target port range, which specifies the range of the target port

<source port range>: Source port range, which specifies the range of the source port



The X35 project does not support this command.

10.2.18 +CGEQOS, Define EPS Quality of Service

10.2.18.1 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 (see 3GPP TS 24.301 [83] and 3GPP TS 23.203 [85]). When in UMTS/GPRS the MT applies a mapping function to UMTS/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.

10.2.18.2 Syntax

Command	Possible Response
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)

10.2.18.3 Attributes

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

10.2.18.4 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).



The cid max value is 23.

<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 bitrate Traffic Flows

[5 – 9] Value range for non-guaranteed bitrate 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]).



The X35 project does not support this command.

10.2.19 +CGAUTH, Display Authentication Information

10.2.19.1 Description

This command is used to set the type of PPP authentication (PAP/CHAP) and username and password for the specified PDP context.

10.2.19.2 Syntax

Command	Possible Response
AT+CGAUTH=<cid>,<auth>[,<name>,<pwd>]	OK or: +CME ERROR: <err>
AT+CGAUTH?	+CGAUTH: <cid>,<auth>,<name>,<pwd> [<CR><LF>+CGAUTH: <cid>,<auth>,<name>,<pwd>] [...]] OK
AT+CGAUTH=?	+CGAUTH: (list of supported <cid>s),(list of supported <auth>s),(max length of supported <name>),(max length of supported <pwd>) OK

10.2.19.3 Attributes

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

10.2.19.4 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)
- 2 Challenge-Handshake Authentication Protocol (CHAP)
- 3 PAP and CHAP

<name>: string type; User name and the maximum length: 64 bytes,

<pwd>: string type; Password and the maximum length: 64 bytes

NOTE 1: MTK platform AT+CGAUTH Persistent parameter is No.

10.2.20 +GTSTATIS, Display the Transmission and Reception Rate and Total Bytes of TX and RX

10.2.20.1 Description

This command is used to query the UE transmission and reception rate and the total number of bytes received during dialing. When the dialing is stopped, the total number of bytes received and transmitted is cleared to 0.

AT+GTSTATIS? is used to read the transmission and reception rate and the total number of bytes received

10.2.20.2 Syntax

Command	Possible Response
AT+GTSTATIS?	+GTSTATIS: <rx_rate>,<tx_rate>,<rx_bytes>,<tx_bytes>
	OK

	If AT+GTSET="STATISEX",1 +GTSTATIS: <rx_rate>,<tx_rate>,<rx_bytes>,<tx_bytes>,<rx_state>,<tx_s tate>,<rx_max_speed>,<tx_max_speed> OK
AT+GTSTATIS=?	OK

10.2.20.3 Attributes

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

10.2.20.4 Defined Values

<state>: integer type

- 0 Disable GTSTATIS. Default value.
- 1 Enable GTSTATIS.

<rx_state>,<tx_state>: integer type

- 0 Has no data transmission.
- 1 Has data transmission.

<rx_rate>,<tx_rate>,<rx_max_speed>,<tx_max_speed> : long long type

The format of rate is BYTES per second.

<rx_bytes>,<tx_bytes> : long long type

Total bytes of TX/RX data transmission NOTE: The default value is 0 for non-dial situations

11 Fibocom Set Profile Commands

11.1 Set Profile Commands

11.1.1 +GTUSBMODE, Set USB Profile

11.1.1.1 Description

This command changes the USB profile of the module. There are two main profiles: AT+NCM profile for legacy AT command and MBIM profile for Windows 8.1/Windows 10 supporting. The new profile is activated after a reset or power cycle.

11.1.1.2 Syntax

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

11.1.1.3 Attributes

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

11.1.1.4 Defined Values

<mode>: integer type and supported mode depends on the target device and they may be as below:

- 17 DIAG + MODEM + AT + PIPE + RMNET + ADB
- 18 DIAG + MODEM + AT + PIPE + ECM + ADB
- 20 MODEM
- 21 MODEM + AT
- 24 RNDIS + MODEM + DIAG + ADB
- 29 MBIM+AT+ DIAG

- 30 MBIM + MODEM + DIAG + AT
- 31 DIAG + MODEM + RMNET + DPL + QDSS + ADB
- 32 DIAG + MODEM + AT + PIPE + RMNET
- 33 DIAG + MODEM + AT + PIPE + ECM



<mode>The value is 31, which is Qualcomm native USB mode.

FG190 Series, FM190 series, FM190W Series, FG190W series and FG190B series are not support MBIM.

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11.1.2 +GTAUTOCONNECT, Auto PDP Activate

11.1.2.1 Description

This command is used to activate ECM/RMNET function automatically with default bearer cid during boot up based on USBMODE. Takes effect when you reboot the device.

11.1.2.2 Syntax

Command	Possible Response
+GTAUTOCONNECT=<state>	OK or ERROR
+GTAUTOCONNECT?	+GTAUTOCONNECT: <state> OK
+GTAUTOCONNECT=?	+GTAUTOCONNECT: (list of supported <state>s) OK

11.1.2.3 Attributes

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

11.1.2.4 Defined Values

<state>: integer type

- 0 Disable auto connect. Default value.

- 1 Enable auto connect.

11.1.3 +GTIPPASS, Enable IP Pass-through

11.1.3.1 Description

This command is used to enable IP pass-through function for all data calls. Should enable before setup data call, all ECM assigned address are public IP address by network.

11.1.3.2 Syntax

Command	Possible Response
+GTIPPASS=<state>[,<type>,<mac>]	OK or ERROR
+GTIPPASS?	+GTIPPASS: <state>[,<type>[,<mac>]] OK
+GTIPPASS=?	+GTIPPASS: (list of supported <state>s), (list of supported <type>s), (max length of supported <mac>) OK

11.1.3.3 Attributes

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

11.1.3.4 Defined Values

<state>: integer type

- 0 Disable IP pass-through. Default value.
- 1 Enable IP pass-through.

<type>: integer type

- 1 USB. Default value.
- 2 Ethernet.

<mac>: string type; only required if type is Ethernet. The mac address corresponds to the mac address of the host client's Ethernet port.

11.1.4 +GTMAPVLAN, MAP VLAN ID

11.1.4.1 Description

This command is used to map VLAN ID for specified cid.

11.1.4.2 Syntax

Command	Possible Response
+GTMAPVLAN=<cid>,<vlan_id>	OK or ERROR
+ GTMAPVLAN?	+ GTMAPVLAN: <cid>,<vlan_id> OK or OK
+ GTMAPVLAN=?	+ GTMAPVLAN: (list of supported <cid>s), (list of supported <vlan_id>s) OK

11.1.4.3 Attributes

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

11.1.4.4 Defined Values

<cid>: integer type; profile id specified with AT+CGDCONT

<vlan_id>: integer type; range from 0-4094.If vlan_id set zero, will cancel the fixed vlan_id.

11.1.5 +GTMPDN, Enable VLAN Multiple PDN

11.1.5.1 Description

This command is used to enable multiple PDN connectivity with VLAN for all data calls.

11.1.5.2 Syntax

Command	Possible Response
+GTMPDN=<state>	OK or ERROR
+GTMPDN?	+GTMPDN: <state> OK
+GTMPDN=?	+GTMPDN: (list of supported <state>s) OK

11.1.5.3 Attributes

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

11.1.5.4 Defined Values

<state>: integer type

- 0 Disable vlan mdn connectivity. Default value.
- 1 Enable vlan mdn connectivity

11.1.6 +GTDNS, Request DNS Addresses

11.1.6.1 Description

This command is used to obtain the primary and secondary DNS address when PDP context specified by profile id is activated.

11.1.6.2 Syntax

Command	Possible Response
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

11.1.6.3 Attributes

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

11.1.6.4 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

11.1.7 +GTROAMCFG, Roaming Dialing Control

11.1.7.1 Description

This command is used to control ECM/RMNET dial on roaming condition

11.1.7.2 Syntax

Command	Possible Response
AT+GTROAMCFG=< n >	OK or: ERROR
AT+GTROAMCFG?	+GTROAMCFG: <n>,<roaming_status> OK
AT+GTROAMCFG=?	+GTROAMCFG: (list of supported <n>s) OK

11.1.7.3 Attributes

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

11.1.7.4 Defined Values

< n >: integer type; function switch, If the value of n is 0, UE cannot dial on roaming condition. If the value is 1, UE can dial on roaming condition. The default value is 1

- 0 Disable function
- 1 Enable function

<roaming_status>: integer type; UE registered on HPLMN/EHPMN (non-roam) or non-HPLMN (roam)

- 0 Non-roam
- 1 Roam

11.1.8 +GTURCMODE, Setup Urc Report Mode

11.1.8.1 Description

This command setups the urc report mode in the module. The command allows the module not reporting the specified urc messages. At most ten URCs can be specified to not report to the TE.

11.1.8.2 Syntax

Command	Possible Response
AT+GTURCMODE=<report_flag>,[URC]	OK or: ERROR
AT+GTURCMODE?	+ GTURCMODE: <report_flag >,[URC]> [<CR><LF>+ GTURCMODE: <report_flag >,[URC]>][...]] OK
AT+GTURCMODE=?	+ GTURCMODE: (range of supported<report_flag >s) OK

11.1.8.3 Attributes

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

11.1.8.4 Defined Values

< report_flag >: integer type. The urc reporting flag.

- 0: Not reporting the urc
- 1: Reporting the urc

< URC >: string type. The substring of urc specified to match with the urc to report or not report. The max length of URC is 10.



The X35 project does not support this command.

11.1.9 +GTAUTODHCP, ECM Auto DHCP

11.1.9.1 Description

This command is used to enable auto DHCP function for ECM activate during boot up.

11.1.9.2 Syntax

Command	Possible Response
AT+GTAUTODHCP=<state>	OK or ERROR
AT+GTAUTODHCP?	+GTAUTODHCP: <state> OK
AT+GTAUTODHCP=?	+GTAUTODHCP: (list of supported <state>s) OK

11.1.9.3 Attributes

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

11.1.9.4 Defined Values

<state>: integer type

- 0: Disable auto DHCP.
- 1: Enable auto DHCP.Default value

11.1.10 +GTPREDNSCFG, to Pre-configure DNS Address

11.1.10.1 Description

This command is used to pre-configure primary and secondary DNS address by user when network did not send DNS address to UE.

11.1.10.2 Syntax

Command	Possible Response
AT+GTPREDNSCFG=<mode>[,<pri_dns_server>[,<sec_dns_server>]]	OK or: +CME ERROR: <err>
AT+GTPREDNSCFG?	+GTPREDNSCFG:<mode>[,<pri_dns_server>[,<sec_dns_server>]] OK
AT+GTPREDNSCFG=?	+ GTPREDNSCFG: (list of supported<mode>s),(list of supported <pri_dns_server>s),(list of supported <sec_dns_server>s) OK or: +CMS ERROR: <err>

11.1.10.3 Attributes

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

11.1.10.4 Defined Values

<Mode>: integer type.

- 0: Disable function

- 1: Enable function

<pri_dns_server>: pre-configured primary DNS server

<sec_dns_server>: pre-configured secondary DNS server

11.1.11 +GTWWAN, ECM/RMNET Configuration

11.1.11.1 Description

This command is used to enable/disable ECM/RMNET function with specified cid based on current USBMODE.

Note before enable ECM/RMNET function, make sure the PDP context with this specified cid has been defined.

11.1.11.2 Syntax

Command	Possible Response
AT+GTWWAN=<state>,<cid>	OK or: +CME ERROR: <err>
AT+GTWWAN?	++GTWWAN: <state>,<cid>,<ip>,<pdns>,<sdns> OK Or +GTWWAN: 0
AT+GTWWAN=?	+GTWWAN: (list of supported <state>s),(list of supported <cid>s) OK

11.1.11.3 Attributes

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

11.1.11.4 Defined Values

<state>: integer type

- 0: Deactivate ECM/RMNET. Default value.

- 1: Active ECM/RMNET data call.

<cid>: integer type; profile id specified with AT+CGDCONT

<ip>: string type; IP address assigned by network to ECM/RMNET 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

11.1.12 +GTRMNETMAP, Set RMNET NIC Mapping Mode

11.1.12.1 Description

This command is used to set the mode to map the RMNET Network Interface Card (NIC) and the profile index. To allocate the RMNET NIC in the index order or randomly.

11.1.12.2 Syntax

Command	Possible Response
+GTRMNETMAP= <state>	OK or ERROR
+GTRMNETMAP?	+GTRMNETMAP: <state> OK Or ERROR
+GTRMNETMAP=?	+GTRMNETMAP: (list of supported <state>) OK

11.1.12.3 Attributes

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

11.1.12.4 Defined Values

<state>: integer type

- 0: Random mode

- 1: Map with profile index

11.1.13 +GTPING, Check data business connection status

11.1.13.1 Description

This command is used to determine the data business connection status.

11.1.13.2 Syntax

Command	Possible Response
+GTPING= <mode>[,<"ip/hostname">]	+GTPING:<state> OK or ERROR
+GTPING=?	+GTPING: (list of supported <mode>), (list of supported < ip/hostname >) OK

11.1.13.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
Yes	No	Yes	No	> 1s

11.1.13.4 Defined Values

<mode>: integer type

- 0: Specifies ip/hostname is an IPV4 address
- 1: Specifies ip/hostname is an IPV6 address

<ip/hostname>: string type; The ip address or hostname need to ping

- string length:0~64

<state>: integer type

- 0: The network is disconnected
- 1: The network is connected

11.1.14 +GTMAPCFG, Get Map Configuration

11.1.14.1 Description

This command is used to get current map configuration. Include channel id , rmnet network interface card name, network mask,gateway,ip and dns.

11.1.14.2 Syntax

Command	Possible Response
+GTMAPCFG?	+GTMAPCFG: <channel>,<rmnet_name>,<net_maske>,<gateway> ,<ip>,<dns1,dns2> OK or +GTRMNETMAP:0 or ERROR

11.1.14.3 Attributes

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

11.1.14.4 Defined Values

<Channel>: integer type(1-42)

<rmnet_name>: string type; The rmnet network interface card name

<net_maske>: string type; The network mask Information

<gateway>: string type; The gate way Information

<ip>: string type; IP information, include ipv4 ip and ipv6 ip

<dns1,dns2>: DNS information

11.1.15 +MMAD, query ADC channel voltage value

11.1.15.1 Description

This command queries the current channel voltage value of the requested ADC in millivolts (mV).

11.1.15.2 Syntax

Command	Possible Response
AT+MMAD	Response 1: +MMAD: <channel>,<value> OK Response 2: ERROR
AT+MMAD	Response 1: +MMAD: <channel>,<value> OK Response 2: ERROR

11.1.15.3 Attributes

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

11.1.15.4 Defined Values

<Channel>: ADC channel number. There are usually two channels.

Range: 0–1 (The range varies depending on platforms.)

Unsigned type, decimal number

<value>: Voltage value detected in millivolts (mV)

Range: 0–2000 (The maximum value varies depending on platforms.)

Unsigned type, decimal number

12 Fibocom AUDIO Commands

12.1 AUDIO Introduction

This section describes the Audio features, which includes the following configuration items:

Gain: Control of volume levels for voice

Transimisson Mode: I2s or pcm

DTMF tone: transmits, play, duration,detect

12.2 AUDIO commands

12.2.1 +CLVL, Loudspeaker Volume

12.2.1.1 Description

This command sets the volume of the internal loudspeaker of the Module.

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

12.2.1.2 Syntax

Command	Possible Response
AT+CLVL=<level>	OK or: +CME ERROR: <err>
AT+CLVL?	+CLVL: <level> OK
AT+CLVL=?	+CLVL: (list of supported <level>s) OK

12.2.1.3 Attributes

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

12.2.1.4 Defined Values

Reference 3GPP TS 27.007

<level>: 0-7 Manufacturer-specific volume range.

- 0 is lowest volume (not mute).
- The default value is 4.

12.2.2 +CMUT, Mute/Unmute Microphone and Speaker Path

12.2.2.1 Description

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

12.2.2.2 Syntax

Command	Possible Response
AT+CMUT=<state>	OK or: +CME ERROR: <err>
AT+CMUT?	+CMUT: <state> OK
AT+CMUT=?	+CMUT: (list of supported <state>s) OK

12.2.2.3 Attributes

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

12.2.2.4 Defined Values

Reference 3GPP TS 27.007

<state> : integer type;

- 0 Unmute microphone and speaker path (default value)

- 1 Mute microphone path, Unmute speaker path
- 2 Unmute microphone, mute speaker path
- 3 Mute microphone path, mute speaker path

12.2.3 +GTDTMF, Software Decode

12.2.3.1 Description

This command enables/disables the DTMF software decode. IF DTMF tone is detected in voice mode the module will return the unsolicited result code +GTDTMF: <x>

12.2.3.2 Syntax

Command	Possible Response
AT+GTDTMF=<n>	OK or: +CME ERROR: <err>
AT+GTDTMF?	+GTDTMF: <n> OK
AT+GTDTMF=?	+GTDTMF: (list of supported <n>s) OK

12.2.3.3 Attributes

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

12.2.3.4 Defined Values

<n>: char type, the range of detected DTMF: 0-9,A-D,*,#

- 0 Disable DTMF decode, default value.
- 1 Enable DTMF decode unsolicited result code +GTDTMF: <x>

12.2.4 +MAVOL, Volume Setting

12.2.4.1 Description

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

12.2.4.2 Syntax

Command	Possible Response
AT+MAVOL=<accy>,<feature>,<vol>	OK or: +CME ERROR: <err>
AT+MAVOL?	+MAVOL: <accy>,<feature>,<vol> OK
AT+MAVOL=?	+MAVOL: (list of supported <accy>s), (list of supported <feature>s), (list of supported <feature>s) OK

12.2.4.3 Attributes

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

12.2.4.4 Defined Values

<accy>

- 1: SPK+/SPK-
- 2: AUXO+/AUXO-
- 3: 1 and 2

<feature>

- 1: Voice
- 2: Tone
- 4: MIDI
- 8: TTS

<vol> Volume level 0-7



The X75 project supports command parameters ranging from (1),(1),(0-7).

12.2.5 +MMICG, Microphone Gain Value

12.2.5.1 Description

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

12.2.5.2 Syntax

Command	Possible Response
AT+MMICG=<gain>	OK or: +CME ERROR: <err>
AT+MMICG?	+MMICG: <gain> OK
AT+MMICG=?	+MMICG: (list of supported <gain>s) OK

12.2.5.3 Attributes

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

12.2.5.4 Defined Values

<gain> Microphone gain values:

- 0-15 0 is lowest gain value (not mute)
- The default value is 10

12.2.6 +MAI2SY, Set Digital Audio to Transmit Parameters

12.2.6.1 Description

This command is used for setting digital audio to transmit the parameters, including master mode and slave mode, transmission mode, sampling rate and word width.

12.2.6.2 Syntax

Command	Possible Response
---------	-------------------

AT+MAI2SY=<master>,<tran_mode>,<sample>,<width>	OK or: +CME ERROR: <err>
AT+ MAI2SY?	+MAI2SY: <master>,<tran_mode>,<sample>,<width> OK
AT+ MAI2SY=?	+MAI2SY: (list of supported<master>s), (list of supported<tran_mode>s), (list of supported< sample>s), (list of supported< width>s) OK

12.2.6.3 Attributes

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

12.2.6.4 Defined Values

<master>: Set data transmission to master mode or slave mode

- 0: module is in master mode, external CODEC is in slave mode
- 1: The module is in slave mode and the external codec is in master mode

<tran_mode>: Data Transimisson Mode

- 0: I2S mode
- 1: PCM mode

<sample>: Sampling rate (PCM can change to 8k or 16k)

- 0: 8k
- 1: 16k
- 2: 24k
- 3: 32k
- 4: 44.1k

<width>: Word width;

- 0: 16BIT
- 1: 24BIT
- 2: 32BIT



- The X75 project supports command parameters ranging from (0),(0,1),(0,1),(0);
- The X35 project supports command parameters ranging from (0),(0,1),(0,1),(0); In the I2S mode, the sampling rate is 48K, the parameters of the sampling rate do not work;
- In the X35 project, the command will not take effect until it is restarted.

12.2.7 +MAPATH, Set Audio path

12.2.7.1 Description

This command is used for setting the audio input and output paths.

12.2.7.2 Syntax

Command	Possible Response
AT+MAPATH=<direct>,<accy>	OK or: +CME ERROR: <err>
AT+MAPATH?	+MAPATH: <direct>,<accy> OK
AT+MAPATH=?	+MAPATH: (list of supported<direct>s), (list of supported<accy>s) OK

12.2.7.3 Attributes

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

12.2.7.4 Defined Values

<direct>: Set the audio input and output mode

- If ALC5621 is used
Audio channel input and output Module (default)

- If CS42L73 is used
Audio channel input Module
Audio channel output from Module

<accy>: Set the audio input and output path

- If ALC5621 is used
1st channel MIC+/MIC- and AUXI+/AUXI- (Default)
2nd channel MIC+/MIC- and AUXI+/AUXI-
1st channel SPK+/SPK- (Default)
2nd channel AUXO+/AUXO-
Both 1st and 2nd

12.2.8 +VTD, Tone Duration

12.2.8.1 Description

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

Note1:

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

Note2:.

In GSM/UMTS the value of tone duration is preset and cannot be altered(27.007-e50)

12.2.8.2 Syntax

Command	Possible Response
AT+VTD=<n>	OK or: +CME ERROR: <err>
AT+VTD?	+VTD: <n> OK
AT+VTD=?	+VTD: (list of supported<n>s) OK

12.2.8.3 Attributes

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

12.2.8.4 Defined Values

Reference 3GPP TS 27.007

<n> Defines the length of tones emitted by the +VTS command

- 1-10 100mS to 1S adjustable

12.2.9 +VTS, Command-Specific Tone Duration

12.2.9.1 Description

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

Note1: In GSM, the tone duration value can be modified depending on the specific network.

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

Note2: The duration defined by +VTS is specific to the DTMF string in this command only. It does not erase the duration defined by the +VTD command, and is erased when the Module is powered down. If <duration> is not defined, the +VTD value is used.

12.2.9.2 Syntax

Command	Possible Response
AT+VTS=<DTMF>,[<duration>]	OK or: +CME ERROR: <err>
AT+VTS?	+VTS: OK
AT+VTS=?	+VTS: (list of supported<DTMF>s),[(list of supported<duration>s)] OK

12.2.9.3 Attributes

Pin Restricted	Persistent	Sync Mode	Effect Immediately	Time of Duration
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No	Yes	Yes	Yes	< 1s
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12.2.9.4 Defined Values

Reference 3GPP TS 27.007

<DTMF>: String of ASCII characters (0-9, #, *, A-D)

- String length is up to 32 characters long

<duration>: A DTMF tone of different duration from that set by the +VTD command. If no set, module will use value from VTD

- 1-10 100mS to 1S adjustable

12.2.10 +VTA, Set play DTMF type

12.2.10.1 Description

This command enable/disable play DTMF tone at local side when send DTMF to the network by VTS.

12.2.10.2 Syntax

Command	Possible Response
AT+VTA=<para>	OK or: +CME ERROR: <err>
AT+VTA?	+VTA: <para> OK
AT+VTA=?	+VTA: (list of supported<para>s) OK

12.2.10.3 Attributes

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

12.2.10.4 Defined Values

<para>:

- 0: Disable play DTMF tone at local side

- 1: Enable play DTMF tone at local side



X62/X75 projects support command parameter range of (0).

13 Fibocom FOTA Command

13.1 FOTA Upgrade Command

This section describes the FOTA features. Modem's firmware can be upgraded from the Remote Server by the FOTA process.

13.1.1 +GTOTA, FOTA Upgrade

13.1.1.1 Description

This command is used to start FOTA upgrade process. The firmware data can be downloaded over FTP or HTTP protocol.

13.1.1.2 Syntax

Command	Possible Response
AT+GTOTA=<type>,<"url">,[<"filename">,<"username">,<"password">]	OK or: +CME ERROR: <err>
AT+GTOTA=?	+GTOTA: <type>,<"url">,[<"filename">,<"username">,<"password">] OK

13.1.1.3 Attributes

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

13.1.1.4 Defined Values

<type> integer type and range 0-1; Default value is 0

- FOTA upgrade through HTTP
- FOTA upgrade through FTP

<"url"> string type; Address of HTTP or FTP server. The maximum length is 255 bytes.

<"filename"> string type; The file name of OTA package. The maximum length is 255 bytes.

<"username"> string type; User name for FTP server. The maximum length is 255 bytes.

<"password"> string type; FTP password for <"username">. The maximum length is 255 bytes.



Note1: When <type> is 0, parameters <"filename">, <"username">, and <"password"> can't be used. When <type> is 1, parameters <"filename">, <"username">, and <"filename"> must be given.

Note2: When using HTTP, the file name and path of the OTA package must be included in <"URL">. When using FTP, <"URL"> is just the address of FTP server, while filename is given by parameter <"filename">.

Note3: The file path may also be included to <"filename"> when needed

Note4: During the firmware downloading, the module will report the following unsolicited report indicating the downloading status:

GTOTA DOWNLOAD START

GTOTA DOWNLOADING: <percent>%

GTOTA DOWNLOAD COMPLETE

14 Fibocom GPS Command

14.1 GPS Commands

14.1.1 +GTGPSPOWER, Control GNSS Power

14.1.1.1 Description

This command is used to control GNSS module power.

14.1.1.2 Syntax

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

14.1.1.3 Attributes

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

14.1.1.4 Defined Values

<mode>: int type, range 0,1.

- 0: power off GNSS module(default)
- 1: power on GNSS module

14.1.2 +GTGPS, Read GNSS Navigation information

14.1.2.1 Description

This command is used to read GNSS navigation information.

14.1.2.2 Syntax

Command	Possible Response
AT+GTGPS[=<item>]	+GTGPS: GNSS navigation information of <item>s OK or: +GTGPS: all GNSS navigation information OK or: +CME ERROR: <err>
AT+GTGPS?	+GTGPS: all GNSS navigation information OK or: +CME ERROR: <err>
AT+GTGPS=?	+GTGPS: (list of supported <item>s) OK

14.1.2.3 Attributes

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

14.1.2.4 Defined Values

<item>:string type.

- “RMC” : Get RMC sentence
- “GGA” : Get GGA sentence
- “GSA” : Get GSA sentence
- “GSV” : Get GSV sentence



Note1: The output of navigation information is affected by the <value> in the satellite configuration (when x = 2) in the AT + GTGPSCFG instruction.

Note2: When the “RMC” statement contains GPRMC (when GPS is selected), and GARMC (when Galileo is selected).

The “GGA” statement contains GPGGA (when GPS is selected), and GAGGA (when Galileo

is selected).

The "GSA" statement contains GPGSA (when GPS is selected), GAGSA (when Galileo is selected), and PQGSA (when QZSS is selected).

The "GSV" statement contains GPGSV (when GPS is selected), GAGSV (when GALILEO is selected), GLGSV (when GLONASS is selected), and PQGSA (when QZSS is selected).

14.1.3 +GTGPSEPO, Set GPS Operation Mode

14.1.3.1 Description

This command is used to set the operation mode of GPS.

14.1.3.2 Syntax

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

14.1.3.3 Attributes

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

14.1.3.4 Defined Values

<mode>: int type and range 0,1.

- 0: Disable agps function(default).
- 1: Enable agps MSB mode function.
- 2: Enable agps MSA mode function.

14.1.4 +GTAGPSSERV, Set AGPS Server

14.1.4.1 Description

This command is used to set agps server.

14.1.4.2 Syntax

Command	Possible Response
AT+GTAGPSSERV=<IP/URL>,<port>	OK or: +CME ERROR: <err>
AT+GTAGPSSERV?	+GTAGPSSERV:<IP/URL>,<port> OK or: +CME ERROR: <err>
AT+GTAGPSSERV=?	+GTAGPSSERV: (IP/URL),(list of supported <port>s) OK

14.1.4.3 Attributes

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

14.1.4.4 Defined Values

<IP/URL>: string type, the ip or domain from where to download agps data.

<port>: int type and rang 1-65535s, agps server port.

14.1.5 +GTGPSCFG, GNSS/A-GNSS Configure

14.1.5.1 Description

This command is used to configure the parameters of GNSS/A-GNSS.

14.1.5.2 Syntax

Command	Possible Response
AT+GTGPSCFG=<x>,<value>	OK or: +CME ERROR: <err>
AT+GTGPSCFG?	+GTGPSCFG: 0,<value> 1,<value> 2,<value> 3,<value> OK or: +CME ERROR: <err>
AT+GTGPSCFG=?	+GTGPSCFG: (x),(list of supported <value>s) OK

14.1.5.3 Attributes

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

14.1.5.4 Defined Values

<x>:int type.

- 0: supl version.
- 1: xtra enable/disable.(Currently not supported)
- 2: satellite switch.
- 3: enable/disable supl certificate.

<value>:int type.

supl version:

- 0: SUPL1.0.
- 1: SUPL2.0 (default).
- 2: SUPL2.0.4 (default for X35/X72/X75 platform).

xtra enable/disable:

- 0: disable XTRA function. (default).
- 1: enable XTRA function.

satellite switch:

- 0: Satellite Positioning Combination GPS + GLONASS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, GLGSV.

- 1: Satellite Positioning Combination GPS + BeiDou.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, BDGLSV, BDGSA.

- 2: Satellite Positioning Combination GPS + GALILEO.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, GARMC, GAGSV, GAGSA, GAGGA.

- 3: Satellite Positioning Combination GPS + QZSS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, PQGLSV, PQGSA.

- 4: Satellite Positioning Combination GPS + BeiDou + GALILEO.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, BDGLSV, BDGSA, GARMC, GAGSV, GAGSA, GAGGA.

- 5: Satellite Positioning Combination GPS + BeiDou + GLONASS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, BDGLSV, BDGSA, GLGSV.

- 6: Satellite Positioning Combination GPS + BeiDou + QZSS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, BDGLSV, BDGSA, PQGLSV, PQGSA.

- 7: Satellite Positioning Combination GPS + GLONASS + GALILEO.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, GLGSV, GARMC, GAGSV, GAGSA, GAGGA.

- 8: Satellite Positioning Combination GPS + GALILEO + QZSS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, GARMC, GAGSV, GAGSA, GAGGA, PQGLSV, PQGSA.

- 9: Satellite Positioning Combination GPS + GLONASS + QZSS.

NMEA output contains: GPRMC, GPGLSV, GPGSA, GPGGA, GLGSV, PQGLSV, PQGSA.

- 10: Satellite Positioning Combination GPS + BeiDou + GALILEO + GLONASS.

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA, BDGSV, BDGSA, GARMC, GAGSV, GAGSA, GAGGA, GLGSV.

- 11: Satellite Positioning Combination GPS + BeiDou + GLONASS + QZSS.

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA, BDGSV, BDGSA, GLGSV, PQGSV, PQGSA.

- 12: Satellite Positioning Combination GPS + BeiDou + GALILEO + QZSS.

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA, BDGSV, BDGSA, GARMC, GAGSV, GAGSA, GAGGA, PQGSV, PQGSA.

- 13: Satellite Positioning Combination GPS + GALILEO + GLONASS + QZSS.

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA, GARMC, GAGSV, GAGSA, GAGGA, GLGSV, PQGSV, PQGSA.

- 14: Satellite Positioning Combination GPS + BeiDou + GALILEO + GLONASS + QZSS.(default)

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA, BDGSV, BDGSA, GARMC, GAGSV, GAGSA, GAGGA, GLGSV, PQGSV, PQGSA.

- 15: Satellite Positioning Combination GPS.

NMEA output contains: GPRMC, GPGSV, GPGSA, GPGGA.

enable/disable supl certificate:

- 0: disable supl certificate. (default).
- 1: enable supl certificate



supl version:

NMEA packets for QZSS on Qualcomm X72/X75 platform: GQGSV, SQGSA.

14.1.6 +GTGPSCERT, A-GNSS Supl Certificate Configure

14.1.6.1 Description

This command is used to configure supl certificate of A-GNSS.

14.1.6.2 Syntax

Command	Possible Response
AT+GTGPSCERT=<type>,<serial_num>,<length>,"<cert_data>"	OK or: +CME ERROR: <err>
AT+GTGPSCERT?	+GTGPSCERT: <serial_num> OK or: +CME ERROR: <err>
AT+GTGPSCERT=?	+GTGPSCERT: (list of supported<type>s),(list of supported <serial_num>s)[,(list of supported <length>s)] [,<cert_data >] OK

14.1.6.3 Attributes

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

14.1.6.4 Defined Values

<type>:int type.

- 0: delete supl certificate.
- 1: set supl certificate

<serial_num>:int type.

- 1-9: the serial number of the supl certificate.

<length>:int type

- 1-2000: length of supl certificate.

<cert_data> string.

Certificate data in PEM format (Base64) of max 2000 chars, if certificate is more than 1000 char, it should be split into multiple AT commands with sequence number

<cert_data >: string, If there are more than 1000 certificates, the maximum number of certificates in PEM (Base64) format is 2000 characters

char, which should be split into multiple AT commands with sequence numbers

15 Fibocom Thermal Commands

15.1 Thermal Commands

15.1.1 +GTSEN RDTEMP, Read Thermal Sensor Current Temperature

15.1.1.1 Description

This command is used to read the thermal sensor current temperature.

15.1.1.2 Syntax

Command	Possible Response
AT+GTSEN RDTEMP=<sensor_id>	+GTSEN RDTEMP: <sensor_id>,<current_temperature>[<CR><LF>+GTSEN RDTEMP: <sensor_id>,<current_temperature><CR><LF>+GTSEN RDTEMP: <sensor_id>,<current_temperature><CR><LF>+GTSEN RDTEMP: <sensor_id>,<current_temperature><CR><LF>+GTSEN RDTEMP: <sensor_id>,<current_temperature>] OK or ERROR
AT+GTSEN RDTEMP=?	+ GTSEN RDTEMP: (list of supported < sensor_id >s) OK

15.1.1.3 Attributes

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

15.1.1.4 Defined Values

- < sensor_id >: integer type; the scope of different modules will vary, we can do this by AT+GTSEN RDTEMP=? to query the sensor number range of a specific module; take the FG360 as an example, the range of FG360 is (0-23):

0: Response all sensors current temperature

(1-23): Response corresponding sensor current temperature

Form.1 FG360 sensor_id

Sensor id	Sensor name	Sensor id	Sensor name	Sensor id	Sensor name	Sensor id	Sensor name
1	soc_max	7	gpu1	13	soc_dram_ntc	19	pmic
2	cpu_little0	8	dramc	14	ltepa_ntc	20	pmic_vcore
3	cpu_little1	9	mmsys	15	nrpa_ntc	21	pmic_vproc
4	cpu_little2	10	md_5g	16	rf_ntc	22	pmic_vgpu
5	cpu_little3	11	md_4g	17	md_rf	23	crystal
6	gpu0	12	md_3g	18	conn_gps		

<current_temperature>: integer type,current sensor current temperature.

16 Error Handling and Error Code

16.1 Error Handling Commands

16.1.1 +CMEE, Report Mobile Equipment Error

16.1.1.1 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.

16.1.1.2 Syntax

Command	Possible Response
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

16.1.1.3 Attributes

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

16.1.1.4 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.

16.1.2 +CEER, Extended Error Report

16.1.2.1 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.

16.1.2.2 Syntax

Command	Possible Response
AT+CEER	+CEER: <category>[,<cause>,<description>] OK
AT+CEER=?	OK

16.1.2.3 Attributes

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

16.1.2.4 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

16.2 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"

Parameter	Description
	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"
	26, "dial string too long"
	27, "invalid characters in dial string"
	30, "no network service"
	31, "network timeout"
	32, "network not allowed - emergency calls only"
	40, "network personalization PIN required"
	41, "network personalization PUK required"
	42, "network subset personalization PIN required"
	43, "network subset personalization PUK required"
	44, "service provider personalization PIN required"
	45, "service provider personalization PUK required"
	46, "corporate personalization PIN required"
	47, "corporate personalization PUK required"
	48, "hidden key required"
	This key is required when accessing hidden 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"

Parameter	Description
	134, "service option temporarily out of order"
	135, "NS-api already used"
	148, "Unspecified GPRS error"
	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"
	1057, "Bearer capability not authorized"

Parameter	Description
	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"

16.3 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"

Parameter	Description
	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"
	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"

Parameter	Description
	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"
	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"

Parameter	Description
	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"
	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"