



LN920 AT Commands Reference Guide

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APPLICABILITY TABLE

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1. INTRODUCTION

1.1. Scope

This document is aimed in providing a detailed specification and a comprehensive listing as a reference for the whole set of AT command.

1.2. Audience

Readers of this document should be familiar with Telit modules and their ease of controlling by means of AT Commands.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

1. TS-EMEA@telit.com
2. TS-AMERICAS@telit.com
3. TS-APAC@telit.com

Alternatively, use:

<http://www.telit.com/support>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<http://www.telit.com>

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Icons and Text Conventions



SET section – This section provides all information related to SET functionality of involved AT command. If it has got strictly and relevant SET information, these are located at section end.



READ section – This section provides all information related to READ functionality of involved AT command. If it has got strictly and relevant READ information, these are located at section end.



TEST section – This section provides all information related to TEST functionality of involved AT command. If it has got strictly and relevant TEST information, these are located at section end.



Additional info – This section provides any kind of additional and useful information related to the AT command section as well as command exceptions or special behavior cases.



REFERENCE section – This section provides useful references (standards or normative) related to involved AT command.



EXAMPLE section – This section provides useful examples related to involved AT command.



NOTE section – This section provides all information related to involved AT commands. Each note can provide a different level of information: danger, caution/warning and tip/information.



Danger – This information **MUST** be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1. AT COMMANDS

The Telit wireless module family can be controlled via the serial interface using the standard AT commands.¹ The Telit wireless module family is compliant with:

1. Hayes standard AT command set, to maintain the compatibility with existing SW programs.
2. 3GPP TS 27.007 specific AT command and GPRS specific commands.
3. 3GPP TS 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover, Telit wireless module family supports also Telit proprietary AT commands for special purposes. The following is a description of how to use the AT commands with the Telit wireless module family.

1.1. Definitions

The following syntactical definitions apply:

- <CR>** **Carriage return character**, is the command line and result code terminator character, which value, in decimal ASCII between 0 and 255, is specified within parameter **S3**. The default value is 13.
- <LF>** **Linefeed character**, is the character recognized as line feed character. Its value, in decimal ASCII between 0 and 255, is specified within parameter **S4**. The default value is 10. The line feed character is output after carriage return character if verbose result codes are used (**V1** option used) otherwise, if numeric format result codes are used (**V0** option used) it will not appear in the result codes.
- <...>** Name enclosed in angle brackets is a syntactical element. They do not appear in the command line.
- [...]** Optional sub parameter of a command or an optional part of TA information response is enclosed in square brackets. Brackets themselves do not appear in the command line. When sub parameter is not given in AT commands which have a Read command, new value equals to its previous value. In AT commands which do not store the values of any of their sub parameters, and so have not a Read command, which are called *action type* commands, action should be done based on the recommended default setting of the sub parameter.

1.2. AT Command Syntax

The syntax rules followed by Telit implementation of either Hayes AT commands, GSM commands are very similar to those of standard basic and extended AT commands

There are two types of extended command:

1. **Parameter type commands.** This type of commands may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine ranges of values supported). Each of them has a test command (trailing =?) to give information about the type of its sub parameters; they also have a Read command (trailing?) to check the current values of sub parameters.
2. **Action type commands.** This type of command may be "executed" or "tested".
 1. "executed" to invoke a function of the equipment, which generally involves more than the simple storage of a value for later use
 2. "tested" to determine:
 1. if sub parameters are associated with the action, the ranges of sub parameters values that are supported; if the command has no sub parameters, issuing the correspondent Test command (trailing =?) raises the result code **ERROR**.
Note: issuing the Read command (trailing?) causes the command to be executed.
 2. whether or not the equipment implements the Action Command (in this case issuing the correspondent Test command - trailing =? - returns the **OK** result code), and, if sub

¹ The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.

parameters are associated with the action, the ranges of sub parameters values that are supported.

Action commands don't store the values of any of their possible sub parameters.

Moreover:

The response to the Test Command (trailing =?) may be changed in the future by Telit to allow the description of new values/functionalities.

If all the sub parameters of a parameter type command **+CMD** are optional, issuing **AT+CMD=<CR>** causes the **OK** result code to be returned and the previous values of the omitted sub parameters to be retained.

1.2.1. String Type Parameters

A string, either enclosed between quotes or not, is a valid string type parameter input. According to V25.ter space characters are ignored on the command line and may be used freely for formatting purposes, unless they are embedded in numeric or quoted string constants; therefore a string containing a space character has to be enclosed between quotes to be considered a valid string type parameter (e.g. typing **AT+COPS=1,0,"A1"** is the same as typing **AT+COPS=1,0,A1**; typing **AT+COPS=1,0,"A BB"** is different from typing **AT+COPS=1,0,A BB**).

A string is always case sensitive.

A small set of commands requires always to write the input string parameters within quotes: this is explicitly reported in the specific descriptions.

1.2.2. Command Lines

A command line is made up of three elements: the **prefix**, the **body** and the **termination character**.

The **command line prefix** consists of the characters "AT" or "at", or, to repeat the execution of the previous command line, the characters "A" or "a" or "AT#" or "at#".

The **termination character** may be selected by a user option (parameter S3), the default being <CR>.

The basic structures of the command line are:

1. **ATCMD1<CR>** where **AT** is the command line prefix, **CMD1** is the body of a **basic command** (nb: the name of the command never begins with the character "+") and **<CR>** is the command line terminator character
2. **ATCMD2=10<CR>** where 10 is a sub parameter
3. **AT+CMD1;+CMD2=,10<CR>** These are two examples of **extended commands** (nb: the name of the command always begins with the character "+"). They are delimited with semicolon. In the second command the sub parameter is omitted.
4. **+CMD1?<CR>** This is a Read command for checking current sub parameter values
5. **+CMD1=?<CR>** This is a test command for checking possible sub parameter values

These commands might be performed in a single command line as shown below:

ATCMD1 CMD2=10+CMD1;+CMD2=,10;+CMD1?;+CMD1=?<CR>

anyway, it is always preferable to separate into different command lines the basic commands and the extended commands; furthermore, it is suggested to avoid placing several action commands in the same command line, because if one of them fails, then an error message is received but it is not possible to argue which one of them has failed the execution.

² The set of proprietary AT commands differentiates from the standard one because the name of each of them begins with either "@", "#", "\$" or "*". Proprietary AT commands follow the same syntax rules as extended commands

If command **V1** is enabled (verbose responses codes) and all commands in a command line has been performed successfully, result code **<CR><LF>OK<CR><LF>** is sent from the TA to the TE, if sub parameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **<CR><LF>ERROR<CR><LF>** is sent and no subsequent commands in the command line are processed.

If command **V0** is enabled (numeric responses codes), and all commands in a command line has been performed successfully, result code **0<CR>** is sent from the TA to the TE, if sub-parameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **4<CR>** and no subsequent commands in the command line are processed.

In case of errors depending on ME operation, **ERROR** (or **4**) response may be replaced by **+CME ERROR: <err>** or **+CMS ERROR: <err>**.



The command line buffer accepts a maximum of 400 characters. If this number is exceeded none of the commands will be executed and TA returns **ERROR**.

1.2.2.1. ME Error Result Code - +CME ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3GPP TS 27.007 commands.

Syntax: **+CME ERROR: <err>**

Parameter: **<err>** - error code can be either numeric or verbose (see +CMEE). The possible values of **<err>** are reported in the table:

Numeric Format ³	Verbose Format ⁴
0	phone failure
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
34	numeric parameter instead of text parameter
35	text parameter instead of numeric parameter
36	numeric parameter out of bounds
37	text string too short

³ Not all modules support the error codes shown in the table.

⁴ There could be small variations in the message depending on the module in use.

Numeric Format ³	Verbose Format ⁴
38	The GPIO Pin is already used
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
49	EAP method not supported
50	Invalid EAP parameter
51	Parameter length error for all Auth commands
52	Temporary error for all Auth command
53	not verified hidden key
100	unknown
103	Illegal MESSAGE
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available
263	unknown class
264	unknown network message
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination
277	Invalid number of parameters
278	Invalid Parameter
320	Call index error
321	Call state error
322	Sys state error
323	Parameters error
550	generic undocumented error
551	wrong state
552	wrong mode
553	context already activated
554	stack already active
555	activation failed
556	context not opened
557	can not setup socket
558	can not resolve DN
559	time-out in opening socket
560	can not open socket
561	remote disconnected or time-out
562	connection failed
563	tx error
564	already listening
565	socket disconnection
566	can not resume socket
567	ip version type incompatible
568	ipv6 not enabled

Numeric Format ³	Verbose Format ⁴
569	
600	Generic undocumented error
601	wrong state
602	Can not activate
603	Can not resolve name
604	Can not allocate control socket
605	Can not connect control socket
606	Bad or no response from server
607	Not connected
608	Already connected
609	Context down
612	Resource used by other instance
613	Data socket yet opened in cmdmode
614	FTP CmdMode data socket closed
615	FTP not connected
616	FTP disconnected
617	FTP read command closed
618	FTP read command error
619	FTP write command closed
620	FTP write command error
621	FTP read data closed
622	FTP read data error
623	FTP write data closed
624	FTP write data error
625	FTP host not found
626	FTP accept failure
627	FTP listen failure
628	FTP bind failure
629	FTP file create failure
630	FTP file get failure
631	FTP file put failure
632	FTP file not found
633	FTP timed out
634	FTP login incorrect
635	FTP close error
636	FTP server not ready
637	FTP server shutdown
638	FTP unexpected reply
639	FTP user ID and password don't match
640	FTP user ID and password don't match
641	FTP user already logged in
642	FTP open channel timeout
643	FTP communication timeout
644	FTP unknown error
657	Network survey error (No Carrier)
658	Network survey error (Busy)
659	Network survey error (Wrong request)
660	Network survey error (Aborted)
680	LU processing
681	Network search aborted
682	PTM mode
683	Network search terminated
684	CSG Search processing
690	Active call state
691	RR connection established
770	SIM invalid
900	No Response for AT Command
1000	SSL not activated
1001	SSL certs and keys wrong or not stored
1002	SSL generic error
1003	SSL already activated
1004	SSL error during handshake
1005	SSL socket error
1006	SSL invalid state

Numeric Format ³	Verbose Format ⁴
1007	SSL cannot activate
1008	SSL not connected
1009	SSL already connected
1010	SSL error enc/dec data
1011	SSL disconnected
1100	Model not recognized
1101	Model information missing
1102	Unable to open the file
1103	Unable to close the file
1104	Unable to read the nv file
1105	Unable to write the nv file
1106	Input pattern is wrong
1113	Call establishment failed
1114	File name already exist

1.2.2.2. Message Service Failure Result Code - +CMS ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3GPP TS 27.005 commands.

Syntax: **+CMS ERROR: <err>**

Parameter: **<err>** - numeric error code.

The **<err>** values are reported in the table:

Numeric Format	Meaning
According to 3GPP TS 24.011 section 8.2.5.4	
0...127	
According to 3GPP TS 23.040 sub clause 9.2.3.22 values	
128...255	
According to 3GPP TS 27.005 section 3.2.5 - Message Service Failure Result Code +CMS ERROR	
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network time-out
340	no +CNMA acknowledgement expected
500	unknown error
510	msg blocked
<err> 512 and on are manufacturer specific	
512	No SM resources
513	TR1M timeout

Numeric Format	Meaning
514	LL error
515	No response from network

1.2.3. Information Responses and Result Codes

The TA response, in case of verbose response format enabled, for the previous examples command line could be as shown below:

1. information response to **+CMD1?**
<CR><LF>+CMD1:2,1,10<CR><LF>
2. information response to **+CMD1=?**
<CR><LF>+CMD1(0-2),(0,1),(0-15)<CR><LF>
3. result code **<CR><LF>OK<CR><LF>**

Moreover, there are other two types of result codes:

1. *result codes* that inform about progress of TA operation (e.g. connection establishment **CONNECT**)
2. *result codes* that indicate occurrence of an event not directly associated with issuance of a command from TE (e.g. ring indication **RING**).

Here the basic result codes according to ITU-T V25Ter recommendation

Numeric form	Verbose form
0	OK
1	CONNECT or CONNECT <text>3F3F5
2	RING
3	NO CARRIER
4	ERROR
6	NO DIALTONE
7	BUSY
8	NO ANSWER
10	CONNECT 24004
11	CONNECT 48004
12	CONNECT 96004
15	CONNECT 144004
23	CONNECT 1200/754

1.2.4. Command Response Time-Out

Every command issued to the Telit modules returns a result response, if response codes are enabled (default). The time needed to process the given command and return the response varies, depending on the command type. Commands that do not interact with the SIM or the network, and only involve internal setups or readings, have an immediate response. Commands that interact with the SIM or the network could take many seconds to send a response, depending on SIM configuration (e.g., number of contacts stored in the phonebook, number of stored SMS), or on the network the command may interact with.

1.2.5. Command Issuing Timing

The chain Command -> Response shall always be respected, and a new command must not be issued before the module has terminated all the sending of its response result code (whatever it may be).

This applies especially to applications that "sense" the **OK** text and therefore may send the next command before the complete code **<CR><LF>OK<CR><LF>** is sent by the module.

It is advisable anyway to wait for at least 20ms between the end of the reception of the response and the issue of the next AT command.

⁵ <text> can be "300", "1200", "2400", "4800", "9600", "14400" or "1200/75"

If the response codes are disabled and therefore the module does not report any response to the command, then at least the 20ms pause time shall be respected.

1.3. Storage

1.3.1. Factory Profile and User Profiles

The Telit wireless modules store the values, set by several commands, in the internal nonvolatile memory (NVM), allowing to remember this setting even after power off. In the NVM, these values are set either as factory profile or as user profiles. There are two customizable user profiles and one factory profile in the NVM of the device: by default, the device will start with user profile 0 equal to factory profile.

For backward compatibility, each profile is divided into two sections, one base section which was historically the one that was saved and restored in early releases of code, and the extended section which includes all the remaining values.

The **&W** command is used to save the current values of both sections of profiles into the NVM user profile.

Commands **&Y** and **&P** are both used to set the profile to be loaded at startup. **&Y** instructs the device to load at startup only the base section. **&P** instructs the device to load at startup the full profile: base + extended sections.

The **&F** command resets to factory profile values only the command of the base section of profile, while the **&F1** resets to factory profile values the full set of base + extended section commands.

The values set by other commands are stored in NVM outside the profile: some of them are stored always, without issuing any **&W**, some other are stored issuing specific commands (**+CSAS**, **#SLEDSAV**, **#SKTSAV**, **#ESAV**); all these values are read at power-up.

In this document, each AT command description begins with a "AT Command short overview table" having the following format:

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
/	see below	/	/	/

This chapter focus on the values that **Setting saved** field can assume and their meaning. The meaning of the other fields will be described in the next chapter. **Setting saved** field can have one of the value listed below (to have information on the AT instance introduced hereafter, see the reference section of the **#PORTCFG** command):

Specific profile the parameters values set by the command are stored in the profile base section. The stored values set is associated to the specific AT instance used to enter the command. It is a profile used by the specific AT instances.

Examples of the AT commands: **+IPR**, **E**, **Q**, **V**, **X**, **&Y**, etc.

The parameters values set by the command are stored in the profile extended section. The stored values set is associated to the specific AT instance used to enter the command. It is a profile used by the specific AT instance.

Examples of the AT commands: **+FCLASS**, **+CREG**, **+CLIP**, **#STIA**, etc.

Common profile the parameters values set by the command are stored in the profile extended section. The stored values set is not associated to the specific AT instance used to enter the command. It is a profile shared between the AT instances.

Examples of the AT commands: **+CALM**, **#E2SLRI**, **#DVI**, etc.

Auto the parameters values set by the command are automatically stored in NVM, without issuing any storing AT command, and independently from the profile (unique values). The values are automatically restored at startup.

AT commands examples: **+COPS**, **+CGQREQ**, **#SCFG**, etc.

In some cases, the parameters values are store in the file system.

AT commands examples: **#TEMPCFG**, **#TEMPMON**, etc.

Other

the parameters values set by the command are stored in NVM issuing a specific command and independently from the profile.

Examples of the AT commands: **#SLED** setting is saved by **#SLEDSAV**
#BIQUADINEX setting is saved by **#PSAV**
 etc.

1.4. AT Command Short Overview Table

As stated before, each AT command description begins with a "AT Command short overview table" having the following format:

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	/	No	-	2

Here are the table fields meanings:

SIM Presence indicates if the AT command to be executed needs the SIM presence.

Can be aborted indicates if the AT command can be aborted during its execution.

MAX timeout indicates the time within which the command must be executed.

SELINT indicates on which AT interface type the AT command is available.

2. AT COMMANDS REFERENCES

2.1. Call & DTMF

2.1.1. AT#SCT - Show Call Timers

The command reads from USIM the information about incoming and outgoing calls duration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SCT

Execution command returns the value stored in USIM field Incoming Call Timer, which contains the accumulated incoming call timer duration value for the current call and previous calls, and the value stored in the USIM field Outgoing Call Timer, that contains the accumulated outgoing call timer duration value for the current call and previous calls, in the format:

#SCT: <ICT>,<OCT>

Additional info:

- ▶▶ Intermediate response parameters

Name	Type	Default	Description
<ICT>	string	-	Incoming Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds
<OCT>	string	-	<OCT> - Outgoing Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds



AT#SCT=?

Test command returns **OK** result code.

2.1.2. AT#SCI - Show Call Information

The command reads from USIM the information about incoming and outgoing calls timing.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SCI

Execution command returns the value stored in USIM field Incoming Call Information, which contains the time of the call and duration of the last calls, and the value stored in the USIM field Outgoing Call Information, that contains time of the call and duration of the last calls, in the format:

#SCI: <indexn>,<number>,<text>,<callTime>,<callDuration>[,<status>]<CR><LF>

#SCI: <indexn>,<number>,<text>,<callTime>,<callDuration>[,<status>][...]]]

Additional info:

- ▶▶ Intermediate response parameters

Name	Type	Default	Description
<indexn>	integer	-	the type of the entry (1: incoming call; 2: outgoing call)
<number>	string	-	phone number associated to the call
<text>	string	-	the alphanumeric text associated to the number; character as specified by command Select TE Character Set +CSCS
<callTime>	string	-	call time in format "yy/MM/dd,hh:mm:ss Â±zz", where: yy: year, MM: month, dd: day, hh: hour, mm: minute, ss: seconds, Â±zz: time zone
<callDuration>	string	-	call duration in the format: "hh:mm:ss", where hh: hour, mm: minute, ss: seconds
<status>	string	-	only for incoming calls, call status (0: answered: 1: not answered)



AT#SCI=?

Test command returns **OK** result code.

2.2. General Control and Config

2.2.1. AT#GETFW - Get firmware status

This command used to read all modem carrier firmware information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#GETFW

Return all modem firmware information in the following format:

```

HOST FIRMWARE : <Host Version>
SLOT STATUS CARRIER VERSION TMCFG CNV LOC
<modem carrier firmware 1 >
<modem carrier firmware 2 >
â€¦
<modem carrier firmware N >
    
```

- CNV is optional information.
- MODEM CONFIG is optional information.
This information field will be shown only if it supported.
- LOC is information of loaded firmware index.



AT#GETFW?

Returns information of the activated modem carrier firmware



AT#GETFW=?

Test command returns **OK**.

2.2.2. AT#ACTIVEFW - Active firmware

This command is used to activate Modem Firmware

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ACTIVEFW=<op_mode>, <option>

Active the selected modem carrier firmware at <slot_idx>.

If the specified modem carrier firmware selected, it returns OK result.

Power-cycle (reboot) action will be performed, automatically and a new selected modem carrier firmware loaded at boot time.

Parameters:

Name	Type	Default	Description
<op_mode>	integer	N/A	mode of operation
<option>	integer	-	option corresponding to <op_mode>

Values:

- 0 : Active specific modem carrier firmware by SIM
- 1 : Active specific modem carrier firmware by slot index
- 2 : Active specific modem carrier firmware by carrier name
- 3 : Active specific modem carrier firmware by version name

If <op_mode> is 0

<option> is decimal number of auto firmware detection mode by SIM

0: one shot: carrier firmware is loaded based on currently inserted SIM

1: automatically at reboot, or in case of hot swap enabled, when new SIM is inserted " switch only occurs if SIM is not matched to the currently running firmware

2: disable automatic mode

If <op_mode> is 1

<option> is decimal number of slot index to active

1: Active modem carrier firmware at slot 1

2: Active modem carrier firmware at slot 2

â€¦

N: Active modem carrier firmware at slot N

Where N is the maximum index for the modem firmware





If <op_mode> is 2

<option> is string value of carrier name to active

If <op_mode> is 3

<option> is string value of version name to active

EX> "40.00.001"

-
-  The SMS/Phonebook user data and SIM dependent information will remain regardless the carrier firmware switch. (SIM dependent information: <number> of +CSVM. etc)
 -  NVM items are applied to the default value corresponding to the carrier after the firmware switch
 -  Firmware switch <op_mode>1-3 operation should be discarded until automatic sim detection mode(#ACTIVEFW=0,2) is disabled.
 -  The stored configuration is maintained even when XFP update.
-

**AT#ACTIVEFW?**

Returns information of the activated modem carrier firmware

**AT#ACTIVEFW=?**

Test command returns OK

2.2.3. AT#CLEARFW - Clear firmware

This command is used to clear modem firmware from the module.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CLEARFW=<op_mode>[,<option>]

Execution command clears modem firmware from module

Parameters:

Name	Type	Default	Description
<op_mode>	integer	N/A	option mode

Values:

- 0 : clear all modem firmware
- 1 : clear specific modem firmware by slot index
- 2 : clear specific modem firmware by carrier name
- 3 : clear specific modem firmware by version name

<option>	integer	-	<p>If <op_mode> is 0: There are no option field for <op_mode> 0</p> <p>If <op_mode> is 1: <option> is decimal number of slot index to clear (ex) 2</p> <p>If <op_mode> is 2: <option> is string value of carrier name to clear (ex) "carrier name"</p> <p>If <op_mode> is 3: <option> is string value of version name to clear (ex) "version name"</p>
----------	---------	---	--

- Slot 1 is fixed for specific firmware image and cannot be erased by this command
- Double Quotation (" ") should be added for "carrier name" and "version name".
- If <op_mode> is 2:
Carrier name has been deprecated (for backward compatibility only)



AT#CLEARFW=?

This command is used to clear modem firmware from module.

2.2.4. AT#FIRMWARE - Firmware

This command is used to read modem firmware information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FIRMWARE[=<mfw_idx>]

Set command loads the selected modem carrier firmware.

If the specified modem carrier firmware is selected, it returns **OK** result. Power-cycle (reboot) action will be automatically performed and the newly selected modem carrier firmware is loaded at boot time.

Parameter:

Name	Type	Default	Description
<mfw_idx>	integer	-	1 : modem carrier firmware 1 ... N : modem carrier firmware N Where N is the maximum index for the modem firmware

Additional info:

- ▶▶ Execution command returns all firmware information in the following format

```

HOST FIRMWARE : <Host Version>
MODEM FIRMWARE : <The maximum value of N>
INDEX STATUS CARRIER VERSION TMCFG LOC
<modem carrier firmware 1 >
...
<modem carrier firmware N >
    
```

- i** #FIRMWARE has been replaced by **AT#ACTIVEFW**.
- i** Carrier name has been deprecated (for backward compatibility only)



AT#FIRMWARE?

Read command returns the activated modem firmware index

#FIRMWARE: <mfw_idx>



AT#FIRMWARE=?

Test command returns the list of supported carrier firmware index.

#FIRMWARE: (1-N)

2.2.5. AT#B30TXDIS - Set B30 TX disable

This command enables or disables LTE B30 transmitter.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#B30TXDIS=<mode>

Set command enables/disabled LTE B30 TX.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	LTE B30 TX enable/disable value.

Values:

- 0 : B30 TX enable
- 1 : B30 TX disable



The value set by command operate after power cycle.



AT#B30TXDIS?

Read command reports the currently selected <mode> in the format:

#B30TXDIS: <mode>



AT#B30TXDIS=?

Test command reports the supported range of values.

2.2.6. Command Line Prefixes

2.2.6.1. AT - Starting a Command Line

AT is the prefix used to start a command line.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT

The prefix **AT** is a two-character abbreviation ("ATtention"), always used to start a command line to be sent from TE to TA, with the only exception of AT#/ prefix. As a command, it can be issued just to test if the device is responding to AT commands.

2.2.6.2. **A/** - Last Command Automatic Repetition

The command immediately executes the previously issued command or commands.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



A/

If the prefix **A/** is issued, the device immediately executes once again the body of the preceding command line. No editing is possible, and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired.

If **A/** is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an **OK** result code).

- This command works only at fixed IPR.
- The custom prefix **AT#** has been defined: it causes the last command to be executed again too; but it doesn't need a fixed **+IPR**.

2.2.6.3. AT#/- Repeat Last Command

The command immediately executes the previously issued command or commands.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#/-

If **AT#/-** is issued, the device immediately executes once again the body of the preceding command line. No editing is possible, and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired.

If **AT#/-** is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an **OK** result code).

-  This command is the same as **A/** but does not need a fixed **+IPR**.

2.2.7. Generic Modem Control

2.2.7.1. AT#SELINT - Select Interface Style

This command sets the AT command interface style.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SELINT=[<v>]

Set command sets the AT command interface style depending on parameter.

Parameter:

Name	Type	Default	Description
<v>	integer	2	AT command interface style

Value:

2 : standard AT parser



AT#SELINT?

Read command reports the current interface style in the format:

#SELINT: <v>



AT#SELINT=?

Test command reports the available range of values for parameter <v>.

2.2.7.2. AT&F - Set to Factory-Defined Configuration

Set configuration parameters to default values.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&F[<value>]

Execution command sets the configuration parameters to default values specified by manufacturer; it takes in consideration hardware configuration switches and other manufacturer-defined criteria.

Parameter:

Name	Type	Default	Description
<value>	integer	0	parameters to reset

Values:

- 0 : only the factory profile base section parameters are considered
- 1 : either the factory profile base section and the extended section are considered (full factory profile)



If parameter <value> is omitted, the command has the same behavior as **AT&F0**.

2.2.7.3. ATZ - Soft Reset

Soft Reset



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATZ[<n>]

Execution command loads the base section of the specified user profile and the extended section of the default factory profile

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	user profile number

Value:

0,1 : user profile number

- If parameter <n> is omitted, the command has the same behavior as **ATZ0**
- Any active call is terminated.

2.2.7.4. AT&Y - Default Reset Basic Profile Designation

Define the basic profile that is loaded on startup.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&Y[<n>]



Execution command defines the basic profile that will be loaded on startup.

Parameter:

Name	Type	Default	Description
<n>	integer	0	basic profile that will be loaded on startup.

Value:

0,1 : profile number: the wireless module can store 2 complete configurations (see command &W).

-  Differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&Y** will be loaded on every startup.
-  If parameter is omitted the command has the same behavior as **AT&Y0**.

2.2.7.5. AT&P - Default Reset Full Profile Designation

Define which full profile is loaded at startup.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT&P[<n>]



Execution command defines which full profile will be loaded at startup.

Parameter:

Name	Type	Default	Description
<n>	integer	0	full profile will be loaded on startup.

Value:

0,1 : profile number: the wireless module can store 2 full configurations (see command &W).

-  Differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&P** will be loaded at every startup.
-  If parameter is omitted, the command has the same behavior as **AT&P0**

2.2.7.6. AT&W - Store Current Configuration

Stores the complete configuration of the device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&W[<n>]

Execution command stores on profile <n> the complete configuration of the device.

Parameter:

Name	Type	Default	Description
<n>	integer	0	profile identifier

Value:

0,1 : profile identifiers



If parameter is omitted, the command has the same behavior of **AT&W0**.

2.2.7.7. AT&V - Display some Configuration and Profile

The command displays some of the basic modem configuration settings and parameters

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V

Execution command returns some of the basic modem configuration settings and parameters, one for each row, in the format:

setting/parameter : value

- i** The row of information about **CTS (C106) OPTIONS** is in the output of **&V** for compatibility reasons and represents only a dummy value.



Example of returned values.

- **AT&V**

```

COMMAND ECHO           : E1=YES
RESULT MESSAGES        : Q0=YES
VERBOSE MESSAGES       : V1=YES
EXTENDED MESSAGES      : X1=YES
LINE SPEED              : F0=autodetect
CONSTANT DTE SPEED     : YES
FLOW CONTROL OPTIONS   : &K3=HW bidirect.
ERROR CORRECTION MODE  : RLP
CTS (C106) OPTIONS     : &B2=OFF while disc.
DSR (C107) OPTIONS     : &S3=PHONE ready->ON
DTR (C108) OPTIONS     : &D0=ignored
DCD (C109) OPTIONS     : &C1=follows carrier
RI (C125) OPTIONS      : \R1=OFF dur. off-hk
C108/1 OPERATION       : &D0=NO
POWER SAVING ON DTR    : +CFUN:1=NO
DEFAULT PROFILE        : &Y0=user profile 1
OK

```

2.2.7.8. ATV - Single Line Connect Message

Command sets single line connect message.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATV[<n>]

Execution command sets single line connect message.


Parameter:

Name	Type	Default	Description
<n>	integer	0	set single line connect message

Values:

0 : set OFF

1 : set ON

-  if parameter is omitted, the command has the same behaviour of **ATV0**.

2.2.7.9. AT+GCI - Country of Installation

Set command allows to select the installation country code according to ITU-T35 Annex A.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GCI=<code>

Parameter:

Name	Type	Default	Description
<code>	integer	59	installation country code

Value:

59 : it currently supports only the Italy country code



AT+GCI?

Read command reports the currently selected country code.



AT+GCI=?

Test command reports the supported values of parameter <code>.

2.2.7.10. AT%L - Line Signal Level

Command has no effect and is included only for backward compatibility with landline modems.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2

2.2.7.11. AT%Q - Line Quality

Command has no effect and is included only for backward compatibility with landline modems

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2

2.2.7.12. ATL - Speaker Loudness

Command has no effect and is included only for backward compatibility with landline modems.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATL<n>

Set command has no effect and is included only for backward compatibility with landline modems.

Parameter:

Name	Type	Default	Description
<n>	integer	-	This parameter has no effect

2.2.7.13. ATM - Speaker Mode

Command has no effect and is included only for backward compatibility with landline modems.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATM=<n>

Set command has no effect and is included only for backward compatibility with landline modems.

Parameter:

Name	Type	Default	Description
<n>	integer	-	No effect.

2.2.7.14. AT+GMI - Manufacturer Identification

This command returns the manufacturer identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMI

Execution command returns the manufacturer identification followed by an <OK> at newline.



AT+GMI=?

Test command returns **OK** result code.

2.2.7.15. AT+GMM - Model Identification

The command returns the model identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMM

The execution command returns the model identification followed by an <OK> at newline.



AT+GMM=?

Test command returns OK result code.

2.2.7.16. AT+GMR - Revision Identification

The command returns the software revision identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMR

Execution command returns the software revision identification followed by an <OK> at newline.



AT+GMR=?

Test command returns **OK** result code.

2.2.7.17. AT+CEER - Extended Error Report

Reports extended error related to the last unsuccessful call.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CEER

Execution command returns one or more lines of information text **<report>** offering the TA user an extended error report, in the format:

+CEER: <report>

This report regards some error condition that may occur:

1. the failure in the last unsuccessful call setup (originating or answering)
2. the last call release



If no error condition has occurred since power up, then **"Normal, unspecified"** condition is reported



AT+CEER=?

Test command returns **OK** result code.

2.2.7.18. AT+GSN - Serial Number

The command reports the device board serial number.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GSN

Execution command returns the device board serial number.



The number returned is not the IMSI, but it is the board number.



AT+GSN=?

Test command returns **OK** result code.

2.2.7.19. AT+CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGMI

Execution command returns the device manufacturer identification code followed by an **OK** at newline.



AT+CGMI=?

Test command returns **OK** result code.

2.2.7.20. AT+CGMM - Request Model Identification

This command returns the device model identification.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CGMM

Execution command returns the device model identification code followed by an **OK** at newline.



AT+CGMM=?

Test command returns **OK** result code.

2.2.7.21. AT+CGMR - Request Revision Identification

The command returns device software revision number.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGMR

Execution command returns device software revision number followed by an **OK** at newline.



AT+CGMR=?

Test command returns **OK** result code.

2.2.7.22. AT+CGSN - Request Product Serial Number Identification

This command allows to retrieve the product serial number in form of IMEI of the mobile.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGSN

Execution command returns the product serial number, identified as the IMEI of the mobile.



AT+CGSN=?

Test command returns **OK** result code.

2.2.7.23. AT#CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMI

Execution command returns the device manufacturer identification code, with command echo.

The response is as follows

#CGMI: <code>

OK



AT#CGMI=?

Test command returns **OK** result code.

2.2.7.24. AT#CGMR - Request Revision Identification

The command returns device software revision number.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMR

Execution command returns device software revision number, with command echo.

The response is as follows

#CGMR: <num>

OK



AT#CGMR=?

Test command returns **OK** result code.

2.2.7.25. AT#CGSN - Product Serial Number Identification

This command returns the product serial number in form of IMEI of the mobile.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGSN

Execution command returns the product serial number in form of IMEI of the mobile, with command echo.

The response is as follows

#CGSN: <sn>

OK



AT#CGSN=?

The test command returns the **OK** result code.

2.2.7.26. AT#SWPKGV - Request Software Package Version

This command allows to retrieve the software package version.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SWPKGV

Execution command returns the software package version without **#SWPKGV:** command echo. The response is as follows:

```

AT#SWPKGV
<Telit Software Package Version>-<Production Parameters Version>
<Modem FW Version>
<Production Parameters Version>
<Application FW Version>

OK

```



AT#SWPKGV=?

Test command returns **OK** result code.



```

AT#SWPKGV
38.02.000-B006-POH.000400
M0H.020000-B014
POH.000400
A0H.000200-B006
OK

```

2.2.7.27. AT+CPAS - Phone Activity Status

Execution command reports the device status in the form shown in Additional info section.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CPAS

Additional info:

- ▶▶ Message format returned by the execution command:

+CPAS: <pas>

Name	Type	Default	Description
<pas>	integer	0	phone activity status.

Values:

- 0 : ready (device allows commands from TA/TE)
- 1 : unavailable (device does not allow commands from TA/TE)
- 2 : unknown (device is not guaranteed to respond to instructions)
- 3 : ringing (device is ready for commands from TA/TE, but the ringer is active)
- 4 : call in progress (device is ready for commands from TA/TE, but a call is in progress)

- i** '1' and '2' at <pas> is not supported.
- i** In the LTE registration state, CPAS: 4 (call in progress) is displayed.



AT+CPAS=?

Test command reports the supported range of values for <pas>.

- i** Although **+CPAS** is an execution command, 3GPP TS 27.007 requires the Test command to be defined.

2.2.7.28. AT+CFUN - Set Phone Functionality

This command selects the level of functionality in the ME.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CFUN=[<fun>[,<rst>]]

Set command selects the level of functionality in the ME.

Parameters:

Name	Type	Default	Description
<fun>	integer	1	Power saving function mode.

Values:

- 0 : minimum functionality (low power mode)
- 1 : mobile full functionality
- 4 : disable both TX and RX
- 6 : reset
- 7 : offline mode

<rst>	integer	0	reset flag
-------	---------	---	------------

Values:

- 0 : do not reset the ME before setting it to <fun> functionality level
- 1 : reset the ME before setting it to <fun> full functionality

i Issuing **AT+CFUN=0[,0]** causes the module to perform either a network deregistration and a SIM deactivation.

i In the **<fun>=7**(offline), modem can only be changed to **<fun>=6**(reset)



AT+CFUN?

Read command reports the current setting of <fun>.



AT+CFUN=?

Test command returns the list of supported values for <fun> and <rst>.

2.2.7.29. AT+CACM - Accumulated Call Meter

This command resets the Advice of Charge related Accumulated Call Meter (ACM) value in SIM card or in the active application in the UICC.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CACM=[<pwd>]

Set command resets the Advice of Charge related accumulated call meter (ACM) value in SIM card or in the active application in the UICC. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is usually required to reset the value.

Parameter:

Name	Type	Default	Description
<pwd>	string	-	SIM PIN2



AT+CACM?

Read command returns the current value of ACM in the format:

+CACM: <acm>

Additional info:

▶▶ Response parameter

Name	Type	Default	Description
<acm>	string	-	accumulated call meter value similarly coded as <ccm> under +CAOC ; three bytes of the ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30)



The value <acm> is in home units; price per unit and currency are defined with command **+CPUC**.



AT+CACM=?

Test command returns the **OK** result code.

2.2.7.30. AT+CAMM - Accumulated Call Meter Maximum

This command sets the Advice of Charge related to accumulated call meter maximum (ACMmax) value stored in SIM.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CAMM=<acmmax>[,<pwd>]

Set command sets the Advice of Charge related accumulated call meter maximum value (ACMmax) stored in SIM. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM (refer **+CACM**) reaches ACMmax calls are prohibited. SIM PIN2 is usually required to set the value.

Parameters:

Name	Type	Default	Description
<acmmax>	string	-	accumulated call meter maximum value
<pwd>	string	-	SIM PIN2

Setting <acmmax> to 0 disables the feature.



AT+CAMM?

Read command returns the current value of ACMmax in the format:

+CAMM: <acmmax>



AT+CAMM=?

Test command returns the **OK** result code.

2.2.7.31. AT+CPUC - Price per Unit and Currency Table

This command sets the values of Price per Unit and Currency Table.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPUC=<currency>,<ppu>[,<pwd>]

Set command sets the values of Advice of Charge related Price per Unit and Currency Table (PUCT) stored in SIM. The PUCT information can be used to convert the home units (as used in commands **+CAOC**, **+CACM** and **+CMM**) into currency units. SIM PIN2 is usually required to set the parameters.

Parameters:

Name	Type	Default	Description
<currency>	string	-	three-character currency code (e.g. "GBP", "DEM", "USD"); character set as specified by command select TE character set +CSCS
<ppu>	string	-	price per unit; dot is used as a decimal separator (e.g. "2.66")
<pwd>	string	-	SIM PIN2



AT+CPUC?

Read command reports the current values of <currency> and <ppu> parameters in the format:

+CPUC: <currency>,<ppu>



AT+CPUC=?

Test command returns the **OK** result code.

2.2.7.32. AT+CSVM - Set Voice Mail Number

Command to set voice mail server number.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSVM=<mode>[,<number>[,<type>]]

Set command is dummy. It only checks for parameters values validity; it does not send any actual write request to SIM to update voice mail number, nor sends any request to network to enable/disable voice mail.

Parameters:

Name	Type	Default	Description
<mode>	integer	1	enable/disable voice mail number
Values:			
0	:	disable the voice mail number	
1	:	enable the voice mail number	
<number>	string	-	phone number of format specified by <type>
<type>	integer	129	type of address octet in integer format
Values:			
129	:	unknown type of number and ISDN/Telephony numbering plan	
145	:	international type of number and ISDN/Telephony numbering plan (contains the character "+")	



AT+CSVM?

Read command returns the currently selected voice mail number and the status (i.e. enabled/disabled) in the format

+CSVM:<mode>,<number>,<type>



AT+CSVM=?

Test command reports the range for the parameters <mode> and <type>.

2.2.7.33. AT+CLAC - Available AT Commands

This command shows the available AT commands list.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CLAC

The execution command causes the ME to return one or more lines reporting the AT commands that are available to the user. The format is:

`<ATcmd1>[<CR><LF><ATcmd2>[...]]`

`<ATcmdn>` is the AT command.



AT+CLAC=?

Test command returns the OK result code.

2.2.7.34. AT#LANG - Select Language

Set command selects the currently used language for displaying different messages.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LANG=<lan>

Parameter:

Name	Type	Default	Description
<lan>	string	en	selected language

Values:

en : English
it : Italian
de : German



AT#LANG?

Read command reports the currently selected <lan> in the format:

#LANG: <lan>



AT#LANG=?

Test command reports the supported range of values for parameter <lan>.

2.2.7.35. AT+CMEE - Report Mobile Equipment Error

The command enables the use of result code.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CMEE=[<n>]

Set command disables/enables the use of result code:

+CME ERROR: <err>

as an indication of an error relating to the **+Cxxx** command issued.

When enabled, device related errors cause the **+CME ERROR: <err>** final result code instead of the default **ERROR** final result code. **ERROR** is returned normally when the error message is related to syntax, invalid parameters or DTE functionality.

Parameter:

Name	Type	Default	Description
<n>	integer	0	enable flag

Values:

- 0 : disable
- 1 : enable and use numeric<err> values
- 2 : enable and use verbose <err> values

i The detailed description of <err> is available in section "ME Error Result Code - +CME ERROR: <err>".

i **+CMEE** has no effect on the final result code **+CMS**.



AT+CMEE?

Read command returns the current value of parameter <n> in the format:

+CMEE: <n>



AT+CMEE=?

Test command returns the supported values of parameter <n>.

2.2.7.36. AT#VCDISABLE - Disable Voice Call

The command is used to disable Voice Call functionality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#VCDISABLE=<type>

Set command set the incoming voice call function disable.

Parameter:

Name	Type	Default	Description
<type>	integer	N/A	Disable type

Values:

- 0 : Incoming call allowed.
- 1 : Ignore paging.
- 2 : Reject the voice call with cause code 88.

- The setting is saved in NVM, will affect after rebooting.
- When set <type> by 1, modem may not be able to distinguish clearly whether paging is for Voice Call at the time of receiving the Paging Message.
- Usually, default value is 0 in models support the voice function.



AT#VCDISABLE?

Read command read a current value.

#VCDISABLE: <type>



AT#VCDISABLE=?

Test command reports the supported range.

2.2.7.37. AT#PERSISTAPN - Preserve APN Profile during firmware upgrade

APN Persistence

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PERSISTAPN=<mode>

Set command determines whether to retain the APN profile after a firmware update. When a firmware download event occurs, the APN profile is backed up. If a backup APN profile exists when the firmware is downloaded, the APN profile is restored.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	mode for operation

Values:

- 0 : initialized with the APN profile specified by the network operator
- 1 : backup and restore the current APN profile

- When this feature is set to enable, the set value is retained even if the changed firmware is changed.
- It applies not only to downloading the firmware but also when changing the active carrier with the **AT#FIRMWARE** command.



AT#PERSISTAPN?

Read command returns "OK" string along with last accepted mode in the format:

#PERSISTAPN: <mode>



AT#PERSISTAPN=?

Test command reports the supported range of values.

2.2.7.38. AT#PERSISTAPNBACKUP - APN backup on current operator

This command is used to trigger APN backup on current operator.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#PERSISTAPNBACKUP

The command returns the following message:

AT#PERSISTAPNBACKUP
OK



This command returns ERROR if Preserved APN is not enabled using #PERSISPAPN command.



AT#PERSISTAPNBACKUP?

Read command returns **OK** result code.



AT#PERSISTAPNBACKUP=?

Test command returns **OK** result code.

2.2.7.39. AT#HWREV - Hardware Identification

This command returns the device Hardware revision identification code.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#HWREV

Execution command returns the device Hardware revision identification code without command echo.



AT#HWREV=?

Test command returns the **OK** result code.

2.2.7.40. AT+CSCS - Select TE Character Set

This command sets character-set used by the device.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSCS=[<chset>]

Set command sets character-set used by the device.

Parameter:

Name	Type	Default	Description
<chset>	string	IRA	character set

Values:

- GSM : GSM default alphabet (3GPP TS 23.038).
- IRA : international reference alphabet (ITU-T T.50).
- 8859-1 : ISO 8859 Latin 1 character set.
- PCCP437 : PC character set Code Page 437.
- UCS2 : 16-bit universal multiple-octet coded character set (ISO/IEC10646).



AT+CSCS?

Read command returns the current value of the active character set.



AT+CSCS=?

Test command returns the supported values for parameter <chset>.

2.2.7.41. AT+PACSP - Network Selection Menu Availability

This command returns the current value of the <mode> parameter which is PLMN mode bit in the CSP file within the SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+PACSP?

Read command returns the current value of the <mode> parameter in the format:

+PACSP<mode>

Additional info:

- ▶▶ Read command response parameter

Name	Type	Default	Description
<mode>	integer	N/A	PLMN mode bit (in CSP file on the SIM)

Values:

- 0 : Restriction of menu option for manual PLMN selection
- 1 : No restriction of menu option for Manual PLMN selection



AT+PACSP=?

Test command returns the **OK** result code.

2.2.7.42. AT#USBCFG - USB Configuration

This command sets the USB configuration on the modem device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#USBCFG=<mode>

Set command sets the USB composition according to <mode> number given, where:

Parameter:

Name	Type	Default	Description
<mode>	integer	1	USB configuration mode

Values:

- 0 : use 0x1062 composition file
- 1 : use 0x1060 composition file
- 2 : use 0x1061 composition file
- 3 : use 0x1063 composition file

Additional info:

- ▶▶ 0x1062: RNDIS + DIAG + ADB + NMEA + MODEM + MODEM + AUX
- 0x1060: DIAG + ADB + RmNet + NMEA + MODEM + MODEM + AUX
- 0x1061: DIAG + ADB + MBIM + NMEA + MODEM + MODEM + AUX
- 0x1063: DIAG + ADB + ECM + NMEA + MODEM + MODEM + AUX

- The modem device is reset automatically, and new USB composition applied from the next boot up time.
- The value is stored when Set command executed and it is kept even on download case.



AT#USBCFG?

Read command returns the current composition set by number as detailed in the section above:

- 0x1062 composition file return 0
- 0x1060 composition file return 1
- 0x1061 composition file return 2
- 0x1063 composition file return 3



AT#USBCFG=?

Test command returns the list of supported values.

2.2.7.43. AT#USB3TUNE - Tune USB 3.0 PHY

This command allows USB 3.0 PHY tuning.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#USB3TUNE=<emp>,<drv>

This command allows USB 3.0 PHY tuning.

Parameters:

Name	Type	Default	Description
------	------	---------	-------------

<emp> integer - Adjusts the Tx output post cursor level.

The value of this parameter should be one of below table.

Dec	De-emphasis(dB)	V_{de}/V_{pre}
0	0.0	100%
1	-0.2	98%
2	-0.4	95%
3	-0.6	93%
4	-0.9	91%
5	-1.1	88%
6	-1.3	86%
7	-1.6	84%
8	-1.8	81%
9	-2.1	79%
10	-2.3	77%
11	-2.6	74%
12 (default)	-2.9	72%
13	-3.2	70%
14	-3.5	67%
15	-3.8	65%
16	-4.1	63%
17	-4.4	60%
18	-4.8	58%
19	-5.1	55%
20	-5.5	53%
21	-5.9	51%
22	-6.3	48%
23	-6.7	46%
24	-7.2	44%
25	-7.7	41%
26	-8.2	39%
27	-8.7	37%
28	-9.3	34%
29	-9.9	32%
30	-10.5	30%
31	-11.3	27%

<drv> integer - Select Tx drive level.

The value of this parameter should be one of below table.

Dec	Vp-p1 (mV)	% of V_{cca}
0	231.3	25%
1	253.6	27%

2	276.0	30%
3	298.4	32%
4	320.8	35%
5	343.1	37%
6	365.5	40%
7	387.9	42%
8	410.3	44%
9	432.7	47%
10	455.0	49%
11	477.4	52%
12	499.8	54%
13	522.2	56%
14	544.6	59%
15	566.9	61%
16	589.3	64%
17	611.7	66%
18	634.1	69%
19	656.5	71%
20	678.8	73%
21	701.2	76%
22	723.6	78%
23	746.0	81%
24	768.3	83%
25	790.7	85%
26	813.1	88%
27	835.5	90%
28	857.9	93%
29	880.2	95%
30	902.6	98%
31(default)	925.0	100%

Additional info:

▶▶ This tune data is going to be applied after target reboot.

- The setting is maintained for both firmware updates and firmware switches.
- Be careful to configure these values because configuring can make USB connection failed.



AT#USB3TUNE?

Read command reports the currently selected parameters in the format:

#USB3TUNE : <emp>,<drv>



AT#USB3TUNE=?

Reports the supported range of values for parameter(s) **<emp>** and **<drv>**.

#USB3TUNE: (0-31),(0-31)

2.2.7.44. AT#USBSWITCH - Switch USB Speed

This command allows switching USB speed between Super-speed and High-speed.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#USBSWITCH=<mode>

Switch USB configuration between Super-speed and High-speed mode.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	USB mode

Values:

- 0 : Auto (Support all speeds)
- 1 : Support only High-speed

- Manually reboot is required after changing USB configuration.
The setting is kept after both firmware update and firmware switch.
- After **AT#REBOOT** or **AT#SHDN** command is issued, a serial port opened in the host machine should be closed because a Yellow Bang error appears once on Windows OS.



AT#USBSWITCH?

Read command reports the currently selected <mode> in the format:

#USBSWITCH: <mode>



AT#USBSWITCH=?

Test command reports the supported range of values for parameters <mode>.

2.2.7.45. AT#USBDMOFF - Disable of DIAG channel on USB

This command enables/disables DIAG channel of USB composition.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#USBDMOFF=<disable>,<seccode>

Configure DIAG channel of USB composition.

Parameters:

Name	Type	Default	Description
<disable>	integer	0	disable / enable DIAG channel
Values:			
0	:	Enable DIAG channel	
1	:	Disable DIAG channel	
<seccode>	string	-	Security Code, must be "Tws!!1"



QPST can't detect DIAG channel in disabling case.



AT#USBDMOFF?

Reports the current configured values.



AT#USBDMOFF=?

Returns the list of supported values.



Examples for this command

- Disable DIAG
AT#USBDMOFF=1,"Tws!!1"
OK
- Enable DIAG
AT#USBDMOFF=0,"Tws!!1"
OK

2.2.7.46. AT&Z - Store Telephone Number in the Internal Phonebook

The command stores a telephone number in the internal phonebook.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&Z<n>=<nr>

Execution command stores the telephone number <nr> in the record <n>.




Parameters:

Name	Type	Default	Description
<n>	integer	N/A	phonebook record

Value:

0-9 : record number

<nr>	string	-	telephone number (maximum length 24 digits)
------	--------	---	---

-  The module has a built-in non-volatile memory where 10 telephone numbers can be stored, each one having a maximum of 24 digits.
-  The records cannot be overwritten and must be cleared before rewriting. To delete the record <n>, issue the command **AT&Z<n>=<CR>**.
-  The records in the module memory can be viewed with the command **&N**, and the phone number stored in record <n> can be dialed using the **ATDS=<n>**.

2.2.7.47. AT&N - Display Internal Phonebook Stored Numbers

The command displays telephone numbers stored in the internal phonebook.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&N[<n>]


Execution command returns the telephone number stored at the <n> position in the internal memory.

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	phonebook record number

Value:

0÷9 : phonebook record number

-  If parameter <n> is omitted, then all the internal records are shown.

2.2.7.48. AT&V2 - Display Last Connection Statistics

The command displays last connection statistics.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V2

Execution command returns the last connection statistics and connection failure reason.



Example of connection statistics get with no connection and no error.

- **AT&V2**

```
TOTAL CONNECTION TIME      : 0:00:00
CONNECTION FAILURE REASON  : powered off
```

```
OK
```

2.2.7.49. AT&V0 - Display Current Configuration and Profile



The command displays current modem configuration and profile.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V0

Execution command returns all the modem configuration parameters settings.

-  This command is the same as **&V**, it is included only for backwards compatibility.
-  The row of information about CTS (C106) OPTIONS is in the output of **&V0** only for compatibility reasons and represents only a dummy value.

2.2.7.50. AT#FWSWITCH - Set Active Firmware Image

Set active modem firmware image and network configuration

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FWSWITCH=<config_num>[,<modem_fw>]

Set command allows to activate the specified modem FW image and network configuration.

Parameters:

Name	Type	Default	Description
<config_num>	integer	N/A	network configuration to be activated
Values:			
0	:		Rest of World. Generic GCF Config; Default Config
1	:		North America. Generic PTCRB Config
10	:		North America. AT&T Network Conifg
11	:		North America. T-Mobie Netowrk Config
12	:		North America. Verizon Wireless Network Config
30	:		Japan. NTT Docomo Network Config
31	:		Japan. KDDI Network Config
<modem_fw>	integer	N/A	modem FW image to be activated. If <modem_fw> is not specified, a current <modem_fw> will be configured.
Values:			
0	:		M0 modem FW
1	:		M1 modem FW
2	:		M2 modem FW

Additional info:

- ▶▶ Execution command lists the supported network configuration on modem FW in string format as below
 AT#FWSWITCH
 #FWSWITCH: <modem_fw>,<config_num>,"<config name string>",<config version string>
 ...
 #FWSWITCH: <modem_fw>,<config_num>,"<config name string>",<config version string>
 OK

- This AT command performs a system reboot.
- A current activated <config_num> and <modem_fw> maintained, even if new firmware updated.

**AT#FWSWITCH?**

Read command reports the current activated configuration in the following format

#FWSWITCH: <config_num>,<modem_fw>

**AT#FWSWITCH=?**

Test command reports the range of supported values for parameters <config_num> on <modem_fw>

#FWSWITCH: <config_num>,0 // the supported <config_num> on modem_fw - 0

#FWSWITCH: <config_num>,1 // the supported <config_num> on modem_fw - 1

#FWSWITCH: <config_num>,2 // the supported <config_num> on modem_fw - 2

OK



Example 1. switch to AT&T config in the M1 modem FW from GCF Generic config in the M0 modem FW

- Example 1


```
// Query current FW switch config
AT#FWSWITCH?
#FWSWITCH: 0,0
OK

// Switch to AT&T network config on M1 modem FW
AT#FWSWITCH=10,1
OK

// Show the supported network config list
AT#FWSWITCH
#FWSWITCH: 0,0,"Generic GCF",POL.000010
#FWSWITCH: 0,1,"Generic PTCRB",POL.010010
#FWSWITCH: 0,10,"AT&T",POL.100010
...
OK
```

2.2.7.51. AT#FWAUTOSIM - Automatic Carrier Switch By SIM

This command activates the automatic carrier switch functionality based on SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FWAUTOSIM=<mode>

Set command sets automatic carrier switch enable mode by SIM.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	automatic carrier switch mode by SIM

Values:

- 0 : Disable automatic carrier switch by SIM
- 1 : Enable automatic carrier switch by SIM
- 2 : Enable one-shot automatic carrier switch by SIM



If automatic carrier switch mode is enabled, the #FWSWITCH command will return **ERROR**.



AT#FWAUTOSIM?

Read command reports the current stored <mode>.

#FWAUTOSIM: <mode>

Additional info:

- ▶▶ automatic carrier switch mode by SIM

Name	Type	Default	Description
<mode>	integer	N/A	automatic carrier switch mode by SIM

Values:

- 0 : Disable automatic carrier switch by SIM
- 1 : Enable automatic carrier switch by SIM
- 2 : Enable one-shot automatic carrier switch by SIM
- 3 : Waiting enable one-shot automatic carrier switch by SIM



AT#FWAUTOSIM=?

Test command reports the supported range of values for parameter <mode>.

#FWAUTOSIM: (0-2)

2.2.7.52. AT#FWPLS - Firmware PLMN ID List

This command allows to read/add/remove the list of PLMN IDs for automatic carrier switch by SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FWPLS=<mode>[,<carrier_index>[,<sub_carrier_index>[,<mcc_mnc>]]]

Execution command reads/adds/removes the list of PLMN IDs for automatic carrier switch by SIM.

Parameters:

Name	Type	Default	Description
<mode>	integer	N/A	access mode
Values:			
	0	:	read
	1	:	add
	2	:	remove
<carrier_index>	integer	-	carrier index; refer the <config_num> parameter of #FWSWITCH .
<sub_carrier_index>	integer	0	sub carrier index
Values:			
	0	:	main carrier of <carrier_index>
	else	:	sub carrier of <carrier_index>
<mcc_mnc>	integer	-	MCC/MNC; 5 or 6 digits

Additional info:

- ▶▶ If **<mode>** is 0, the response format is:
#FWPLS: <carrier_index>,<carrier_name>
#FWPLS: <mcc_mnc 1>, <access_type>
 ...
#FWPLS: <mcc_mnc n>, <access_type>

Name	Type	Default	Description
<carrier_name>	string	-	carrier name
<access_type>	integer	N/A	access type

Values:

- 0 : read only (pre-defined MCC/MNC)
- 1 : read/write (user-defined MCC/MNC)

- ❗ If **<mode>** is 0 and **<carrier_index>** is omitted, the PLMN of all carriers is shown.
 If **<mode>** is 2 and **<mcc_mnc>** is set, the MCC/MNC is removed in selected carrier list.
 If **<mode>** is 2 and **<mcc_mnc>** is unset, the selected carrier list is deleted.

**AT#FWPLS?**

Read command returns the loaded carrier information in the format:

```
<carrier_index f>:<carrier_name>
...
<carrier_index n>:<carrier_name>
```

**AT#FWPLS=?**

Test command reports the supported range of values for parameters **<mode>**, **<carrier_index>**, **<sub_carrier_index>**, and the maximum length of **<mcc_mnc>**.



```
AT#FWPLS=0,12
#FWPLS: 12, VERIZON
#FWPLS: 310590, 0
#FWPLS: 310890, 0
#FWPLS: 311480, 0
#FWPLS: 311270, 0
#FWPLS: 312770, 0

OK
AT#FWPLS=1,12,0,123123
OK
AT#FWPLS=0,12
#FWPLS: 12, VERIZON
#FWPLS: 310590, 0
#FWPLS: 310890, 0
#FWPLS: 311480, 0
#FWPLS: 311270, 0
#FWPLS: 312770, 0
#FWPLS: 123123, 1

OK
AT#FWPLS=2,12,0,123123
OK
AT#FWPLS=0,12
#FWPLS: 12, VERIZON
#FWPLS: 310590, 0
#FWPLS: 310890, 0
#FWPLS: 311480, 0
#FWPLS: 311270, 0
#FWPLS: 312770, 0

OK
```

2.2.7.53. AT#CQI - HSDPA Channel Quality Indication

This command returns the channel quality indication of the <mode> parameter, which is PLMN mode bit in the CSP file with SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CQI

Execution command indicates channel quality indication in the form:

#CQI: <cqi>

Additional info:

▶▶ CQI values:

Name	Type	Default	Description
<cqi>	integer	N/A	Channel Quality indication

Values:

- 0÷30 : The value range for WCDMA. 1 (worst) – 30 (best)
- 0÷15 : The value range for LTE. 1 (worst) – 15 (best)
- 0 : out of range
- 31 : Unknown or not detectable



AT#CQI=?

Test command returns the supported range of values of the parameter <cqi>.



Will only work while socket is open and data transfer is active.
Working only with UTRAN and E-UTRAN (see +WS46).

2.2.7.54. AT#PDPAUTH - PDP Authentication Parameters

The set command specifies PDP authentication parameters values for a PDP context identified by the (local) context identification parameter **<cid>**.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PDPAUTH=<cid>,<auth_type>,[<username>],[<password>]]

Set command specifies PDP authentication parameters values for a PDP context identified by the (local) context identification parameter **<cid>**.

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	context identifier
Value:			
1÷max	:	specifies a particular PDP context definition. The value of max is returned by the Test command.	
<auth_type>	integer	0	authentication type
Values:			
0	:	no authentication	
1	:	PAP authentication	
2	:	CHAP authentication	
<username>	string	-	supplied by network provider. Required for <auth_type> = 1 and 2
<password>	string	-	supplied by network provider. Required for <auth_type> = 1 and 2.



AT#PDPAUTH?

Read command returns the PDP authentication parameters, excluding **<password>**, set for every PDP, in the format:

```
#PDPAUTH: <cid1>,<auth_type1>,<username1><CR><LF>
...
#PDPAUTH:<cidmax>,<auth_typemax>,<usernamemax><CR><LF>]]
```



AT#PDPAUTH=?

Test command reports the supported range of values for parameters **<cid>** and **<auth_type>** and the maximum allowed length of the string parameters **<password>** and **<username>**.

2.2.7.55. AT+IMEISV - Request IMEI and Software Version Number

This command returns the International Mobile Station Equipment Identity and Software Version Number.



3GPP TS 23.003

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+IMEISV

Execution command returns the International Mobile Station Equipment Identity and Software Version Number, identified as the IMEISV of the module.

Additional info:

- ▶▶ The IMEISV is composed of the following elements (each element shall consist of decimal digits only):
 - Type Allocation Code (TAC). Its length is 8 digits.
 - Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC. Its length is 6 digits.
 - Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.



AT+IMEISV=?

Test command returns **OK** result code.

2.2.7.56. AT#CGMM - Request Model Identification

This command returns the device model identification.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMM

Execution command returns the device model identification code, with command echo.

```
AT#CGMM
#CGMM: <code>
OK
```



AT#CGMM=?

Test command returns **OK** result code.

2.2.7.57. AT#QOSINTER - QMI Qos Flow Indication Interval

Set qos Flow Indication Interval value.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#QOSINTER=<interval>

Set command used to set qos flow indication interval.

After setting, UE sends QoS flow indicators to Host at given time interval.

Parameter:

Name	Type	Default	Description
<interval>	integer	0	qos interval in second unit

Values:

- 0 : Generating indicators whenever it happens
- 1÷10 : Periodic timer



It works after setting report_global_qos_flows to 1 with qos_indication_register_req (QMI_QOS_INDICATION_REGISTER_REQ_V01).

After setting, it periodically operates after receiving the first event (QOS_FLOW_ENABLED_V01 or QOS_FLOW_DISABLED_V01).



The default setting of 0 generates all qos flow indicators. When the non-zero value is set by the command, it operates on the basis of the timer.



AT#QOSINTER?

Read command returns the current interval value, in the format:

#QOSINTER: <interval>



AT#QOSINTER=?

Test command return the supported ranges.

2.2.8. S Parameters

2.2.8.1. ATS2 - Escape Character

The command manages the ASCII character used as escape character.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS2=<char>

Set command sets the ASCII character to be used as escape character.

Parameter:

Name	Type	Default	Description
<char>	integer	43	escape character decimal ASCII

Value:

43 : factory default value is '+'

- The escape sequence consists of three escape characters preceded and followed by **n** ms of idle (see **S12** to set **n**).
- This command only supports 43 for **<char>** parameter.



ATS2?

Read command returns the current value of **S2** parameter.

- The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.2. AT3 - Command Line Termination Character

The command manages the character configured as command line terminator.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT3=<char>

Set command sets the value of the character either recognized by the device as command line terminator and generated by the device as part of the header, trailer, and terminator for result codes and information text, along with **S4** parameter.

Parameter:

Name	Type	Default	Description
<char>	integer	13	command line termination character (decimal ASCII)

Value:

0÷127 : command line termination character

- i** The "previous" value of **S3** is used to determine the command line termination character for entering the command line containing the **S3** setting command. However, the result code issued shall use the "new" value of **S3** (as set during the processing of the command line)



AT3?

Read command returns the current value of **S3** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s

2.2.8.3. ATS4 - Response Formatting Character

The command manages the character generated by the device as part of the header, trailer, and terminator for result codes and information text.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS4=<char>

Set command sets the value of the character generated by the device as part of the header, trailer, and terminator for result codes and information text, along with the **S3** parameter.

Parameter:

Name	Type	Default	Description
<char>	integer	10	response formatting character (decimal ASCII)

Value:

0÷127 : response formatting character

- i** If the value of **S4** is changed in a command line the result code issued in response of that command line will use the new value of **S4**.



ATS4?

Read command returns the current value of **S4** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.4. AT5 - Command Line Editing Character

The command manages the value of the character recognized by the DCE as a request to delete from the command line the immediately preceding character.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT5=<char>

Set command sets the value of the character recognized by the device as a request to delete from the command line the immediately preceding character.

Parameter:

Name	Type	Default	Description
<char>	integer	8	command line editing character (decimal ASCII)

Value:

0÷127 : command line editing character



AT5?

Read command returns the current value of **S5** parameter.



The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.5. AT57 - Connection Completion Time-Out

This set command specifies the amount of time that the DCE shall allow between either answering a call (automatically or by the **ATA** command) or completion of signaling of call addressing information to network (dialing), and establishment of a connection with the remote DCE. If no connection is established during this time, the DCE disconnects from the line and returns a result code indicating the cause of the disconnection.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT57=<tout>

Set command sets the amount of time, in seconds, that the device shall allow between either answering a call(automatically or by A command) or completion of signaling of call addressing information to network (dialing), and establishment of a connection with the remote device.

Parameter:

Name	Type	Default	Description
<tout>	integer	60	defines time interval expressed in seconds

Value:

1÷255 : available range



AT57?

Read command returns the current value of **S7** parameter.



The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.6. ATS10 - Carrier Off with Firm Time

The command is available only for backward compatibility

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS10=<n>

Set command has no effect and is available only for backward compatibility with landline modems.

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	dummy

Value:

1÷255 : dummy parameter

2.2.8.7. ATS12 - Escape Prompt Delay

The command manages the prompt delay between two different escape characters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS12=<time>

Set command sets:

3. the minimum period, before receipt of the first character of the three escape character sequence, during which no other character has to be detected in order to accept it as valid first character;
4. the maximum period allowed between receipt of first or second character of the three escape character sequence and receipt of the next;
5. the minimum period, after receipt of the last character of the three escape character sequence, during which no other character has to be detected in order to accept the escape sequence as a valid one.

Parameter:

Name	Type	Default	Description
<time>	integer	50	delay expressed in fiftieth of a second

Value:

20÷255 : expressed in fiftieth of a second

- The minimum period **S12** has to pass after **CONNECT** result code too, before a received character is accepted as valid first character of the three escape character sequence.



ATS12?

Read command returns the current value of **S12** parameter.

- The format of the numbers in output is always 3 digits, left-filled with 0s

2.2.8.8. ATS25 - Delay to DTR Off

The command manages the amount of time that the device will ignore the **DTR**.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS25=<time>

Set command defines the amount of time, in hundredths of second, that the device will ignore the **DTR** for taking the action specified by command **&D**.

Parameter:

Name	Type	Default	Description
<time>	integer	5	expressed in hundredths of a second

Value:

0÷255 : expressed in hundredths of a second

- i** The delay is effective only if its value is greater than 5. To be recognized as valid, the **DTR** transition must be greater than **S25**. Low values could require a transition increased of a factor 1.5 to be correctly handled (e.g., to be sure that **S25=5** works, use a **DTR** toggle of 75ms to be detected).
- i** In power saving (e.g. **+CFUN=5** with **DTR** low) **DTR** must be off at least 3 seconds for taking the action specified by command **&D**, independently of **S25** parameter.



ATS25?

Read command returns the current value of **S25** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.9. AT30 - Disconnect Inactivity Timer

This command defines disconnect inactivity timer.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT30=<tout>

Set command defines the inactivity time-out in minutes. The device disconnects if no characters are exchanged for a time period of at least <tout> minutes.

Parameter:

Name	Type	Default	Description
<tout>	integer	0	expressed in minutes

Values:

- 0 : disabled, disconnection due to inactivity is disabled
- 1÷127 : inactivity time-out value



AT30?

Read command returns the current value of **S30 parameter**.

- The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.10. AT38 - Delay before Forced Hang Up

This command sets delay to before forced hang up.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT38=<delay>


Set command sets the delay, in seconds, between the device's receipt of **H** command (or **ON-to-OFF** transition of **DTR**) and the disconnect operation.

Parameter:

Name	Type	Default	Description
<delay>	integer	0	acknowledge timer in units of seconds

Value:

0÷255 : factory default value is 0

-  Set command has no effect and it included only for backward compatibility.



AT38?

Read command returns the current value of **S38 parameter**.

-  The format of the numbers in output is always 3 digits, left-filled with 0s.

2.2.8.11. AT&V1 - S Registers Display

The command displays the S registers values.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V1

Execution command returns the S registers values in both decimal and hexadecimal format. The response is in the form:

REG (S register)	DEC (value in dec. notation)	HEX (value in hex notation)
<reg0>	<dec>	<hex>
<reg1>	<dec>	<hex>
...
<regN>	<dec>	<hex>



Here is a generic example showing the format.

AT&V1

```

REG DEC HEX
000 000 000
001 000 000
002 043 02B
003 013 00D
004 010 00A
005 008 008
007 060 03C
012 050 032
...  ...  ...
...  ...  ...

OK

```

2.2.8.12. AT&V3 - Extended S Registers Display

The command displays the extended S registers values.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V3

Execution command returns the extended S registers values in both decimal and hexadecimal format. The response is in the form as shown in **AT&V1** command.



Here is a generic example showing the format.

AT&V3

```

REG  DEC  HEX
000  000  000
001  000  000
002  043  02B
003  013  00D
004  010  00A
005  008  008
007  060  03C
012  050  032
025  005  005
...   ...  ...
...   ...  ...

OK

```

2.2.9. DTE - Modem Interface Control

2.2.9.1. ATE - Command Echo

This command allows to enable or disable the command echo.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATE[<n>]

The execution command allows to enable/disable the command echo.

Parameter:

Name	Type	Default	Description
<n>	integer	1	Configuration value

Values:

- 0 : disables command echo
- 1 : enables command echo, hence command sent to the device are echoed back to the DTE before the response is given.



If parameter is omitted, the command has the same behavior of **ATE0**

2.2.9.2. ATQ - Quiet Result Codes

This command allows to enable or disable the result code.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATQ[<n>]

Set command enables or disables the result codes.

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables result codes

Values:

- 0 : enables result codes
- 1 : disables result codes. The commands entered after ATQ1 do not return the result code.
- 2 : disables result codes (only for backward compatibility). The commands entered after ATQ2 do not return the result code.



If parameter is omitted, the command has the same behavior of **ATQ0**.



After issuing **ATQ0** the **OK** result code is returned
AT+CGACT=?
+CGACT: (0-1)
OK

After issuing **ATQ1** or **ATQ2** the **OK** result code is not returned.
AT+CGACT=?
+CGACT: (0-1)

2.2.9.3. ATV - Response Format

This command allows to set format of information responses and result codes.



[1] ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATV[<n>]

Set command determines the contents of the header and trailer transmitted with result codes and information responses. It also determines if result codes are transmitted in a numeric form or an alphanumeric form (according to [1]).

Parameter:

Name	Type	Default	Description
<n>	integer	1	format of information responses and result codes. See Additional info section.

Values:

- 0 : limited headers and trailers and numeric format of result codes
- 1 : full headers and trailers and verbose format of result codes

Additional info:

<n>=0	
information responses	<text><CR><LF>
result codes	<numericCode><CR>
<n>=1	
information responses	<CR><LF> <text><CR><LF>
result codes	<CR><LF> <verboseCode><CR><LF>

- the <text> portion of information responses is not affected by this setting.
- if parameter is omitted, the command has the same behavior of **ATV0**

2.2.9.4. ATI - Identification Information

This command returns identification information.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATI[<n>]

Execution command returns product information.

Parameter:

Name	Type	Default	Description
<n>	integer	0	information request

Values:

- 0 : numerical identifier
- 1 : module checksum
- 2 : checksum check result
- 3 : manufacturer
- 4 : product name
- 5 : DOB version



If parameter is omitted, the command has the same behavior of **ATIO**

2.2.9.5. AT&C - Data Carrier Detect (DCD) Control

This command controls the DCD output behavior.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&C[<n>]

Set command controls the DCD output behavior of the serial port.

Parameter:

Name	Type	Default	Description
<n>	integer	1	DCD output behavior

Values:

- 0 : DCD remains always High
- 1 : DCD follows the Carrier detect status: if carrier is detected DCD goes High, otherwise DCD is Low
- 2 : DCD is always High except for 1 sec "wink" when a data call is disconnected



If parameter is omitted, the command has the same behavior of **AT&C0**.

2.2.9.6. AT&D - Data Terminal Ready (DTR) Control

This set command configures the behavior of the module according to the DTR control line transitions.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&D[<n>]

Set command configures the module behavior relative to the DTR signal transitions.

Parameter:

Name	Type	Default	Description
<n>	integer	0	defines the module behavior according to the DTR control line transitions

Values:

- 0 : DTR transitions are ignored by the module
- 1 : DTR drop from active to inactive: Change to command mode while retaining the connected data call
- 2 : DTR drop from active to inactive: Disconnect data call, change to command mode. During the inactive state of DTR auto answer is off

- If parameter is omitted, the command has the same behavior of **AT&D0**.
- URC message is sent only if DTR is ON, otherwise, URC message discarded.

2.2.9.7. ATQ - Standard Flow Control

This command controls the RS232 flow control behavior.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATQ[<n>]

Set command controls the RS232 flow control behavior.

Parameter:

Name	Type	Default	Description
<n>	integer	3	RS232 flow control behavior

Values:

- 0 : no flow control
- 3 : hardware bi-directional flow control (both RTS/CTS active) (factory default)



This command has no effect on USB interface. It's only used for UART interface.

2.2.9.8. AT&K - Flow Control

Flow Control settings.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&K[<n>]

Set command controls the serial port flow control behavior.

Parameter:

Name	Type	Default	Description
<n>	integer	3	flow control behavior

Values:

- 0 : no flow control
- 3 : hardware bi-directional flow control (both RTS/CTS active)

- i** If parameter is omitted, the command has the same behavior as **AT&K0**
- i** **&K** has no Read Command. To verify the current setting of **&K**, simply check the settings of the active profile issuing **AT&V**.
- i** It has no effect and is included only for backward compatibility with legacy modems.

2.2.9.9. AT&S - Data Set Ready (DSR) Control

Set DSR behavior on serial port

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&S[<n>]



Set command controls DSR behavior on serial port

Parameter:

Name	Type	Default	Description
<n>	integer	3	Configuration parameter

Values:

- 0 : Always High
- 1 : Follows carrier status
- 2 : High on DATA mode, Low on AT command mode
- 3 : Follows DTR status

-  If parameter is omitted, the command has the same behavior of **AT&S0**.
-  DSR behavior with AT&S1 work as DCD behavior with AT&C1.

2.2.9.10. AT+IPR - UART DCE Interface Data Rate Speed

The command sets the speed of the DTE serial port.



- [1] Hardware User's Guide of the used module
- [2] ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+IPR=<rate>

Set command specifies the **DTE** speed on UART interface;

Parameter:

Name	Type	Default	Description
<rate>	integer	115200	speed of the serial port expressed in bit per second

Values:

300	:	bps
600	:	bps
1200	:	bps
2400	:	bps
4800	:	bps
9600	:	bps
19200	:	bps
38400	:	bps
57600	:	bps
115200	:	bps
230400	:	bps
921600	:	bps
2900000	:	bps
3000000	:	bps
3200000	:	bps
4000000	:	bps



AT+IPR?

Read command returns the current value of <rate> parameter.



AT+IPR=?

Test command returns the list of supported auto detectable <rate> values and the list of fixed-only <rate> values in the format:

+IPR:(list of supported auto detectable **<rate>** values), (list of fixed-only **<rate>** values)



This command has no effect on **USB** interface; the DCE sends the **OK** result but the settings has no effect on serial interface

</>Test command example

AT+IPR=?

+IPR:

(),(300,600,1200,2400,4800,9600,19200,38400,57600,115200,230400,921600,2000000,2900000,3200000,3200000,3686400,4000000)

OK

2.2.9.11. AT+IFC - DTE-Modem Local Flow Control

This set command selects the flow control of the serial port in both directions.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+IFC=<byDTE>,<byDCE>

Set command selects the flow control behavior of the serial port in both directions: from DTE to modem (<byDTE> option) and from modem to DTE (<byDCE>)

Parameters:

Name	Type	Default	Description
<byDTE>	integer	2	specifies the method used by the DTE to control the flow of data received from the device (DCE)

Values:

- 0 : no flow control
- 2 : flow control by RTS control line (C105, Request to Send)

<byDCE>	integer	2	specifies the method used by the device (DCE) to control the flow of data received from the DTE
---------	---------	---	---

Values:

- 0 : no flow control
- 2 : flow control by CTS control line (C105, Clear to Send)

- The only possible commands are **AT+IFC=0,0** and **AT+IFC=2,2**.



AT+IFC?

Read command returns active flow control settings.

- AT&K is also used to set the flow control and it has the same effect with this command if flow control behavior had been set with AT&K command, The changed setting value by AT&K will return



AT+IFC=?

Test command returns all supported values of the parameters <byDTE> and <byDCE>.



This command has no effect on USB interface. It's only for UART interface

2.2.9.12. AT+ICF - DTE-Modem Character Framing

This set command defines the asynchronous character framing.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+ICF=<format>[,<parity>]

Set command defines the asynchronous character framing to be used when autobauding is disabled.

Parameters:

Name	Type	Default	Description
<format>	string	3	sets the number of Data bits and Stop bits. Only the <format>=3 is supported.
Value:			
3 : 8 Data, 1 Stop			
<parity>	string	0	This parameter is used for the backward compatibility. It's no meaningful.
Values:			
0 : odd			
1 : even			



AT+ICF?

Read command returns current settings for parameters <format> and <parity>.



AT+ICF=?

Test command returns the ranges of values for the parameters <format> and <parity>.



This command has no effect on USB interface. It's used only for UART interface.



```
AT+ICF=3
OK
```

```
AT+ICF=?
+ICF: (3),(0,1)
```

```
OK
```


2.2.9.13. ATX - Extended Result Codes

This command allows to select the subset of result code messages.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



ATX[<n>]

Set command selects the subset of result code messages the modem uses to reply to the DTE upon AT commands execution.

Parameter:

Name	Type	Default	Description
<n>	integer	1	configuration value

Values:

- 0 : when entering in dial mode a CONNECT result code is relayed; see Additional info.
- 1÷4 : when entering in dial mode a CONNECT <text> result code is relayed, see Additional info.

Additional info:

- ▶▶ <n>=0
OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER result codes are enabled. Dial tone and busy detection (**NO DIALTONE** and **BUSY** result codes) are disabled.

<n>=1-4
all the remaining result codes are enabled.

- ⓘ When the <n> parameter is omitted, the command acts like **ATX0**.

- ⓘ Current value is returned by **AT&V**.

Parameter:

<n>

- 0 - EXTENDED MESSAGES : X0=NO
- 1..4 - EXTENDED MESSAGES : X1=YES



For complete control on **CONNECT** response message see also **+DR** command.

2.2.9.14. AT#NOPT - Notification Port

Set notification (URC) message port

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#NOPT=<num>

Set command specifies the port output notification (URC) messages

Parameter:

Name	Type	Default	Description
<num>	integer	0	Notification(URC) port

Values:

- 0 : All Ports; URC messages are sent to all ports
- 1 : Telit USB Modem 1 Port
- 2 : Telit USB Modem 2 Port
- 3 : Telit USB Aux port

- URC messages sent out only on the configured ports by this command
- DTE must enable DTR line to get URC messages on Telit USB ports, otherwise URC message will be discarded.



AT#NOPT?

Read command reports the current notification port.



AT#NOPT=?

Test command reports the available range of values for parameter <num>.

2.2.9.15. AT#NOPTXT - Notification Port Extension

Set notification extension port

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#NOPTXT=<noptxt_enable>[,<port1_enable>,<port2_enable>,<port3_enable>]]]

Set command specified the port output notification (URC) messages

This command is extended from AT#NOPT command.

Unlike AT#NOPT, this command allow to specify a number of ports URC message print out

Parameters:

Name	Type	Default	Description
<noptxt_enable>	integer	0	enable #NOPTXT
Values:			
0 : Disable #NOPTXT command set			
1 : Enable #NOPTXT command set			
<port1_enable>	integer	N/A	enable port1 - Telit USB Modem 1 port
Values:			
0 : disable URC message on port1			
1 : enable URC message on port1			
<port2_enable>	integer	N/A	enable port2 - Telit USB Modem 2 port
Values:			
0 : disable URC message on port2			
1 : enable URC message on port2			
<port3_enable>	string	N/A	enable port3 - Telit USB AUX port
Values:			
0 : disable URC message on port3			
1 : enable URC message on port3			

if <noptxt_enable> is enable, #NOPT's setting value ignored and URC message port specified by #NOPTXT setting value.



AT#NOPTXT?

Read command show current <mode> on all notification(URC) port in the following format

#NOPTXT: <noptxt_enable>,<port1_enable>,<port2_enable>,<port3_enable>

**AT#NOPTXT=?**

Test command returns the list of supported values in the following format

#NOPTXT: (0,1),(<port1_descr>,(0,1)),(<port2_descr>,(0,1)),...

<portn_descr>:

1. "USB_MDM1" - Telit USB Modem 1 Port
2. "USB_MDM2" - Telit USB Modem 2 Port
3. "USB_AUX" - Telit USB Aux Port



DTE must enable DTR line to get URC messages on Telit USB ports, otherwise URC message will be discarded



This command enable URC message on "Telit USB Modem1 Port" and "Telit USB Modem2 Port"

- AT#NOPTXT=1,1,1,0
OK

2.2.9.16. AT\R - Ring (RI) Control

This command allows the user to control the **RING** output pin behaviour.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT\R[<n>]

Set command controls the **RING** output pin behaviour.

Parameter:

Name	Type	Default	Description
<n>	integer	1	RING pin behaviour

Values:

- 0 : RING on during ringing and further connection
- 1 : RING on during ringing
- 2 : RING follows the ring signal



If the parameter is omitted, the command has the same behaviour of **AT\RO**.



To check the ring option status use the **&V** command.

2.2.10. Call (Voice and Data) Control

2.2.10.1. ATD - Dialup Connection

This command establishes a Mobile Originated call to the destination phone number.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	Yes	-	2



ATD

The **ATD** execution command can assume different formats, which are described in the following Additional info section.

Additional info:

►► **ATD<number>[;]**

If ";" character is present, a voice call is performed using the phone number given as parameter.

Name	Type	Default	Description
<number>	string	-	phone number to be dialed Accepted characters are 0-9 and *,#, "A", "B", "C", "D", "+". For backwards compatibility with landline modems, modifiers "T", "P", "R", ",", "W", "!", "@" are accepted, but have no effect.

►► **ATD*<gprs_sc>[*<addr>][*<L2P>][*<cid>]]#**

This command is specific for GPRS functionality, and causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

Name	Type	Default	Description
<gprs_sc>	integer	N/A	is the GPRS Service Code, which identifies a request to use the GPRS communication
Value:			
	99	:	GPRS Service Code
<addr>	string	-	identifies the called party in the address space applicable to the PDP.
<L2P>	string	-	for communications software that does not support arbitrary characters in the dial string, the following numeric equivalents shall be used: 1 is equivalent to PPP.

<cid>	integer	-	PDP context definition, see +CGDCONT command
--------------------	---------	---	---

2.2.10.2. ATA - Answer Incoming call

The command is used to answer to an incoming call if automatic answer is disabled.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



ATA

Execution command informs the DCE that answer sequence must be started if automatic answer is disabled.

- i This command must be the last in the command line and must be followed immediately by a <CR> character.
- i Data only products do not start the call and command answer is **ERROR** if a voice call is requested.

2.2.10.3. ATH - Hang Up/Disconnect the Current Call

This execution command hangs up/disconnects the current voice/data call or dial-up.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATH



When a data call or a dial-up is active the device is in on-line mode hence, to execute **ATH** command the device must be previously turned in command mode using the escape sequence or, if **&D1** option is active, typing Low the DTR pin.

2.3. Network

2.3.1. AT+CNUM - Subscriber Number

This command returns the MSISDN (if the phone number of the device has been stored in the SIM card).



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CNUM

Execution command returns the MSISDN (if the phone number of the device has been stored in the SIM card) in the following format:

+CNUM: <alpha>,<number>,<type>[<CR><LF>

+CNUM: <alpha>,<number>,<type>[...]]

The parameters are described in the Additional info section.

Additional info:

- ▶▶ List of the parameters meaning.

Name	Type	Default	Description
<alpha>	string	-	alphanumeric string associated to <number> ; The character set depends on the value set with +CSCS .
<number>	string	-	numeric string containing the phone number in the format <type>
<type>	integer	N/A	type of number

Values:

129	:	national numbering scheme
145	:	international numbering scheme (contains the character "+")



AT+CNUM=?

Test command returns the **OK** result code.

2.3.2. AT+COPN - Read Operator Names

This command read operator names.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+COPN

Execution command returns the list of operator names from the ME in the format:

+COPN: <numeric1>,<alpha1>[<CR><LF>

+COPN: <numeric2>,<alpha2>[...]]

The parameters are described in the Additional info section.

Additional info:

- ▶▶ List of the parameters meaning.

Name	Type	Default	Description
<numeric>	string	-	operator in numeric format, see +COPS .
<alphan>	string	-	operator in long alphanumeric format, see +COPS .

- i** Each operator code <numeric> that has an alphanumeric equivalent <alphan> in the ME memory is returned.
- i** Because <alphan> display to depend on character set (**+CSCS**), <alphan> may not be displayed properly.



AT+COPN=?

Test command returns the **OK** result code.

2.3.3. AT+CREG - Network Registration Status

The command enables/disables the network registration unsolicited result code (URC) and selects its presentation format.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CREG=[<mode>]

Set command enables/disables the network registration unsolicited result code and selects one of the two available formats:

short format: **+CREG: <stat>**

long format: **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]**

The parameter meanings are shown in Unsolicited code value section.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code and selects one of the two formats: short or long format. URC short format is displayed every time there is a change in the network registration status. URC long format is displayed every time there is a change of the network cell.

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and selects the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)

Unsolicited fields:

Name	Type	Description
<stat>	integer	network registration status of the module

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to
- 3 : registration denied
- 4 : unknown
- 5 : registered, roaming

<lac>	string	the parameter reports: 6. Local Area Code when <AcT> =0 7. Tracking Area Code when <AcT> =7
<ci>	string	Cell Id for the currently registered on cell
<AcT>	integer	access technology of the registered network Values: 0 : GSM 2 : UTRAN 7 : E-UTRAN

<lac>, **<ci>** and **<AcT>** network information is reported by URC only if **<mode>**=2, and the module is registered on some network cell.



AT+CREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the network information (**<lac>**, **<ci>** and **<AcT>**) according to the used **<mode>** parameter value.

+CREG: <mode>,<stat>[,<lac>,<ci>[,<AcT>]]

<lac>, **<ci>**, and **<AcT>** network information is reported only if **<mode>**=2 and the module is registered on some network cell.



AT+CREG=?

Test command returns supported values for parameter **<mode>**.



Check the registration status of the module.

AT+CREG?

+CREG: 0,2

OK

The module is in network searching state

...

...

Check again module status

AT+CREG?

+CREG: 0,1

OK

The module is registered

2.3.4. AT+CLCK - Facility Lock/Unlock

This command is used to lock, unlock, or interrogate a MT or a network facility.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]

Set command is used to lock, unlock, or interrogate a MT or a network facility.

Parameters:

Name	Type	Default	Description
<fac>	string	N/A	facility

Values:

- "AB" : All Barring services (applicable only for <mode>=0)
- "AC" : All inComing barring services (applicable only for <mode>=0)
- "AG" : All outGoing barring services (applicable only for <mode>=0)
- "AI" : BAIC (Barr All Incoming Calls)
- "AO" : BAOB (Barr All Outgoing Calls)
- "IR" : BIC-Roam (Barr Incoming Calls when Roaming outside the home country)
- "OI" : BOIC (Barr Outgoing International Calls)
- "OX" : BOIC-exHC (Barr Outgoing International Calls except to Home Country)
- "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)
- "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
- "PU" : network sUbsset Personalization
- "PP" : service Provider Personalization
- "PC" : Corporate Personalization
- "PF" : lock Phone to the very First inserted SIM/UICC card (also referred in the present document as PHFSIM) (MT asks password when other than the first SIM/UICC card is inserted)

<mode>	integer	N/A	defines the operation to be done on the facility
--------	---------	-----	--

Values:

- 0 : unlock
- 1 : lock

2 : query status

<passwd>	string	-	shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD
<class>	integer	7	a sum of integers each representing a class of information 1: voice(telephony) 2: data 4: fax (facsimile services) 8: short message service 16: data circuit sync 32: data circuit async 64: dedicated packet access 128: dedicated PAD access

Value:

1÷255 : 1..255

Additional info:

- ▶▶ When **<mode>=2** and command is successful:
+CLCK: <status>[,<class1>[<CR><LF>
+CLCK: <status>,<class2>[...]]

Name	Type	Default	Description
<status>	integer	N/A	the status of the facility

Values:

0 : not active
1 : active



AT+CLCK=?

Test command reports all the facilities supported by the device.



Querying such a facility returns an output on three rows, the first for voice, the second for data, the third for fax:

```
AT+CLCK="AO",2
+CLCK: <status>,1
+CLCK: <status>,2
+CLCK: <status>,4
OK
```

2.3.5. AT+CPWD - Change Facility Password

This command is used to change the password for the facility lock function defined by command Facility Lock +CLCK.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	Yes	-	2



AT+CPWD=<fac>,<oldpwd>,<newpwd>

Action command sets a new password for the facility lock function defined by command Facility Lock +CLCK.

Parameters:

Name	Type	Default	Description
<fac>	string	N/A	facility
Values:			
"AB"	:	All Barring services	
"AC"	:	All inComing barring services	
"AG"	:	All outGoing barring services	
"AI"	:	BAIC (Barr All Incoming Calls)	
"AO"	:	BAOC (Barr All Outgoing Calls)	
"IR"	:	BIC-Roam (Barr Incoming Calls when Roaming outside the home country)	
"OI"	:	BOIC (Barr Outgoing International Calls)	
"OX"	:	BOIC-exHC (Barr Outgoing International Calls except to Home Country)	
"SC"	:	SIM (PIN request)	
"P2"	:	SIM PIN2	
"PN"	:	Network Personalization	
"PU"	:	network sUbset Personalization	
"PP"	:	service Provider Personalization	
"PC"	:	Corporate Personalization	
"PF"	:	lock Phone to the very First inserted SIM/UICC card (also referred in the present document as PHFSIM) (MT asks password when other than the first SIM/UICC card is inserted)	
<oldpwd>	string	-	It shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD.
<newpwd>	string	-	new password; maximum length of password can be determined with <pwdlength>

**AT+CPWD=?**

Test command returns a list of pairs (<fac>,<pwdlength>) which present the available facilities and the maximum length of their password.

Additional info:

- ▶▶ the available facilities and the maximum length of their password

Name	Type	Default	Description
<fac>	string	-	facility
<pwdlength>	integer	-	maximum length of the password for the facility

2.3.6. AT+CPOL - Preferred Operator List

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



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPOL=[<index>] [,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>,<E_UTRAN_AcTn>]]]

Execution command writes an entry in the SIM list of preferred operators.

Parameters:

Name	Type	Default	Description
<index>	integer	N/A	The order number of operator in the SIM preferred operators.
	Value:		
	1÷n	:	order number in the list
<format>	integer	N/A	
	Values:		
	0	:	Long format alphanumeric <oper>
	1	:	Short format alphanumeric <oper>
	2	:	Numeric <oper>
<oper>	string	-	<format> indicates if the format is alphanumeric or numeric
<GSM_AcT>	integer	N/A	GSM access technology.
	Values:		
	0	:	access technology not selected
	1	:	access technology selected
<GSM_Compact_AcT>	integer	N/A	GSM compact access technology
	Values:		
	0	:	access technology not selected
	1	:	access technology selected
<UTRAN_AcT>	integer	N/A	UTRA access technology
	Values:		
	0	:	access technology not selected
	1	:	access technology selected
<E_UTRAN_AcTn>	integer	N/A	E-UTRAN access technology

Values:

- 0 : access technology not selected
 - 1 : access technology selected
-

- i** If **<index>** given but **<oper>** left out, the entry deleted.
If **<oper>** given but **<index>** left out, **<oper>** put in the next free location.
If only **<format>** given, the format of the **<oper>** in the read command changes.
 - i** The user controlled PLMN could not be read/wrote/returned values and range on some SIM like AT&T when **#CPLS** is 0 because the EF_PLMNwACT field does not exist.
 - i** The module which does not have the GSM access technology cannot support **<GSM_Act>** and **<GSM_Compact_Act>**.
-



AT+CPOL?

Read command returns all used entries from the SIM list of preferred operators.



AT+CPOL=?

Test command returns the whole **<index>** range supported by the SIM and the range for the parameter **<format>**

2.3.7. AT+CPLS - Selection of Preferred PLMN List

The command is used to select a list of preferred PLMNs in the SIM/USIM card.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CPLS=<list>

Set command 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.

Parameter:

Name	Type	Default	Description
<list>	integer	0	PLMNs list selector

Values:

- 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

- The value set by command is directly stored in NVM and doesn't depend on the specific CMUX instance.
- If trying to set + CPLS which is not in supported range, an error would be returned.



AT+CPLS?

Read command returns the selected PLMN selector **<list>** from the SIM/USIM.



AT+CPLS=?

Test command returns the whole index range supported **<list>s** by the SIM/USIM.

2.3.8. AT+CSQ - Signal Quality

Execution command returns received signal strength indication **<rssi>** and channel bit error rate **<ber>** from the MT.



3GPP TS 27.007
3GPP TS 25.133

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSQ

See Additional info sections.

Additional info:

▶▶ [3G Networks](#)

The execution command returns the following message:

+CSQ: <rssi>,<ecio>

Name	Type	Default	Description
<rssi>	integer	N/A	measurements of the radio signal power, expressed in dBm, are mapped to <rssi> as shown below

Values:

0	:	-113 dBm or less
1	:	-111 dBm
2÷30	:	-109 dBm ... -53 dBm; 2 dBm per step
31	:	-51 dBm or greater
99	:	not known or not detectable

<ecio>	integer	N/A	Chip energy per total wideband power in dBm. For <ecio> levels are mapped to range 0...7.
---------------------	---------	-----	---

Values:

0	:	-1...0
1	:	-5...-2
2	:	-8...-6
3	:	-11...-9
4	:	-15...-12
5	:	-18...-16
6	:	-22...-19
7	:	-24...-23
99	:	not known or not detectable

►► 4G Networks

The execution command returns the following message:

+CSQ: <rsqi>,<rsrq>

Name	Type	Default	Description
<rsqi>	integer	N/A	Received Signal Strength Indication. For <rsqi> to be compliant with 3GPP TS27.007 specification, levels are mapped to range 0...31.
Values:			
0	:	-113 dBm or less	
1	:	-111 dBm	
2÷30	:	-109...-53 dBm	
31	:	- 51 dBm or greater	
99	:	not known or not detectable	
<rsrq>	integer	N/A	Reference Signal Received Quality. For <rsrq> levels are mapped to range 0...7.
Values:			
0	:	-4...-3 dBm	
1	:	-6...-5 dBm	
2	:	-8...-7 dBm	
3	:	-10...-9 dBm	
4	:	-13...-11 dBm	
5	:	-15...-14 dBm	
6	:	-17...-16 dBm	
7	:	-19...-18 dBm	
99	:	not known or not detectable	

i For UMTS, the current radio signal strength indicates CPICH RSCP in levels.

i For UMTS, radio signal quality CPIC Ec/Io range -24dB to 0dB is scaled to 0 to 7.



AT+CSQ=?

Test command returns values supported as compound values.

2.3.9. AT#SERVINFO - Serving Cell Information

This command reports serving cell information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2

AT#SERVINFO

Execution command reports information about serving cell. The information and the format of the returned message depends on the network type.

GSM network

#SERVINFO:<BARFCN>,<dBM>,[<NetNameAsc>],<NetCode>,<BSIC>,<LAC>,<TA>,<GPRS>[,<PBARFCN>],[<NOM>],<RAC>,[PAT]]

LTE network

#SERVINFO:<EARFCN>,<dBM>,[<NetNameAsc>],<NetCode>,<PhysicalCellId>,<TAC>,<DRX>,<SD>,<RSRP>

The parameters are described in the Additional info sections.

Additional info:

▶▶ Parameters meaning.

Name	Type	Default	Description
<dBM>	integer	-	received signal strength in dBm.
<NetNameAsc>	string	-	operator name, quoted string or "" if network name is unknown.
<NetCode>	hex	-	country code and operator code.
<LAC>	integer	-	Localization Area Code
<BSIC>	string	-	Base Station Identification Code
<TA>	integer	-	Time Advance: it is available only if a GSM or GPRS is running.
<GPRS>	integer	0	GPRS supported in the cell
Values:			
	0	:	not supported
	1	:	supported
<BARFCN>	integer	-	BCCH ARFCN of the serving cell

▶▶ Parameters meaning.

Name	Type	Default	Description
<NOM>	string	N/A	Network Operator Mode.
Values:			

- I : Network Mode I
- II : Network Mode II
- III : Network Mode III

<RAC>	integer	-	Routing Area Color Code.
<URA>	integer	-	UTRAN Registration Area Identity

►► Parameters meaning.

Name	Type	Default	Description
<DRX>	integer	-	Discontinuous reception cycle length.
<SD>	integer	N/A	Service Domain
Values:			
	0	:	No Service
	1	:	CS only
	2	:	PS only
	3	:	CS & PS
<RSCP>	integer	-	Received Signal Code Power in dBm.
<EARFCN>	integer	-	LTE Assigned Radio Channel
<PhysicalCellId>	integer	-	Physical Cell ID
<TAC>	integer	-	Tracking Area Code
<RSRP>	integer	-	Reference Signal Received Power

►► Parameters meaning.

Name	Type	Default	Description
<PBARFCN>	integer	-	Not supported by 3GPP. PBCCH ARFCN of the serving cell; it is printed only if PBCCH is supported by the cell, otherwise the label " hopping " will be printed
<PAT>	integer	N/A	Priority Access Threshold.
Values:			
	0	:	Priority Access Threshold
	3÷6	:	Priority Access Threshold

AT#SERVINFO=?

Test command returns **OK** result code.

2.3.10. AT#BCCHLOCK - Lock to Single BCCH ARFCN

This command enables/disable single BCCH ARFCN locking.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#BCCHLOCK=<LockedBcch>[,<LockedUarfcn>[,<LockedPsc>[,<LockedEarfcn>[,<LockedPci>]]]]

This command allows to set a single BCCH ARFCN (also UARFCN and EARFCN) the device must be locked to, selectable within those allowed for the specific product.

Parameters:

Name	Type	Default	Description
<LockedBcch>	integer	1024	enable/disable 2G BCCH locking
Values:			
1024	:	disable	
0÷124	:	enable on GSM 900MHz	
975÷1023	:	enable on GSM 900MHz	
512÷885	:	enable on DCS 1800MHz	
128÷251	:	enable on GSM 850MHz	
512÷810	:	enable on PCS 1900MHz	
<LockedUarfcn>	integer	0	enable/disable 3G BCCH locking
Values:			
0	:	disable	
712÷10838	:	enable on downlink UARFCN in UMTS supported bands (some values in range 712-10838 are not supported according to product band configuration).	
<LockedPsc>	integer	65535	enable/disable 3G BCCH locking Primary Scrambling Code selection
Values:			
65535	:	disable	
0÷511	:	Primary Scrambling Code	
<LockedEarfcn>	integer	0	A number in the range 0-68935 representing the earfcn to search. A value of 0 will remove the earfcn restriction and any associated Physical Cell ID lock.
Values:			
0	:	disable	
0÷68935	:	enable on downlink EARFCN in LTE supported bands (some values in range 0-68935 are not supported according to product band configuration).	
<LockedPci>	hex	0	E-UTRAN physical cell ID in hexadecimal format. Valid range 0 - 1F7. If the value 0 of <LockedEarfcn> is input, this value would be 0.

Values:

0 : Physical cell id
 0÷1F7 : Physical cell id

- i** The values set by command are directly stored in NVM and need to be reboot for lock and unlock function.
- i** Note that the use of **<LockedPsc>** must be used with **<LockedUarfcn>** and never use **<LockedPsc>** alone. In other words, if **<LockedUarfcn>** is 0, **<LockedPsc>** must not have a specific value other than 65535. If you set **<LockedPsc>** alone, the problems of 3G search or attach procedure should be happened. However, make it to 65535(disable) alone is possible regardless of **<LockedUarfcn>**.
- i** It is not possible to lock to a 2G BCCH and a 3G BCCH at the same time.
- i** If selected locked 3G BCCH is not available, the module will be out of GSM/GPRS/UMTS network service even for emergency calls and will not select an alternative BCCH.
- i** If selected locked 2G BCCH is not in power scan list, the locking function does not work and normal cell selection is performed.
- i** If selected locked BCCH is available but the module is not allowed to register to the corresponding PLMN, the module will be able to perform only emergency calls and will not select an alternative BCCH.
- i** If selected locked 2G/3G BCCH is available, the module, in idle and in GPRS/UMTS data transfer, will not perform reselection to another cell/ARFCN or UARFCN.
- i** If selected locked 2G BCCH is available, the module, in GSM data transfer (voice call, data call, sms), will not perform handover to another cell.
- i** If selected locked 3G BCCH is available, the module, in UMTS connection, will not perform handover to another cell/UARFCN.
- i** If locked 3G BCCH is set through **<LockedUarfcn>**, the 3G rat is fixed. It means **+WS46** cannot be used for moving another RAT. If **<LockedUarfcn>** is set to 0(disable), the **+WS46** would return to the previously value.
- i** **#BCCHLOCK** setting implies a RAT selection, that is why it is not recommended to use this command together with **+WS46**.
- i** **#BCCHLOCK** setting has higher priority than PLMN selection, that is why it is not recommended to use this command together with manual PLMN selection **+COPS=1**.
- i** In the situation that LTE locked function is used so certain frequency and PCI should be fixed, if the handover event comes down from the network or it is in poor signal strength environment, the RLF may occur continuously. Also, event if reselection event is happened on itself, it cannot move another cells or frequencies. So, this function should be used carefully.
- i** The locking PSC feature related on **<LockedPsc>** is not supported on this module.



AT#BCCHLOCK?

Read command reports the currently stored parameter

<LockedBcch>,**<LockedUarfcn>**,**<LockedPsc>**,**<LockedEarfcn>** and **<LockedPci>** in the format:

#BCCHLOCK: <LockedBcch>,<LockedUarfcn>,<LockedPsc>,<LockedEarfcn>,<LockedPci>

-  If <LockedEarfcn> is set to 0, the related EFS would be removed so <LockedPci> always returned 0 even if its value was input.

 **AT#BCCHLOCK=?**

Test command reports the supported range of values for parameter <LockedBcch>,<LockedUarfcn>,<LockedPsc>,<LockedEarfcn> and <LockedPci>.

2.3.11. AT#BND - Select Band

This command selects RF frequency bands

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#BND=<GSM_band>[,<UMTS_band>[,<LTE_band>[,<LTE_band_ext>]]]

Set command selects the current WCDMA and LTE bands.

Parameters:

Name	Type	Default	Description
<GSM_band>	integer	0	GSM band selection.
Values:			
0	:	GSM 900MHz + DCS 1800MHz	
1	:	GSM 900MHz + PCS 1900MHz	
2	:	GSM 850MHz + DCS 1800MHz	
3	:	GSM 850MHz + PCS 1900MHz	
4	:	GSM 900MHz + DCS 1800MHz + PCS 1900MHz	
5	:	GSM 850MHz + GSM 900MHz + DCS 1800MHz + PCS 1900MHz	
<UMTS_band>	integer	18	WCDMA band selection.
Values:			
0	:	2100MHz (FDD I)	
1	:	1900MHz (FDD II)	
2	:	850MHz (FDD V)	
3	:	2100MHz (FDD I) + 1900MHz (FDD II) + 850MHz (FDD V)	
4	:	1900MHz (FDD II) + 850MHz (FDD V)	
5	:	900MHz (FDD VIII)	
6	:	2100MHz (FDD I) + 900MHz (FDD VIII)	
7	:	1700MHz (FDD IV)	
8	:	2100MHz (FDD I) + 850MHz (FDD V)	
9	:	2100MHz (FDD I) + 900MHz (FDD VIII) + 850MHz (FDD V)	
10	:	1900MHz (FDD II) + 1700MHz (FDD IV) + 850MHz (FDD V)	
11	:	2100MHz (FDD I) + 1900MHz (FDD II) + 1700MHz (FDD IV) + 850MHz (FDD V) + 900MHz (FDD VIII)	
17	:	2100MHz (FDD I) + 1900MHz (FDD II) + 900MHz (FDD VIII)	
18	:	2100MHz (FDD I) + 1900MHz (FDD II) + 1700MHz (FDD IV) + 850MHz (FDD V) + 900MHz (FDD VIII) + JAPAN1800(FDD IX) + JAPAN800(FDD XIX)	
<LTE_band>	hex	N/A	Indicates the LTE supported bands expressed as the sum of Band number (1+2+8 ...) calculated as shown in the table (mask of 64 bits):

Band number(Hex)	Band i
0	disable
1	B1
2	B2
4	B3
8	B4
...	...
80000000	B32
...	...
800000000000	B48

Value:

0-87A03B0F38DF : range of the sum of Band number (1+2+4 ...)

<LTE_band_ext> hex N/A Indicates the LTE supported bands from B65 expressed as the sum of Band number (1+2+8 ...) calculated as shown in the table (mask of 64 bits):

Band number(Hex)	Band i
0	disable
2	B66
40	B71

Value:

0-42 : range of the sum of Band number (2+40)

- i** This setting is maintained even after power off. **<GSM_band>**, **<UMTS_band>** parameters are decimal value. **<LTE_band>** and **<LTE_band_ext>** parameters are hex format value and band set should be entered in HEX format without "0x".
- i** The **<LTE_band>** and **<LTE_band_ext>** cannot be set to 0 at the same time.
- i** This module use fixed unused value 0 for **<GSM_band>** parameter. For any variants which cannot support WCDMA, the **<UMTS_band>** is fixed unused value 0.
- i** Supported band for each network provider.

<GCF>

LTE : 1,2,3,4,6,7,8,12,13,14,17,18,19,20,25,26,28,29,30,38,39,40,41,42,43,48,66,71

WCDMA : 1,2,4,5,8,9,19

GSM : Not Supported

<PTCRB>

LTE : 1,2,3,4,6,7,8,12,13,14,18,19,20,25,26,28,29,30,38,39,40,41,42,43,48,66,71

WCDMA : 1,2,4,5,8,9,19

GSM : Not Supported

<ATT/TMO/VZW>

LTE : 2,4,5,7,12,13,25,29,30,41,66,71

WCDMA : 1,2,4,5,8,9,19

GSM : Not Supported

<KDDI/NTT>

LTE : 1,3,5,7,8,28,38,39,40,41

WCDMA : 1,2,4,5,8,9,19
GSM : Not Supported

**AT#BND?**

Read command returns the current selected band in the format:
#BND: <band>,<UMTS_band>,<LTE_band>,<LTE_band_ext>

**AT#BND=?**

Test command returns the supported range of values of parameters **<band>**,
<UMTS_band>,**<LTE_band>** and **<LTE_band_ext>**.



```
at#bnd=?  
#BND: (0),(0-11,17,18),(87A03B0F38DF),(42)
```

```
OK  
at#bnd?  
#BND: 0,18,87A03B0F38DF,42
```

```
OK  
at#bnd=?  
#BND: (0),(0-11,17,18),(87A03B0F38DF),(42)
```

```
OK  
at#bnd=0,11,38DF,2  
OK  
at#bnd?  
#BND: 0,11,38DF,2
```

```
OK
```

2.3.12. AT+CEMODE - Set Mode of Operation for EPS

This command used to configure the mode of operation for EPS.



3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CEMODE=[<mode>]

This set command configures the mode of operation for EPS.

Parameter:

Name	Type	Default	Description
<mode>	integer	2	mode of operation. The default value depends on product. UE modes of operation can be found in 3GPP TS 24.301. Other values are reserved and will result in an ERROR response to the set command.

Values:

- 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



AT+CEMODE?

Read command returns the current value of parameter <mode> in the format:

+CEMODE: < mode >

- The read command will return right values after set command, but effectively the mode of operation changes after power cycle.



AT+CEMODE=?

Test command returns the supported range of values of parameters <mode>.



```
Set EPS mode
AT+CEMODE=1
OK
```

```
Check EPS mode
AT+CEMODE?
+CEMODE: 1
OK
```

2.3.13. AT+CPNER - Primary Notification Event Reporting

This command enables/disables reporting of primary notification events received from the network.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CPNER=[<reporting>]

This command enables/disables reporting of primary notification events with the following unsolicited result code.

+CPNERU: <message_identifier>,<serial_number>,<warning_type>

Primary notification events used for public warning systems like *ETWS (Earthquake and Tsunami Warning Systems)*.

Parameter:

Name	Type	Default	Description
<reporting>	integer	1	Controlling reporting of primary notification events.

Values:

- 0 : Disable primary notification events.
- 1 : Enable reporting of primary notification events without security information, unsolicited result code(default)

Unsolicited fields:

Name	Type	Description
<message_identifier>	string	string type in hexadecimal character format. The parameter contains the message identifier (2 bytes) of the primary notification.
<serial_number>	string	string type in hexadecimal character format. The parameter contains the serial number (2 bytes) of the primary notification.
<warning_type>	string	string type in hexadecimal character format. The parameter contains the warning type (2 bytes) of the primary notification.



AT+CPNER?

Read command reports the current value of the parameter.



AT+CPNER=?

Test command returns supported of parameter.



```
AT+CPNER?
+CPNER: 1
OK
```


2.3.14. AT+CESQ - Extended Signal Quality

Execution command returns received signal quality parameters.



- [1] 3GPP TS 27.007
- [2] 3GPP TS 45.008
- [3] 3GPP TS 25.133
- [4] 3GPP TS 36.133

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CESQ

Execution command reports received signal quality parameters in the form:

+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>

Additional info:



Name	Type	Default	Description
<rxlev>	integer	N/A	Received signal strength level (see 3GPP TS 45.008 subclause 8.1.4)
Values:			
0	:	rsi < -110 dBm	
1	:	-110 dBm ≤ rsi < -109 dBm	
2	:	-109 dBm ≤ rsi < -108 dBm	
...	:	...	
61	:	- 50 dBm ≤ rsi < - 49 dBm	
62	:	- 49 dBm ≤ rsi < -48 dBm	
63	:	- 48 dBm ≤ rsi	
99	:	not known or not detectable or if the current serving cell is not a GERAN cell	
<ber>	integer	N/A	Channel bit error rate (in percent)
Values:			
0÷7	:	as RXQUAL values, see 3GPP TS 45.008 subclause 8.2.4	
99	:	not known or not detectable or if the current serving cell is not a GERAN cell	
<rscp>	integer	N/A	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)
Values:			

0	:	rscp < -120 dB
1	:	-120 dBm ≤ rscp < -119 dBm
2	:	-119 dBm ≤ rscp < -118 dBm
...	:	...
94	:	-27 dBm ≤ rscp < -26 dBm
95	:	-26 dBm ≤ rscp < -25 dBm
96	:	-25 dBm ≤ rscp
255	:	not known, not detectable or if the current serving cell is not a UTRA cell

<ecno> integer N/A Ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 subclause).

Values:

0	:	Ec/lo < -24 dBm
1	:	-24 dBm ≤ Ec/lo < -23.5 dBm
2	:	-23.5 dBm ≤ Ec/lo < -23 dBm
...	:	...
47	:	-1 dBm ≤ Ec/lo < -0.5 dBm
48	:	-0.5 dBm ≤ Ec/lo < 0 dBm
49	:	0 dBm ≤ Ec/lo
255	:	not known, not detectable or if the current serving cell is not a UTRA cell

<rsrq> integer 0 reference signal received quality (see 3Gpp TS 36.133 subclause 9.1.7)

Values:


0	:	rsrq < -19.5 dBm
1	:	-19.5 dBm ≤ rsrq < -19 dBm
2	:	-19 dBm ≤ rsrq < -18.5 dBm
...	:	...
32	:	-4 dBm ≤ rsrq < -3.5 dBm
33	:	-3.5 dBm ≤ rsrq < -3 dBm
34	:	-3 dBm ≤ rsrq
255	:	not known, not detectable or if the current serving cell is not a EUTRA cell

<rsrp> integer 0 reference signal received power (see 3Gpp TS 36.133 subclause 9.1.4)

Values:

0	:	rsrp < -140 dBm
1	:	-140 dBm ≤ rsrp < -139 dBm
2	:	-139 dBm ≤ rsrp < -138 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, not detectable or if the current serving cell is not a EUTRA cell

 This project does not support the GSM access technology.



AT+CESQ=?

Test command returns values supported as compound values.

2.3.15. AT#ENS - Enhanced Network Selection

Set command is used to activate the Enhanced Network Selection (ENS) functionality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENS=[<mode>]



Set command is used to activate the ENS functionality

Parameter:

Name	Type	Default	Description
<mode>	integer	0	ENS functionality

Values:

- 0 : Disable ENS functionality
- 1 : Enable ENS functionality

-  If AT#ENS=1 has been issued, the following values will be automatically set and also at every next power-up:
 - * All bands are enabled
 - * SIM Application Toolkit enabled on user interface 0 if not previously enabled on a different user interface (AT#STIA-2)
-  The default value is 1 on the ATT mode(variant) only.



AT#ENS?

Read command reports whether the ENS functionality is currently enabled or not, in the format:

#ENS: <mode>



AT#ENS=?

Test command reports the available range of values for parameter <mode>

2.3.16. AT#EONS - Enable URC of Enhanced Operator Name String

This command is used to activate EONS feature and set the relevant URC.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#EONS=<ena>

Set command enables URC & feature of EONS. Unsolicited result code (URC) available format:

#EONS: <net>

Parameter:

Name	Type	Default	Description
<ena>	integer	0	-

Values:

- 0 : Disable URC & feature of EONS
- 1 : Enable URC & feature of EONS

Unsolicited field:

Name	Type	Description
------	------	-------------

<net>	string	Alpha tag of network name. Name string can be any network name as well as EONS and sent by its priority. The following order of priority for which "name source" is to used.
-------	--------	---

Values:

- 1 : EF-SPN
- 2 : EF-OPL and EF-PNN
- 3 : CPHS Operator Name String
- 4 : Name Information received by the NITZ service
- 5 : Any name stored internal to the ME
- 6 : Displaying the broadcast MCC-MNC



AT#EONS?

Read command returns the current selected parameter in the format:

#EONS: <ena>[,<net>]



Name string is shown only when network service is available.



AT#EONS=?

Test command returns the supported range of values of parameters <ena>.

2.3.17. AT+WS46 - PCCA STD-101 Select Wireless Network

This command selects the cellular network technology (Wireless Data Service, WDS).



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+WS46=[<n>]

Set command selects the cellular network (Wireless Data Service, WDS) to operate with the TA (WDS-Side Stack Selection).

Parameter:

Name	Type	Default	Description
------	------	---------	-------------

<n>	integer	N/A	WDS-Side Stack to be used by the TA.
-----	---------	-----	--------------------------------------

4G/3G products support <n> parameter values 22, 28 and 31. 31 is factory default

Values:

- 22 : UTRAN only
- 28 : E-UTRAN only
- 31 : UTRAN and E-UTRAN

i The values in <n> for Query are mutually exclusive. If one value (e.g. "25") is returned, other values shall not be returned.

i <n> parameter setting is stored in NVM and available at once.



AT+WS46?

Read command reports the currently selected cellular network, in the format:

+ WS46: <n>



AT+WS46=?

Test command reports the range for the parameter <n>.

2.3.18. AT+CEREG - EPS Network Registration Status

This command monitors the Evolved Packet System (EPS) network registration status in LTE.



- [1] 3GPP TS 24.008
- [2] 3GPP TS 24.301
- [3] 3GPP TS 25.331

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CEREG=[<mode>]

Set command enables/disables the EPS network registration unsolicited result code (URC) in LTE, and selects one of the available formats:

short format: **+CEREG: <stat>**
 long format: **+CEREG: <stat>[,<tac>],<ci>,<AcT>]]**

<tac>, <ci>, and <AcT> are reported by the command only if available.

In case of error, possible response(s): **+CME ERROR: <err>**

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code (URC), and selects one of the available formats. The following events trigger the URC: URC short format is displayed every time there is a change in the EPS network registration status. URC long format is displayed every time there is a change of network cell in LTE.

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and select the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)

Unsolicited fields:

Name	Type	Description
<stat>	integer	EPS registration status

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to

		3 : registration denied
		4 : unknown. Example, out of LTE 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. 3GPP TS 24.008 [8] and 3GPP TS 24.301 [83] specify the condition when the MS is considered as attached for emergency bearer services. (not applicable).
		9 : registered for "CSFB not preferred", home network (not applicable).
		10 : registered for "CSFB not preferred", roaming (not applicable).
<tac>	string	tracking area code (two bytes) in hexadecimal format (e.g. "00C3" equals 195 in decimal)
<ci>	string	LTE cell ID (four bytes) in hexadecimal format
<AcT>	integer	indicates the access technology of the serving cell.
		Values:
		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.



AT+CEREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the information **<tac>**, **<ci>**, **<AcT>** according to the current **<mode>** parameter value.

+CEREG: <mode>,<stat>,[<tac>],[<ci>],[<AcT>]

- <tac>**, **<ci>** and **<AcT>** are reported only if **<mode>=2** and the mobile is registered on some network cell.



AT+CEREG=?

Test command returns supported values for parameter **<mode>**.

2.3.19. AT#RFSTS - Read Current Network Status

Command reads the current network status and parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#RFSTS

Execution command returns the current network status. The format of the returned message is according to the network on which the module is registered.

GSM network

#RFSTS:<PLMN>,<ARFCN>,<RSSI>,<LAC>,<RAC>,<TXPWR>,<MM>,<RR>,<NOM>,<CID>,<IMSI>,<NetNameAsc>,<SD>,<ABND>

Parameters	Description
<PLMN>	Country code and operator code (MCC, MNC)
<ARFCN>	GSM Assigned Radio Channel
<RSSI>	Received Signal Strength Indication
<LAC>	Localization Area Code
<RAC>	Routing Area Code
<TXPWR>	Tx Power

Parameter/values	Description
<MM>	Mobility Management state (for debug purpose only)
0	NULL
3	LOCATION UPDATING INITIATED
5	WAIT FOR OUTGOING MM CONNECTION
6	CONNECTION ACTIVE
7	IMSI DETACH INITIATED
8	PROCESS CM SERVICE PROMPT
9	WAIT FOR NETWORK COMMAND
10	LOCATION UPDATE REJECTED
13	WAIT FOR RR CONNECTION LOCATION UPDATE
14	WAIT FOR RR CONNECTION MM
15	WAIT FOR RR CONNECTION IMSI DETACH
17	WAIT FOR REESTABLISHMENT
18	WAIT FOR RR ACTIVE
19	IDLE
20	WAIT FOR ADDITIONAL OUTGOING MM CONNECTION
21	CONNECTION ACTIVE GROUP TRANSMIT
22	WAIT RR CONNECTION GROUP TRANSMIT
23	LOCATION UPDATING PENDING
24	IMSI DETACH PENDING
25	RR CONNECTION RELEASE NOT ALLOWED
255	UNKNOWN

Parameter/values	Description
<RR>	Radio Resource state (for debug purpose only)
2	CELL SELECTION

3	WAIT CELL SELECTION
4	DEACTIVATION CELL SELECTION
5	SELECT ANY CELL
6	WAIT SELECT ANY CELL
7	DEACTIVATION SELECT ANY CELL
8	WAIT INACTIVE
9	INACTIVE
10	WAIT IDLE
11	IDLE
12	PLMN SEARCH
13	CELL RESELECTION
14	WAIT CELL RESELECTION
15	DEACTIVATION PLMN SEARCH
16	CELL CHANGE
17	CS CELL CHANGE
18	WAIT CELL CHANGE
19	SINGLE BLOCK ASSIGNMENT
20	DOWNLINK TBF ESTABLISH
21	UPLINK TBF ESTABLISH
22	WAIT TBF
23	TRANSFER
24	WAIT SYNC
25	DTM ENHANCED CALL ESTABLISH
25	DTM
27	DTM ENHANCED MO CALL ESTABLISH
28	MO CONNECTION ESTABLISH
29	MT CONNECTION ESTABLISH
30	RR CONNECTION
31	DTM ESTABLISH
32	DTM RELEASE
33	CALL REESTABLISH
34	DEACTIVATION CALL REESTABLISH
35	NORMAL CHANNEL RELEASE
36	LOCAL CHANNEL RELEASE
37	DEACTIVATION
38	ENHANCED DTM CS CALL ESTABLISH
39	CELL RESELECTION TO UTRAN
40	DTM ENHANCED CS CALL ESTABLISH
41	INTER RAT ACTIVE ON HOLD
42	INTER RAT RESEL ABORT
43	INTER RAT WAIT INTER RAT
44	INTER RAT WAIT FOR RSRC
45	DSIM SUSPEND
46	DSIM WAIT SUSPEND
47	DSIM WAIT SUSPEND IDLE

Parameters	Descriptions
<NOM>	Network Operator Mode
<CID>	Cell ID
<IMSI>	International Mobile Subscriber Identity
<NetNameAsc>	Operator name

Parameter/values	Description
<SD>	Service Domain
0	No Service
1	CS only
2	PS only
3	CS+PS

Parameter/values	Description
<ABND>	Active Band
1	GSM 850
2	GSM 900
3	DCS 1800
4	PCS 1900

LTE network

#RFSTS:<PLMN>,<EARFCN>,<RSRP>,<RSSI>,<RSRQ>,<TAC>,<RAC>,[<TXPWR>],<DRX>,<MM>,<RRC>,<CID>,<IMSI>,[<NetNameAsc>],<SD>,<ABND>,<T3402>,<T3412>,<SINR>

Parameters	Description
<PLMN>	Country code and operator code(MCC, MNC)
<EARFCN>	E-UTRA Assigned Radio Channel
<RSRP>	Reference Signal Received Power
<RSSI>	Received Signal Strength Indication
<RSRQ>	Reference Signal Received Quality
<TAC>	Tracking Area Code
<RAC>	Routing Area Code
<TXPWR>	Tx Power (In traffic only)
<DRX>	Discontinuous reception cycle Length (cycle length in ms)

Parameter/values	Description
<MM>	Mobility Management state (for debug purpose only)
0	NULL
1	DEREGISTERED
2	REGISTRATION INITIATED
3	REGISTERED
4	TRACKING AREA UPDATE INITIATED
5	SERVICE REQUEST INITIATED
6	DEREGISTRATION INITIATED

Parameters	Description
<RRC>	Radio Resource state (for debug purpose only; see above)
<CID>	Cell ID

Parameter/values	Description
<IMSI>	International Mobile Station ID<SD> - Service Domain
0	No Service
1	CS only
2	PS only

3	CS+PS
---	-------

Parameters/values	Description
<ABND>	Active Band
1..63	According to 3GPP TS 36.101

Parameters	Description
<T3402>	Timer T3402 in seconds
<T3412>	Timer T3412 in seconds
<SINR>	Signal-to-Interface plus Noise Ratio



AT#RFSTS=?

Test command tests for command existence.

2.3.20. AT#MONI - Cell Monitor

This command is both a set and an execution command related to cell and network information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#MONI[=[<number>]]

Set command sets one cell out of seven, in a neighbor list of the serving cell including it, from which extract GSM/LTE related information.

After entering the set command, enter the execution command **AT#MONI<CR>** to get the GSM/LTE related information for the selected cell and dedicated channel (if exists) in the format shown, for each network, in the Additional info section.

Parameter:

Name	Type	Default	Description
<number>	integer	-	the parameter meaning depends on the network, see Additional info section.

Additional info:

▶▶ GSM network

Name	Type	Default	Description
<number>	integer	0	GSM network

Values:

- 0÷6 : it is the ordinal number of the cell, in the neighbor list of the serving cell.
- 7 : it is a special request to obtain GSM-related information from the whole set of seven cells in the neighbor list of the serving cell

▶▶ LTE network

Name	Type	Default	Description
<number>	integer	0	LTE network

Values:

- 0 : it is the serving cell
- 1 : it is the intra-frequency cells
- 2 : it is the inter-frequency cells
- 3 : it is the W-CDMA neighbor cells, the report message is empty.
- 4 : it is the GSM neighbor cells
- 5,6 : it is not available

7 : it is a special request to obtain LTE-related information from the all available neighbor cells.

- ▶▶ Execution command **AT#MONI**<CR> reports GSM/LTE related information for selected cell and dedicated channel (if exists) in the following formats:

a) When extracting data for the serving cell and the network name is known the format is:

GSM network

#MONI: <netname> BSIC:<bsic> RxQual:<qual> LAC:<lac> Id:<id> ARFCN:<arfcn> PWR:<dBm> dBm TA: <timadv>

LTE network

#MONI: <netname> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac> Id:<id> EARFCN:<earfcn> PWR:<dBm> DRX:<drx> pci:<physicalCellId> QRxLevMin:<QRxLevMin>

b) When the network name is unknown, the format is:

GSM network

#MONI: <cc> <nc> BSIC:<bsic> RxQual:<qual> LAC:<lac> Id:<id> ARFCN:<arfcn> PWR:<dBm> dBm TA: <timadv>

LTE network

#MONI: Cc:<cc> Nc:<nc> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac> Id:<id> EARFCN:<earfcn> PWR:<dBm> DRX:<drx> pci:<physicalCellId> QRxLevMin:<QRxLevMin>

c) When extracting data for an adjacent cell, the format is:

GSM network

#MONI: Adj Cell<n> [LAC:<lac> Id:<id>] ARFCN:<arfcn> PWR:<dBm>

LTE network

LTE intra-frequency and inter-frequency cells

#MONI: RSRP:<rsrp> RSRQ:<rsrq> PhysCellId:<physicalCellId> EARFCN:<earfcn> PWR:<dBm>

LTE GSM neighbor cells

#MONI: Adj Cell<n> BSIC:<bsic> ARFCN:<arfcn> PWR:<dBm>

Name	Type	Default	Description
<netname>	string	-	name of network operator
<cc>	string	-	country code
<nc>	string	-	network operator code
<n>	integer	-	progressive number of adjacent cell
<bsic>	string	-	base station identification code

<qual>	integer	-	quality of reception: 0..7
<lac>	string	-	localization area code
<id>	integer	-	cell identifier
<arfcn>	integer	-	assigned radio channel
<dBm>	integer	-	received signal strength in dBm.
<timadv>	integer	-	timing advance
<rscp>	integer	-	Received Signal Code Power in dBm.
<drx>	string	-	Discontinuous reception cycle length
<physicalCellId>	integer	-	physical cell identifier
<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<tac>	integer	-	Tracking Area Code
<earfcn>	integer	-	E-UTRA Assigned Radio Channel
<QRxLevMin>	integer	-	minimum required RX level in the cell

- TA: <timadv> reported only for the serving cell.
- When **AT#MONI=7** is the last setting entered, the execution command **AT#MONI<CR>** reports the information previously listed for each of the cells in the neighbor of the serving cell. The information is formatting in a sequence of <CR><LF>-terminated strings.
- The timing advance value is meaningful only during calls or GPRS transfers active.



AT#MONI=?

Test command reports the maximum number of cells, in a neighbor of the serving cell excluding it, from which we can extract GSM/LTE related information, along with the ordinal number of the current selected cell, in the format:

#MONI: (<MaxCellNo>,<CellSet>)

Additional info:

- ▶▶ Parameters meaning.

Name	Type	Default	Description
<MaxCellNo>	integer	-	maximum number of cells in a neighbor of the serving cell and excluding it from which we can extract GSM/LTE related information. This value is always 6 .
<CellSet>	integer	-	last setting done with command #MONI .



The module supports GSM network

```

AT+WS46?
+WS46: 30
OK
AT+CREG?
+CREG: 0,1
OK
AT#MONI=1
OK
AT#MONI=?
#MONI: (6,1)
OK
AT#MONI
#MONI: I TIM BSIC:25 RxQual:0 LAC:D5BD Id:3A27 ARFCN:1018 PWR:-72dbm TA:-1
OK
AT#MONI=7
OK
AT#MONI=?
#MONI: (6,7)
OK
AT#MONI
#MONI: Cell BSIC LAC CellId ARFCN Power C1 C2 TA RxQual PLMN
#MONI: S 25 D5BD 3A27 1018 -74dbm 31 31 4 7 I TIM
#MONI: N1 26 D5BD 3A26 1023 -79dbm -1 -1
#MONI: N2 21 D5BD 5265 1009 -78dbm -1 -1
#MONI: N3 27 D5BD 5266 13 -87dbm -1 -1
#MONI: N4 25 D5BD 5251 1020 -88dbm -1 -1
#MONI: N5 27 D5BD 5286 1011 -95dbm -1 -1
#MONI: N6 30 00D2 C5A0 16 -99dbm -1 -1

OK

```


2.3.21. AT#ICMCONNECT - Control Data call DISCONNECT/CONNECTADD/DELETE

This command establishes data call for Multiple PDN

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ICMCONNECT=<cmd>,<pdn>,<userIpType>[,<cid0>[,<cid1>]]

This command establishes data call, referring to the PDP profile specified by the Cid parameter and enables ECM/RNDIS to bind the activated data service and have access to external internet.

Parameters:

Name	Type	Default	Description
<cmd>	string	N/A	Command
	Values:		
	DIS	:	disconnect
	CON	:	connect
	DEL	:	delete PDN
	ADD	:	add PDN
	SET	:	set PDN
<pdn>	integer	N/A	PDN profile index. In the case of add PDN (i.e. <cmd> is "ADD"), the set value of <pdn> will be ignored, which means no matter what the input value is, the PDN will be added in numerical order if the command executed successfully.
	Value:		
	1÷4	:	PDN index
<userIpType>	integer	4	user IP type
	Values:		
	4	:	IPv4
	6	:	IPv6
	10	:	ipv4v6 (option used only if the <cmd> is "ADD" or "SET")
<cid0>	integer	N/A	PDP context identification (see +CGDCONT command). <cid0> represent the cid with IPV4 type when <cmd> is "ADD" or "SET" with 5 arguments. If <cmd> is "CON" or "SET" with 4 arguments, <cid0> represent the cid with the input <userIpType> IP type.
	Value:		
	1÷max	:	max is where the value of max is returned by the Test command
<cid1>	integer	N/A	PDP context identification with IPV6 type (see +CGDCONT command), valid only if <cmd> is "ADD" or "SET" with 5 arguments.

Value:

1÷max : max is where the value of max is returned by the Test command

- i** This command activates a specified PDP context, so all necessary operations have to be done before issuing the command like registering to network and configuring PDP profiles.
- i** The "OK" result code does not guarantee that data is connected successfully. It is recommended that User should verify the status of connection by issuing read command.
- i** Error is returned if cid profile is not valid or already used by other PDN index while adding PDN profile. Refer to +CDGCONT to set cid profile.
- i** When the IPV4 or IPV6 data call already established for the specific PDN, if user want to change the cid profile which mapping to this PDN, we recommend to disconnect the data call first and then change the PDN by "SET" command option.
- i** If VLAN interface is defined in the VLAN list and has been mapped to the corresponding PDN, VLAN interface could be brought up by using this AT command. It is possible to bring up multiple network interfaces simultaneously which consist of both ECM/RNDIS primary interface and VLAN interfaces over the ECM/RNDIS. The multiple interfaces come to have dedicated data paths to each APN defined by the corresponding cid.



AT#ICMCONNECT?

Read command returns the session state in the following format:

Additional info:

```

▶▶ #ICMCONNECT: <pdn>,<cid0>,<ipv4State>,<cid1>,<ipv6State>
#ICMCONNECT: <pdn>,<cid0>,<ipv4State>,<cid1>,<ipv6State>
OK
    
```

Name	Type	Default	Description
<cid0>	integer	N/A	IPV4 cid
Value:			
1÷max : max is where the value of max is returned by the Test command			
<ipv4State>	integer	N/A	IPV4 connection state
Values:			
0 : disconnected			
1 : connected			
-1 : Invalid CID			
<cid1>	integer	N/A	IPV6 CID
Value:			

1-max : max is where the value of max is returned by the Test command

<ipv6State>	integer	N/A	IPV6 state
-------------	---------	-----	------------

Values:

0	: disconnected
1	: connected
-1	: Invalid CID



AT#ICMCONNECT=?

Test command returns the range of supported values for all the parameters. Note that the range of <cid0> and <cid1> will following the setting of +CGDCONT command.

AT#ICMCONNECT=?

#ICMCONNECT: ("DIS","CON","DEL","ADD","SET"),(1-1),(4,6,10),(1-1),(1-1)

OK



Note that the valid <pdn> range will be returned by test command.



```
//Check the default value
AT# ICMCONNECT?
#ICMCONNECT: 1,1,0,1,0
OK
//Check the range of supported values
AT#ICMCONNECT=?
#ICMCONNECT: ("DIS","CON","DEL","ADD","SET"),(1-1),(4,6,10),(1-1),(1-1)
OK
//Add a cid
AT+CGDCONT=1,"IPV4V6","APN1"
OK
//Add the second cid
AT+CGDCONT=2,"IPV4V6","APN2"
OK
//Cid is added successfully by checking with Test command
AT#ICMCONNECT=?
#ICMCONNECT: ("DIS","CON","DEL","ADD","SET"),(1-1),(4,6,10),(1-2),(1-2)
OK
//Add the second PDN profile with cid 2
AT#ICMCONNECT=add,1,10,2,2
OK
//PDN is added successfully
AT#ICMCONNECT?
#ICMCONNECT: 1,1,0,1,0
#ICMCONNECT: 2,2,0,2,0
OK
//Establish data call for IPV4
AT#ICMCONNECT=con,1,4
OK
//Check the status
AT#ICMCONNECT?
#ICMCONNECT: 1,1,1,1,0
#ICMCONNECT: 2,2,0,2,0
OK
//Disconnect IPV4 data call
AT#ICMCONNECT=dis,1,4
OK
//Establish data call for IPV6
AT#ICMCONNECT=con,1,6
OK
//Disconnect IPV6 data call
AT#ICMCONNECT=dis,1,6
OK
//Delete the added PDN:
AT#ICMCONNECT=del,2
OK
//PDN is deleted successfully
AT#ICMCONNECT?
#ICMCONNECT: 1,1,0,1,0
OK
```

2.3.22. AT#ICMROAMINGEN - Restrict or allow data call in roaming area

The command restricts or allows data call on a roaming network

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ICMROAMINGEN=<pdn>,<enable>

Restrict or allow data call in roaming area

Parameters:

Name	Type	Default	Description
<pdn>	integer	N/A	PDN profile index. In the case of add PDN (i.e. <cmd> is "ADD"), the set value of <pdn> will be ignored, which means no matter what the input value is, the PDN will be added in numerical order if the command executed successfully.

Value:

1÷4 : PDN index

<enable>	integer	N/A	toggle roaming allowance
----------	---------	-----	--------------------------

Values:

0 : disable roaming

1 : enable roaming



AT#ICMROAMINGEN?

Read command returns the session state in the following format:

Additional info:

```

▶▶ #ICMROAMINGEN: <pdn> <enabled>
#ICMROAMINGEN: <pdn> <enabled>
#ICMROAMINGEN: <pdn> <enabled>
OK
    
```

Name	Type	Default	Description
<pdn>	integer	N/A	PDN profile index. In the case of add PDN (i.e. <cmd> is "ADD"), the set value of <pdn> will be ignored, which means no matter what the input value is, the PDN will be added in numerical order if the command executed successfully.

Value:

1÷4 : PDN index

<enable>	integer	0	toggle roaming allowance
----------	---------	---	--------------------------

Values:

0 : disable roaming
1 : enable roaming



AT#ICMROAMINGEN=?

AT#ICMROAMINGEN=?

#ICMROAMINGEN=(1-4),(0,1)

2.3.23. AT#LTECAT - LTE Category Setting

This command selects the LTE category.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#LTECAT=<category>

Set command sets the specific LTE category.

Parameter:

Name	Type	Default	Description
<category>	integer	N/A	LTE category

Values:

- 6 : LTE Category 6
- 12 : LTE Category 12

<category> is saved in NVM.



AT#LTECAT?

Read command returns the LTECAT current setting, in the format:

#LTECAT: <category>



AT#LTECAT=?

Test command reports the supported range of values for parameters <category>.

2.3.24. AT#FDOR - Fast Dormancy

This command triggers fast dormancy; if all conditions are satisfied SCRI will be sent towards the network.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#FDOR=<mode>[,<FDDelayTimer>[,<SCRITimer>]]

Set command triggers fast dormancy; if all conditions are satisfied, SCRI will be sent towards the network. SCRI will be sent in one shot or according to the specified delay timer expiry, depending on the mode selected.

The Fast Dormancy feature is WCDMA only feature and not implemented in LTE. Therefore, it can be set in WCDMA online mode.

Parameters:

Name	Type	Default	Description
<mode>	integer	2	Selection for the supported configurations for Fast Dormancy.
Values:			
1	:		indicate application driven (1 shot) Fast Dormancy to modem.
2	:		switch ON autonomous Fast Dormancy (AFD).
3	:		switch OFF autonomous Fast Dormancy (AFD).
<FDDelayTimer>	integer	6	(maximum timer) will be started when the network re-establishes the radio bearer due to some incoming data. After this timer expiry, Data activity will be checked. If there is data activity within this time period, no action will be taken. If there is no data activity, the signalling connection release request will be sent to network.
Value:			
1÷60	:		integer value in seconds.
<SCRITimer>	integer	0	The timer is used for fast dormancy inhibit timer in NAS/UAS to adapt to network operator requirements. The timer value is stored persistently. A timer value of 0 means that the timer is not used.
Values:			
0	:		used a T323 Timer value in SIB1
1÷120	:		integer value in seconds

Additional info:

- ▶▶ the reject cause from lower layers is reported by the unsolicited indication
#FDOR: <cause>

Name	Type	Default	Description
<cause>	integer	N/A	reject cause

Value:

6 : Reject when Network deactivated FD, by not sending timer T323 in SIB1.

- When **<mode>** is 2, **<FDDelayTimer>** timer value becomes effective and monitor user plane data at the moment of expiry. Default timer value is 6 sec.



AT#FDOR?

Read command returns **OK** string along with last accepted mode and timer values, in the format:

#FDOR: <mode>,< FDDelayTimer >,< SCRITimer>



AT#FDOR=?

Test command returns **OK** string along with supported modes and timer values.

2.3.25. AT+RSRP - Read RSRP measurement value

Additional AT&T specific AT command used for certification tests.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+RSRP?

Read command reports the RSRP measurement info in the format:

**+RSRP: <cellID1>,<EARFCN1>,<RSRP1>[,<cellID2>,<EARFCN2>,<RSRP2>[,...
[,<cellIDn>,<EARFCNn>,<RSRPn>]]]**

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<cellIDx>	integer	-	physical cell id (3 digits)
<EARFCNx>	integer	-	EARFCN for the given cell
<RSRPx>	integer	-	RSRP value in dBm



AT+RSRP=?

Test command returns the **OK** result code.

2.3.26. AT+RSRQ - Read RSRQ measurement value

Additional AT&T specific AT command used for certification tests.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+RSRQ?

Read command reports the RSRQ measurement info in the format:

**+RSRQ: <cellID1>,<EARFCN1>,<RSRQ1>[,<cellID2>,<EARFCN2>,<RSRQ2>[,...
[,<cellIDn>,<EARFCNn>,<RSRQn>]]]**

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<cellIDx>	integer	-	physical cell id (3 digits)
<EARFCNx>	integer	-	EARFCN for the given cell
<RSRQx>	integer	-	RSRQ measured value



AT+RSRQ=?

Test command returns the **OK** result code.

2.3.27. AT+RSCP - Read RSCP measurement value

Additional AT&T specific AT command used for certification tests.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+RSCP?

Read command reports the RSCP measurement info in the format:

**+RSCP: <psc1>,<UARFCN1>,<RSCP1>[,<psc2>,<UARFCN2>,<RSCP2>[,...
[,<pscN>,<UARFCNn>,<RSCPn>]]]**

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<pscx>	integer	-	Primary scrambling code (3 digits)
<UARFCNx>	integer	-	UARFCN for the given cell
<RSCPx>	integer	-	RSCP value in dBm



AT+RSCP=?

Test command returns the **OK** result code.

2.3.28. AT+ECNO - Read ECNO measurement value

Additional AT&T specific AT command used for certification tests.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+ECNO?

Read command reports the ECNO measurement info in the format:

+ECNO: <psc1>,<UARFCN1>,<ECNO1>[,<psc2>,<UARFCN2>,<ECNO2>[,...
[,<pscn>,<UARFCNn>,<ECNOn>]]]

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<pscx>	integer	-	Primary scrambling code (3 digits)
<UARFCNx>	integer	-	UARFCN for the given cell
<ECNOx>	integer	-	ECNO value in dBm



AT+ECNO=?

Test command returns the **OK** result code.

2.3.29. AT+VZWRSP - Read RSRP Values

Additional Verizon Wireless specific AT command used for certification tests.



LTE AT commands for Test automation REQ_FEB2014

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+VZWRSP?

Read command reports the **RSRP** info in the format:

```
+VZWRSP:<cellID1>,<EARFCN1>,<RSRP1>[,<cellID2>,<EARFCN2>,<RSRP2>[,...
[,<cellIDn>,<EARFCNn>,<RSRPn>]]]
```

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<cellIDx>	integer	-	physical cell id (3 digits)
<EARFCNx>	integer	-	EARFCN for the given cell
<RSRPx>	integer	-	RSRP value in dBm/15kHz



AT+VZWRSP=?

Test command returns the **OK** result code.

2.3.30. AT+VZWRSRQ - Read RSRQ Values

Additional Verizon Wireless specific AT command used for certification tests.



LTE AT commands for Test automation REQ_FEB2014

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+VZWRSRQ?

Read command reports the **RSRQ** info in the format:

```
+VZWRSRQ:<cellID1>,<EARFCN1>,<RSRQ1>[,<cellID2>,<EARFCN2>,<RSRQ2>[,...
[,<cellIDn>,<EARFCNn>,<RSRQn>]]]
```

Additional info:

▶▶ Here are the parameters meaning:

Name	Type	Default	Description
<cellIDx>	string	-	physical cell id (3 digits)
<EARFCNx>	integer	-	EARFCN for the given cell
<RSRQx>	string	-	RSRQ value



AT+VZWRSRQ=?

Test command returns the **OK** result code.

2.3.31. AT+COPS - Operator Selection

The command selects a network operator and triggers modem registration.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	Yes	-	2



AT+COPS=[<mode>[,<format>[,<oper>[,<act>]]]]

The set command attempts to select a network operator and registers the module on the just chosen operator; the selection can be automatic or manual.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	defines the operator selection: automatic or manual.
Values:			
0	:		automatic selection, the parameter <oper> is ignored
1	:		manual selection, the parameter <oper> must be present
2	:		deregister from network. The module is unregistered until a +COPS with <mode>=0, 1 or 4 is issued
3	:		set only <format> parameter, the parameter <oper> is ignored
4	:		manual/automatic, <oper> parameter must be present. If manual selection fails, the module will tray automatic mode (<mode>=0)
5	:		Unknown
<format>	integer	0	specifies the operator name format, see <oper> parameter
Values:			
0	:		alphanumeric long form (max length 16 digits)
1	:		alphanumeric short form
2	:		numeric 5 or 6 digits [country code (3) + network code (2 or 3)]
<oper>	mixed	-	network operator in format defined by <format> parameter. String type <format> indicates if the format is alphanumeric or numeric. long alphanumeric format can be up to 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 [8] subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A [10], 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 the structure: (country code digit 3) (country code digit 2) (country code digit 3) (country code digit 1) (network code digit 3) (network code digit 2) (network code digit 1).
<act>	integer	N/A	selects access technology.
Values:			

0 : GSM
 2 : UTRAN
 7 : E-UTRAN

- i** **<mode>** parameter setting is stored in NVM and available at next reboot. **<mode>=3** is not saved.
 If **<mode>=1** or **4**, the selected network is stored in NVM too and is available at the next reboot (this will happen also after inserting another SIM).
<mode>=5 is a value of 'read command' and not of 'set command'. This is a transient state that occurs while a modem is initialized.
 The network name can only be used among the list of network names displayed by the +COPN command when using the manual choice mode with alphanumeric format.
- i** **<format>** parameter setting is never stored in NVM.
- i** If **AT+COPS=0** is issued after the switch-on, it causes a new attempt to select a network operator and registers the module on the selected operator.



AT+COPS?

Read command returns current value of **<mode>**, **<format>**, **<oper>** and **<Act>** in format **<format>**. If no operator is selected, **<format>**, **<oper>** and **<Act>** are omitted.

+COPS: <mode>[, <format>, <oper>,< act>]

If the module is deregistered, **<format>**, **<oper>**, and **<act>** parameters are omitted.

- i** A network name can be displayed with different name from showed network name list by the +COPN command if the UE could get a camped network name from USIM or network.



AT+COPS=?

Test command returns a list of quadruplets, each representing an operator present in the network. The quadruplets list is ended with the range values of the **<mode>** and **<formats>** parameters.

The quadruplets in the list are closed between round brackets, separated by commas, the **<oper>** parameter is returned in both formats.

+COPS: [quadruplets list (<stat>,<oper (in <format>=0)>,,<oper (in <format>=2)>,< act>), (<stat>,<oper (in <format>=0)>,,<oper (in <format>=2)>,< act>), ...] [, ,(range of <mode>), (range of <format>)]

<stat> parameter is described in the Additional info section.


Additional info:

- ▶▶ Meaning of the **<stat>** parameter.

Name	Type	Default	Description
<stat>	integer	N/A	operator availability

Values:

0 : unknown
1 : available
2 : current
3 : forbidden

-  Since with this command a network scan is done, this command may require some seconds before the output is given.
-

2.3.32. AT#ICMAUTOCONN - Set Datacall Auto connection mode

This command triggers automatic data call setup to external internet through RNDIS or ECM when device boots up and register on a mobile network.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ICMAUTOCONN=<pdn>,<auto_connect>

This command is intended to automatically set up a data call to external internet through RNDIS or ECM when device boots up and registers on a mobile network.

Parameters:

Name	Type	Default	Description
<pdn>	integer	N/A	PDN index
Value:			
1÷4 : disable auto connection			
<auto_connect>	integer	N/A	Enable/Disable Auto connection
Values:			
0 : Disable Auto connection			
1 : Enable Auto connection			

- i** Device does not try to connect when set to enable auto connection: command is applied after connecting manually or after rebooting.

Note: this command activates a PDP context, thus all parameters must be setup beforehand (registration, APN).



AT#ICMAUTOCONN?

Read command returns the session state in the following format:

Additional info:

▶▶ # ICMAUTOCONN: <state>

...
OK

Name	Type	Default	Description
<pdn>	integer	N/A	PDN index
Value:			
1÷4 : PDN index			
<auto_connection>	integer	N/A	auto connection status
Values:			

0 : Disabled

1 : Enabled

**AT#ICMAUTOCONN=?**

Test command returns the range of supported values for all the parameters.

2.3.33. AT#ENWCAUSE - EPS Network Cause

This command is related to EPS network cause.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENWCAUSE=[<emmm>[,<esm>]]

Set command enables/disables URC of EMM/ESM cause.

Parameters:

Name	Type	Default	Description
<emmm>	integer	0	URC of EMM
Values:			
0	:	disables URC of EMM	
1	:	enables URC of EMM	
<esm>	integer	0	URC of ESM
Values:			
0	:	disables URC of ESM	
1	:	enables URC of ESM	



<cause> is defined in TS24.301.



AT#ENWCAUSE?

Read command reports whether each URC of network cause is currently enabled or not. Display 3rd and 4th URC values of network cause when having a reject cause from network.

#ENWCAUSE: <emmm>,<esm>,<emmm_cause>,<esm_cause>

Additional info:



<emmm_cause>

- 0 EMM no failure
- 2 IMSI Unknown In HSS
- 3 Illegal UE
- 5 IMEI not accepted
- 6 Illegal ME
- 7 EPS services not allowed
- 8 EPS services and non-EPS services not allowed
- 9 UE identity cannot be derived by NW
- 10 Implicitly detached
- 11 PLMN not allowed
- 12 Tracking Area not allowed
- 13 Roaming not allowed in this tracking area
- 14 EPS services not allowed in this PLMN

- 15 No Suitable Cells in tracking area
- 16 MSC temporarily not reachable
- 17 Network failure
- 18 CS domain not available
- 19 ESM failure
- 20 MAC failure
- 21 Synch failure
- 22 Congestion
- 23 UE security capabilities mismatch
- 24 Security mode rejected, unspecified
- 25 Not authorized for this CSG
- 26 Non-EPS authentication unacceptable
- 38 CS fallback call EST not allowed
- 39 CS service temporarily not available
- 40 No EPS bearer context activated
- 95 Semantically incorrect message
- 96 Invalid mandatory information
- 97 Message type non-existent or not implemented
- 98 Message type not compatible with the protocol state
- 99 Information element non-existent or not implemented
- 100 Conditional IE error
- 101 Message not compatible with the protocol state
- 111 Protocol error, unspecified

<esm_cause>

- 0 ESM no failure
- 8 Operator Determined Barring
- 26 Insufficient resources
- 27 Missing or unknown APN
- 28 Unknown PDN type
- 29 User authentication failed
- 30 Request rejected by Serving GW or PDN GW
- 31 Request rejected, unspecified
- 32 Service option not supported
- 33 Requested service option not subscribed
- 34 Service option temporarily out of order
- 35 PTI already in use
- 36 Regular deactivation
- 37 EPS QoS not accepted
- 38 Network failure
- 39 Reactivation requested
- 40 ESM feature not supported
- 41 Semantic error in the TFT operation
- 42 Syntactical error in the TFT operation
- 43 Invalid EPS bearer identity
- 44 Semantic errors in packet filter(s)
- 45 Syntactical errors in packet filter(s)
- 46 EPS bearer context without TFT already activated
- 47 PTI mismatch
- 49 Last PDN disconnection not allowed
- 50 PDN type IPv4 only allowed
- 51 PDN type IPv6 only allowed
- 52 Single address bearers only allowed
- 53 ESM information not received
- 54 ESM information not received
- 55 Multiple PDN connections for a given APN not allowed
- 56 Collision with network initiated request
- 59 Unsupported QCI value
- 81 Invalid PTI value
- 95 Semantically incorrect message
- 96 Invalid mandatory information
- 97 Message type non-existent or not implemented

-
- 98 Message type not compatible with the protocol state
 - 99 Information element non-existent or not
 - 100 Conditional IE error
 - 111 Protocol error, unspecified
 - 112 APN restriction value incompatible with active EPS bearer context

**AT#ENWCAUSE=?**

Test command returns supported values of parameters **<emm>** and **<esm>**

2.3.34. AT#CEERNET - Extended Numeric Error Report for Network Reject Cause

The command is related to extended numeric error report.



3GPP TS 24.008
3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CEERNET

Execution command causes the TA to return a numeric code in the intermediate response format:

#CEERNET: <code>

which should offer the user of the TA a report for the last mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure not accepted by the network.

Additional info:

- ▶▶ 1. The following error codes are valid for mobility management (MM/GMM) or session management (SM), i.e. for 3G networks.
- 2. In 4G network the <code>s meanings are included in tables 9.9.4.4.1 (for ESM causes) and 9.9.3.9.1 (for EMM cause) of 3GPP TS 24.301 Release 9.


Name	Type	Default	Description
<code>	integer	N/A	error code

Values:

- 2 : IMSI unknown in HLR
- 3 : illegal MS
- 4 : IMSI unknown in VISITOR LR
- 5 : IMEI not accepted
- 6 : illegal ME
- 7 : GPRS not allowed
- 8 : Operator determined barring (SM cause failure)/ GPRS and not GPRS not allowed (GMM cause failure)
- 9 : MS identity cannot be derived by network
- 10 : implicitly detached
- 11 : PLMN not allowed
- 12 : LA not allowed
- 13 : roaming not allowed
- 14 : GPRS not allowed in this PLMN
- 15 : no suitable cells in LA
- 16 : MSC TEMP not reachable

17	:	network failure
20	:	MAC failure
21	:	SYNCH failure
22	:	congestion
23	:	GSM authentication unacceptable
24	:	MBMS bearer capabilities insufficient for the service
25	:	LLC or SMDCP failure
26	:	insufficient resources
27	:	missing or unknown APN
28	:	unknown PDP address or PDP type
29	:	user authentication failed
30	:	activation rejected by GGSN
31	:	activation rejected unspecified
32	:	service option not supported
33	:	req. service option not subscribed
34	:	serv. option temporarily out of order
35	:	NSAPI already used
36	:	regular deactivation
37	:	QOS not accepted
38	:	call cannot be identified (MM cause failure) / SMN network failure (SM cause failure)
39	:	reactivation required
40	:	no PDP context activated (GMM cause failure) / feature not supported (SM cause failure)
41	:	semantic error in TFT operation
42	:	syntactical error in TFT operation
43	:	unknown PDP context
44	:	semantic err in PKT filter
45	:	syntactical err in PKT filter
46	:	PDP context without TFT activated
47	:	multicast group membership timeout
48	:	retry on new cell begin (if MM cause failure) / activation rejected BCM violation (if SM cause failure)
50	:	PDP type IPV4 only allowed
51	:	PDP type IPV6 only allowed
52	:	single address bearers only allowed
63	:	retry on new cell end
81	:	invalid transaction identifier
95	:	semantically incorrect message
96	:	invalid mandatory information

97	:	MSG type non-existent or not implemented
98	:	MSG type not compatible with protocol state
99	:	IE non-existent or not implemented
100	:	conditional IE error
101	:	MSG not compatible with protocol state
111	:	protocol error unspecified
112	:	APN restriction value incompatible with active PDP context

-  If none of this condition has occurred since power up then <code> 0: "**Normal, unspecified**" condition is reported.



AT#CEERNET=?

Test command returns **OK** result code.

2.4. Phonebook

2.4.1. AT+CPBS - Select Phonebook Memory Storage

This command selects phonebook memory storage, which is used by other phonebook commands.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2




AT+CPBS=<storage>[,<password>]

Set command selects phonebook memory storage, which is used by other phonebook commands.

Parameters:

Name	Type	Default	Description
<storage>	string	"SM"	the phonebook memory storage
Values:			
"SM"	:	SIM phonebook	
"FD"	:	SIM fixed dialing-phonebook (FDN) (only phase 2/2+ SIM)	
"LD"	:	SIM last-dialing-phonebook (+CPBF is not applicable for this storage)	
"MC"	:	device missed (unanswered received) calls list (+CPBF is not applicable for this storage)	
"RC"	:	ME received calls list (+CPBF is not applicable for this storage)	
"MB"	:	mailbox numbers stored on SIM; it is possible to select this storage only if the mailbox service is provided by the SIM (see #MBN)	
"DC"	:	ME last-dialing-phonebook (+CPBF is not applicable for this storage)	
"ME"	:	ME phonebook	
"EN"	:	SIM emergency numbers phonebook (+CPBW and +CPBF not applicable for this storage)	
"ON"	:	SIM own numbers (MSISDNs) phonebook (MSI storage may be available through +CNUM also. +CPBF is not applicable for this storage)	
"SD"	:	SIM Service Dialing Numbers (SDN) phonebook (+CPBW is not applicable for this storage)	
<password>	string	-	the PIN2-code required when selecting PIN2-code locked <storage>s above "FD"; If <password> parameter is given, PIN2 will be verified, even if it is not required, i.e. PIN2 is verified even if it has already been inserted and verified during current session.


-
-  If "SM" is the currently selected phonebook, selecting "FD" phonebook with **AT+CPBS="FD"** command simply selects the FDN as the phonebook upon which all subsequent **+CPBW**, **+CPBF** and **+CPBR** commands act. The command does not deactivate "SM" phonebook and does not activate FDN.
-



AT+CPBS?

Read command returns currently selected memory, number of used locations and total number of locations in the memory, in the format:

+CPBS: <storage>,<used>,<total>

-  For **<storage>="MC"**: if there are more than one missed call from the same number the read command will return only the last call.
-



AT+CPBS=?

Test command returns the supported range of values for the parameter **<storage>**.



Current phonebook storage is SIM.

```
AT+CPBS="SM"
```

```
OK
```

```
AT+CPBR=1
```

```
+CPBR: 1,"0105872928",129,"James"
```

```
OK
```

2.4.2. AT+CPBR - Read Phonebook Entries

The command reads phonebook entries.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPBR=<index1>[,<index2>]

Execution command returns phonebook entries in location number range <index1>...<index2> from the current phonebook memory storage selected with **+CPBS**. If <index2> is left out, only location <index1> is returned.

The response format is:

```
[+CPBR:<index1>,<number>,<type>,<text>[,<hidden>]][,<group>]
[,<adnumber>][,<adtype>][,<secondtext>][,<email>]]
```

...

```
[<CR><LF> +CPBR:<index2>,<number>,<type>,<text>[,<hidden>]
[,<group>][,<adnumber>] [,<adtype>][,<secondtext>][,<email>]]]
```

Parameters:

Name	Type	Default	Description
<index1>	integer	-	value in the range of location numbers of the currently selected phonebook memory (see +CPBS)
<index2>	integer	-	value in the range of location numbers of the currently selected phonebook memory (see +CPBS)

Additional info:

▶▶ response parameters

Name	Type	Default	Description
<indexn>	integer	-	the location numbers of phonebook memory
<number>	string	-	phone number of format <type>
<type>	integer	N/A	type of address octet
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	the alphanumeric text associated with the number; character set as specified by command select TE character set +CSCS
<hidden>	integer	0	indicates if the entry is hidden or not

Values:

- 0 : phonebook entry not hidden
- 1 : phonebook entry hidden

<group>	string	-	indicating a group the entry may belong to; character set as specified by command select TE character set +CSCS
<adnumber>	string	-	an additional phone number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	second text field associated with the number; character set as specified by command select TE character set +CSCS
<email>	string	-	email field; character set as specified by command select TE character set +CSCS

- i** If "MC" is the currently selected phonebook memory storage, a sequence of missed calls coming from the same number will be saved as one missed call and **+CPBR** will show just one line of information.
- i** If all queried locations are empty (but available), no information text lines may be returned. If listing fails in an MT error, **+CME ERROR: <err>** is returned.



AT+CPBR=?

Test command returns location range supported by the current storage as a compound value and the maximum lengths of **<number>**, **<text>**, **<group>**, **<secondtext>** and **<email>**, in the format:

+CPBR: (<minIndex> - <maxIndex>),<nlength>,<tlength>,<glength>,<slength>,<elength>

Additional info:

- ▶▶ response parameters

Name	Type	Default	Description
<minIndex>	integer	-	the minimum <index> number
<maxIndex>	integer	-	the maximum <index> number
<nlength>	integer	-	the maximum length of field <number>
<tlength>	integer	-	the maximum length of field <text>
<glength>	integer	-	the maximum length of field <group>
<slength>	integer	-	the maximum length of field <secondtext>
<elength>	integer	-	the maximum length of field <email>

- i** The value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension1 service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension2 service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension6 service



Remember to select the PB storage with **+CPBS** command before issuing PB commands.



```
AT+CPBS="ME"  
OK  
AT+CPBS?  
+CPBS: "ME",1,100  
  
OK  
AT+CPBR=?  
+CPBR: (1-100),40,255  
  
OK  
AT+CPBR=1  
+CPBR: 1,"01048771234",129,"James"  
  
OK
```

2.4.3. AT+CPBF - Find Phonebook Entries

This command allows to search records from the current phonebook memory storage, selected with **+CPBS**.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CPBF=<findtext>

Execution command returns phonebook entries (from the current phonebook memory storage selected with **+CPBS**) which alphanumeric field start with string **<findtext>**.

Parameter:

Name	Type	Default	Description
<findtext>	string	-	string to be searched among the phonebook entries; character set as specified by command select TE character set +CSCS

Additional info:

►► This command returns the response in the following format:

```
[+CPBF:<index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>]
[,<adtype>][,<secondtext>][,<email>]<CR><LF>
+CPBF:<index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>]
[,<adtype>][,<secondtext>][,<email>][...]]
```

Name	Type	Default	Description
<indexn>	integer	-	the location number of the phonebook entry
<number>	string	-	phone number of format <type>
<type>	integer	N/A	type of address octet
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	the alphanumeric text associated with the number; character set as specified by command select TE character set +CSCS
<group>	string	-	a group the entry may belong to; character set as specified by command select TE character set +CSCS
<adnumber>	string	-	an additional number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	a second text field associated with the number; character set as specified by command select TE character set +CSCS

<email>	string	-	an email field; character set as specified by command select TE character set +CSCS
<hidden>	string	N/A	indicates if the entry is hidden or not

Values:

0 : phonebook entry not hidden

1 : phonebook entry hidden

- i** **+CPBF** is not applicable if the current selected storage (see **+CPBS**) is either "MC", "RC" or "LD".
- i** If **<findtext>=""**, the command returns all the phonebook records.
- i** If no PB records satisfy the search criteria, then an **ERROR** message is reported.



AT+CPBF=?

Test command returns the maximum lengths of **<number>**, **<text>**, **<group>**, **<secondtext>** and **<email>**, in the format:

+CPBF: <nlength>,<tlength>,<glength>,<slength>,<elength>

Additional info:

- ▶▶ response parameters

Name	Type	Default	Description
<nlength>	integer	-	the maximum length of field <number>
<tlength>	integer	-	the maximum length of field <text>
<glength>	integer	-	the maximum length of field <group>
<slength>	integer	-	the maximum length of field <secondtext>
<elength>	integer	-	the maximum length of field <email>

- i** The value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
 1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension1 service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension2 service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension6 service



Remember to select the PB storage with **+CPBS** command before issuing PB commands.



Selecting phonebook

```
AT+CPBS="ME"
```

```
OK
```

Searching for string "J"

```
AT+CPBF="J"
```

```
+CPBF: 1,"01048771234",129,"James"
```

```
+CPBF: 2,"0169998888",129,"Jane"
```

```
OK
```

Searching for everything in phone book, and finding all entries

```
AT+CPBF=""
```

```
+CPBF: 1,"01048771234",129,"James"
```

```
+CPBF: 2,"0169998888",129,"Jane"
```

```
+CPBF: 7,"0115556666",129,"Juliet"
```

```
+CPBF: 5,"0181111234",129,"Kevin"
```

```
OK
```

2.4.4. AT+CPBW - Write Phonebook Entry

This command writes phonebook entry in the current phonebook memory.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2





AT+CPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<adnumber>[,<adtype>[,<secondtext>[,<email>[,<hidden>]]]]]]]]]

Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with **+CPBS**.

Parameters:

Name	Type	Default	Description
<index>	integer	-	the location numbers of phonebook memory
<number>	string	-	phone number in the format <type>
<type>	integer	129	type of address octet
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	the alphanumeric text associated with the number; character set as specified by command select TE character set +CSCS
<group>	string	-	a group the entry may belong to; character set as specified by command select TE character set +CSCS
<adnumber>	string	-	an additional number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	a second text field associated with the number; character set as specified by command select TE character set +CSCS
<email>	string	-	email field; character set as specified by command select TE character set +CSCS
<hidden>	integer	0	indicates if the entry is hidden or not
Values:			
	0	:	phonebook entry not hidden
	1	:	phonebook entry hidden

- If record number <index> already exists, it will be overwritten.
- If either <number>, <type> and <text> are omitted, the phonebook entry in location <index> is deleted.

-  If either "LD", "MC" or "RC" memory storage has been selected (see **+CPBS**) it is possible just to delete the phonebook entry in location **<index>**, therefore parameters **<number>**, **<type>** and **<text>** must be omitted.
-  Before defining **<group>** string, it is recommended to check, with **#CPBGR** command, the predefined group names, that could be already stored in USIM in Grouping information Alpha String (GAS) file. If all records in such file are already occupied, **+CPBW** command will return ERROR when trying to use a new group name that is not in the predefined GAS names. To define a new custom group string, it is necessary to overwrite with it one of the old predefined strings, using **#CPBGW** command.

AT+CPBW=?


Test command returns location range supported by the current storage and types of address as compound values, the maximum length of **<number>** field, supported number formats of the storage, the maximum length of **<text>** field, the maximum length of **<group>**, the maximum length of **<secondtext>** and the maximum length of **<email>**. The format is:

+CPBW: (list of supported **<index>**s),**<nlength>**,(list of supported **<type>**s),**<tlength>**,**<glength>**,**<slength>**,**<elength>**

Additional info:

▶▶ response fields

Name	Type	Default	Description
<nlength>	integer	-	Maximum length of field <number>
<tlength>	integer	-	Maximum length of field <text>
<glength>	integer	-	Maximum length of field <group>
<slength>	integer	-	Maximum length of field <secondtext>
<elength>	integer	-	Maximum length of field <email>

-  the value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
 1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension1 service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension2 service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension6 service



Remember to select the PB storage with **+CPBS** command before issuing PB commands.



if <index> is omitted or <index>=0, the number <number> is stored in the first free phonebook location.

```
AT+CPBW=0,"+39040X192YZ1",129,"Text"
```

```
AT+CPBW=,"+39040X192YZ1",129,"Text"
```

2.4.5. AT#CPBE - Emergency Numbers Programming

This command is used to write the emergency number to "EN" phonebook for carrier certification.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#CPBE=<index>[,<number>]

Set command writes the emergency number to "EN" phonebook.

Parameters:

Name	Type	Default	Description
<index>	integer	N/A	index
Value:			
	1÷10	:	index
<number>	string	-	phone number



If <number> is omitted, the phonebook entry in location <index> is deleted.



AT#CPBE?

Read command returns the emergency numbers stored by the user.



AT#CPBE=?

Test command reports the supported range of value for <index> and the maximum length of <number>.



```
AT+CPBR=1,117
+CPBR: 78,"911",129,"", "", "", "", ""
+CPBR: 79,"112",129,"", "", "", "", ""
+CPBR: 80,"*911",129,"", "", "", "", ""
+CPBR: 81,"#911",129,"", "", "", "", ""
+CPBR: 82,"*272911",129,"", "", "", "", ""
OK
AT#CPBE=1,"999"
OK
AT+CPBR=1,117
+CPBR: 68,"999",129,"", "", "", "", ""
+CPBR: 78,"911",129,"", "", "", "", ""
+CPBR: 79,"112",129,"", "", "", "", ""
+CPBR: 80,"*911",129,"", "", "", "", ""
+CPBR: 81,"#911",129,"", "", "", "", ""
+CPBR: 82,"*272911",129,"", "", "", "", ""
OK
```

2.5. SMS & CB

2.5.1. AT+CSMS - Select Message Service

This command selects messaging service type.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.041

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CSMS=<service>

Set command selects messaging service <service>. It returns the types of messages supported by the ME:

+CSMS: <mt>,<mo>,<bm>

For parameters meaning see Additional info section.

Parameter:

Name	Type	Default	Description
<service>	integer	0	Select Message Service

Values:

- 0 : 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005
- 1 : 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005. The requirement of <service> setting 1 is mentioned under corresponding command descriptions

Additional info:

▶▶ Parameters meaning of the returned message.

Name	Type	Default	Description
<mt>	integer	N/A	mobile terminated messages support

Values:


- 0 : type not supported
- 1 : type supported

<mo>	integer	N/A	mobile originated messages support
------	---------	-----	------------------------------------

Values:

- 0 : type not supported

	1	:	type supported	
<bm>	integer		N/A	broadcast type messages support
Values:				
	0	:	type not supported	
	1	:	type supported	

 Setting of **<service>** will not be stored automatically.



AT+CSMS?

Read command reports current service setting along with supported message types in the format:

+CSMS: <service>, <mt>, <mo>, <bm>



AT+CSMS=?

Test command reports the supported value of the parameter **<service>**.

2.5.2. AT+CPMS - Preferred Message Storage

The command selects the memory storage used by SMS (Short Messages).



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CPMS=<memr>[,<memw>[,<mems>]]

Set command selects memory storages <memr>, <memw> and <mems> to be used for reading, writing, sending and storing SMS

The command returns the memory storage status in the format:

+CPMS: <usedr>,<totalr>,<usedw>,<totalw>,<useds>,<totals>

The returned parameters are described in the Additional info section.

Parameters:

Name	Type	Default	Description
<memr>	string	SM	memory from which messages are read and deleted Note: "ME" will be set as default if SIM storage is not supported
Values:			
ME	:	SMS memory storage in Flash	
SM	:	SIM SMS memory storage	
SR	:	Status Report message storage (in SIM EF-SMSR file exists otherwise in the RAM non-volatile memory)	
<memw>	string	SM	memory to which writing and sending operations are made Note: "ME" will be set as default if SIM storage is not supported
Values:			
ME	:	SMS memory storage in Flash	
SM	:	SIM SMS memory storage	
<mems>	string	SM	memory to which received SMS are preferred to be stored Note: "ME" will be set as default if SIM storage is not supported
Values:			
ME	:	SMS memory storage in Flash	
SM	:	SIM SMS memory storage	

Additional info:

►► Here is the meaning of the parameters returned by the command.

Name	Type	Default	Description
<usedr>	integer	-	number of SMs stored in <memr>
<totalr>	integer	-	max number of SMs that <memr> can contain
<usedw>	integer	-	number of SMs stored in <memw>
<totalw>	integer	-	max number of SMs that <memw> can contain
<useds>	integer	-	number of SMs stored in <mems>
<totals>	integer	-	max number of SMs that <memw> can contain

"SR" non-volatile memory is cleared when another SIM card is inserted. It is kept, even after a reset, while the same SIM card is inserted.



AT+CPMS?

Read command reports the message storage status.

+CPMS:<memr>,<usedr>,<totalr>,<memw>,<usedw>,<totalw>,<mems>,<useds>,<totals>

The parameters are described in previous sections.



AT+CPMS=?

Test command reports the supported values for parameters <memr>, <memw> and <mems>.



```
AT+CPMS="SM","ME","SM"
+CPMS: 1,20,27, 50,1,20
OK
```

```
AT+CPMS?
+CPMS: "SM",1,20,"ME",27, 50,"SM",1,20
OK
```

You have 1 out of 20 SMS SIM positions occupied

2.5.3. AT+CMGF - Message Format

Selects the format of SMS messages to be used in following SMS commands.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CMGF=[<mode>]

Set command selects the format of SMS messages used with send, list, read and write commands.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	format to use for SMS operations

Values:

- 0 : PDU mode
- 1 : text mode



AT+CMGF?

Read command reports the current value of the parameter <mode> in the format:

+CMGF: <mode>



AT+CMGF=?

Test command returns the supported values of parameter <mode>.

2.5.4. AT+CSCA - Service Center Address

This command allows to set the Service Center Address for mobile-originated (MO) SMS.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CSCA=<number>[,<type>]

Set command sets the Service Center Address to be used for mobile originated SMS transmissions

Parameters:

Name	Type	Default	Description
<number>	string	-	String type phone number of forwarding address in format specified by <type> parameter
<type>	integer	N/A	The type of number; For Verizon FW, the range of <type> is 0 - 255.

Values:

- 129 : National numbering scheme
- 145 : International numbering scheme (contains the character "+")



AT+CSCA?

Read command reports the current value of the SCA in the format:

+CSCA: <number>,<type>

- If SCA is not present the device reports an error message.



AT+CSCA=?

Test command returns the **OK** result code.



- To use the SM service, is mandatory to set a Service Center Address at which service requests will be directed.
- In Text mode, this setting is used by send and write commands; in PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into the <pdu> parameter equals zero.
- The current settings are stored through **+CSAS**.



```
AT+CSCA="821029190903",145  
OK
```

```
AT+CSCA?  
+CSCA: "+821029190903",145  
OK
```

2.5.5. AT+CSMP - Set Text Mode Parameters

This command is used to select values for additional parameters for storing and sending SMS when the text mode is used (**AT+CMGF=1**).



3GPP TS 23.40
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]

Set command is used to select values for additional parameters for storing and sending SMS when the text mode is used (**AT+CMGF=1**).

Parameters:

Name	Type	Default	Description															
<fo>	integer	17	<p>first octet of SMS-SUBMIT or SMS-DELIVER PDU, as described in 3GPP TS 23.040</p> <p>bit 0/1 = Message Type Indicator bit 2 = Reject Duplicates bit 3/4 = Validity Period Format bit 5 = Status Report Request bit 6 = User Data Header Indicator bit 7 = Reply Path</p>															
		Value:																
		0÷255	: mask															
<vp>	mixed	167	<p>Validity Period, the format depends on Validity Period Format in <fo>, as described in 3GPP TS 23.040:</p> <table border="1"> <thead> <tr> <th>bit 3</th> <th>bit 4</th> <th>Format</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Validity Period not present</td> </tr> <tr> <td>0</td> <td>1</td> <td>Validity Period present, enhanced format</td> </tr> <tr> <td>1</td> <td>0</td> <td>Validity Period present, relative format</td> </tr> <tr> <td>1</td> <td>1</td> <td>Validity Period present, absolute format</td> </tr> </tbody> </table>	bit 3	bit 4	Format	0	0	Validity Period not present	0	1	Validity Period present, enhanced format	1	0	Validity Period present, relative format	1	1	Validity Period present, absolute format
bit 3	bit 4	Format																
0	0	Validity Period not present																
0	1	Validity Period present, enhanced format																
1	0	Validity Period present, relative format																
1	1	Validity Period present, absolute format																
		Value:																
		0÷255	: range for Validity Period in relative format															
<pid>	integer	0	TP-Protocol-Identifier, as described in 3GPP TS 23.40															
		Value:																
		0÷255	: described in 3GPP TS 23.40															
<dcs>	integer	0	SMS Data Coding Scheme, as described in 3GPP TS 23.038															
		Value:																
		0÷255	: described in 3GPP TS 23.038															

- In the parameter **<fo>**: only the following values are supported for Message Type Indicator:
[00] - SMS-DELIVER
[01] - SMS-SUBMIT
- In the parameter **<fo>**: user is not responsible for setting **bit 2** and **bit 6**, if set, they will have no meaning.
- In the parameter **<vp>**: the *absolute format* is a quoted time-string type (see **+CCLK**)
- The current settings are stored through **+CSAS**.
<vp> is stored only as integer type, i.e. only in its *relative format*.
- <vp>**, **<pid>** and **<dcs>** default values are loaded from first SIM SMS Parameters profile, if present. If it is not present, then the default values are those above indicated.



AT+CSMP?

Read command returns the current setting in the format:

+CSMP: <fo>,<vp>,<pid>,<dcs>

- If the Validity Period Format (**<fo>**'s **bit[4]bit[3]**) is [00] (i.e. Not Present), **<vp>** is represented just as a quoted empty string ("").



AT+CSMP=?

Test command returns the OK result code.



- Set the parameters for an outgoing message with 24 hours of validity period and default properties:

```
AT+CSMP=17,167,0,0
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 24 hours of validity period.

```
AT+CSMP=9,"01A80000000000"
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 60 seconds of validity period.

```
AT+CSMP=9,"023C0000000000"
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 29 hours 85 minutes 30 seconds of validity period.

```
AT+CSMP=9,"03925803000000"
OK
```


2.5.6. AT+CSDH - Show Text Mode Parameters

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



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSDH=[<show>]

Set command controls whether detailed header information is shown in text mode (**AT+CMGF=1**) result codes.

Parameter:

Name	Type	Default	Description
<show>	integer	0	control the display of the result codes.

Values:

- 0 : do not show header values (see Additional info section)
- 1 : show the values in result codes

Additional info:

- ▶▶ If <show>=0
do not show header values defined in commands **+CSCA** and **+CSMP** (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode.
For SMS-COMMANDs in **+CMGR** result code do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>



AT+CSDH?

Read command reports the current setting in the format:

+CSDH: <show>



AT+CSDH=?

Test command reports the supported range of values for parameter <show>.

2.5.7. AT+CSCB - Select Cell Broadcast

The command selects which types of Cell Broadcast Messages are to be received by the device.



3GPP TS 27.005
3GPP TS 23.041
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CSCB=[<mode>[,<mids>[,<dcss>]]]

Set command selects which types of Cell Broadcast Messages are to be received by the device

Parameters:

Name	Type	Default	Description
<mode>	integer	0	select which types of Cell Broadcast messages are to be received
Values:			
0 : the message types defined by <mids> and <dcss> are accepted			
1 : the message types defined by <mids> and <dcss> are rejected			
<mids>	string	-	message Identifiers: all different possible combinations of the CBM message identifiers; default is empty string ("").
<dcss>	string	-	Data Coding Schemes: all different possible combinations of CBM data coding schemes; default is empty string ("").



The current settings are stored also by **+CSAS** command



AT+CSCB?

Read command reports the current value of parameters <mode>, <mids> and <dcss>.



AT+CSCB=?

Test command returns the range of values for parameter <mode>.



Select a range
AT+CSCB=0,"0,1,300-315,450","0-3"
OK

2.5.8. AT+CSAS - Save Settings

Execution command saves settings which have been made by the **+CSCA**, **+CSMP** and **+CSCB** commands in local non-volatile memory.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSAS=<profile>

Parameter:

Name	Type	Default	Description
<profile>	integer	0	Index of the profile where the settings are saved

Values:

- 0 : it saves the settings to NVM
- 1÷n : SIM profile number; the value of <n> depends on the SIM.

- Certain settings may not be supported by the SIM and therefore they are always saved to NVM, regardless the value of **<profile>**.
- If parameter is omitted the settings are saved in the non-volatile memory.



AT+CSAS=?

Test command returns the possible range of values for the parameter **<profile>**.

2.5.9. AT+CRES - Restore Settings

Execution command restores message service settings saved by **+CSAS** command from either NVM or SIM.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CRES[=<profile>]

Parameter:

Name	Type	Default	Description
<profile>	integer	N/A	Defines which message service profiles to restore.

Values:

- 0 : restores message service settings from NVM
- 1÷n : restores message service settings from SIM. The n value depends on the SIM.

- Certain settings may not be supported by the SIM and therefore they are always restored from NVM, regardless the value of **<profile>**
- If parameter is omitted the command restores message service settings from NVM.



AT+CRES=?

Test command returns the possible range of values for the parameter **<profile>**.

2.5.10. AT+CMMS - More Message to Send

Set command controls the continuity of SMS relay protocol link. When feature is enabled (and supported by network) multiple messages can be sent much faster as link is kept open.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMMS=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables the relay protocol link continuity.

Values:

- 0 : disable
- 1 : keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 5 seconds, then the link is closed and the parameter <n> is automatically reset to 0
- 2 : enable (if the time between the response of the latest message send command and the next send command exceeds 5 seconds, the link is closed but the parameter <n> remains set to 2)

Entering **AT+CMMS=** returns **OK** but has no effect.



AT+CMMS?

Read command reports the current value of the parameter <n> in the format:

+CMMS: <n>



AT+CMMS=?

Test command returns the range of supported <n>.

2.5.11. AT+CGSMS - Select Service for MO SMS Messages

Set command is used to specify the service or service preference that the MT will use to send MO SMS messages.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGSMS=[<service>]

Parameter:

Name	Type	Default	Description
<service>	integer	1	indicates the service or service preference to be used

Values:

- 0 : GPRS
- 1 : circuit switched
- 2 : GPRS preferred. Use circuit switched if SMS via GPRS service not available or GPRS not registered.
- 3 : circuit switched preferred. Use GPRS if SMS via circuit switched not available.

Entering **AT+CGSMS=** returns **OK** but has no effect.



AT+CGSMS?

The read command returns the currently selected service or service preference in the format:

+CGSMS: <service>



AT+CGSMS=?

Test command reports the supported list of currently available <service>.



The <service> value is saved on NVM as global parameter.

2.5.12. AT+CNMI - New Message Indications to Terminal Equipment

This command sets the parameters for receiving SMS messages.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]

Set command selects the behavior of the device on how the receiving of new messages from the network is indicated to the DTE.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	unsolicited result codes buffering option.

Values:

- 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, otherwise forward them directly to the TE.
- 2 : Buffer unsolicited result codes in the TA in case the DTE is busy and flush them to the TE after reservation. Otherwise forward them directly to the TE.
- 3 : if <mt> is set to 1, it enables the hardware ring line for 1 sec.

<mt>	integer	0	result code indication reporting for SMS-DELIVER.
------	---------	---	---

Values:

- 0 : No SMS-DELIVER indications are routed to the TE and message is stored.
- 1 : If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using the URC described in Additional info section.
- 2 : SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group) are routed directly to the TE using the URC described in the Additional info section.
- 3 : Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

<bm>	integer	0	broadcast reporting option
------	---------	---	----------------------------

Values:

- 0 : Cell Broadcast Messages are not sent to the DTE
- 2 : New Cell Broadcast Messages are sent to the DTE with the URC described in Additional info section.

<ds>	integer	0	SMS-STATUS-REPORTs reporting option
Values:			
0	:		status report receiving is not reported to the DTE and is not stored
1	:		the status report is sent to the DTE with the URC described in the Additional info section.
2	:		if a status report is stored, then the unsolicited result code, described in Additional info section, is sent.
<bfr>	integer	0	buffered result codes handling method
Values:			
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.

Additional info:

▶▶ **<mt>=1:**

+CMTI: <mems>,<index>

▶▶ **<mt>=2:**

PDU mode

+CMT: <alpha>,<length><CR><LF><PDU>

TEXT mode

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

The parameters written in italics will be present depending on **+CSDH** last setting.

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

Acknowledge for the received SMS-DELIVER SM is sent to network immediately when **+CSMS <service>** is set to '0' or when **+CSMS <service>** is set to '1', acknowledge is sent via **+CNMA** command during predefine time-out, an error is sent to network in case timeout expire, next **+CMT** response is depend on acknowledge of current received **+CMT** response in case **+CSMS <service>** parameter set to '1'.

▶▶ **<bm>=2:**

PDU mode

+CBM: <length><CR><LF><PDU>

Text mode

+CBM: <sn>,<mid>,<dc>,<pag>,<pags><CR><LF><data>

▶▶ <ds>=1:

PDU mode

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

TEXT mode

+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>

Acknowledge for the received SMS-STATUS-REPORT SM is sent to network immediately when **+CSMS <service>** is set to '0' or when **+CSMS <service>** is set to '1', acknowledge is sent via **+CNMA** command during pre-defined timeout, an error is sent to network in case timeout expire, next **+CDS** response is depend on acknowledge of current received **+CDS** response in case **+CSMS <service>** parameter set to '1'.


▶▶ <ds>=2:

+CDSI: <mems>,<index>

Unsolicited fields:

Name	Type	Description
<mems>	string	memory storage where the new message is stored: "SM", "ME".
<index>	integer	location on the memory where SMS is stored.
<alpha>	string	alphanumeric representation of originator/destination number corresponding to the entry found in MT phonebook; used character set should be the one selected with command +CSCS .
<lenght>	integer	PDU length
<PDU>	string	PDU message
<oa>	string	originating address, string type converted in the currently selected character set (see +CSCS)
<alpha>	string	alphanumeric representation of <oa>; used character set should be the one selected with command +CSCS .
<scts>	string	arrival time of the message to the SC
<tooa>	integer	type of number <oa>: 129 - number in national format 145 - number in international format (contains the "+")
<fo>	string	first octet of message PDU, see 3GPP TS 03.40/23.040
<pid>	string	Protocol Identifier
<dc>	string	Data Coding Scheme

<sca>	string	Service Centre address, string type, converted in the currently selected character set (see +CSCS)
<tosca>	integer	type of number <sca> : 129 - number in national format 145 - number in international format (contains the "+")
<length>	integer	text length
<data>	string	TP-User-Data * If <dcs> indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set (bit 6 of <fo> is 0), each character of GSM alphabet will be converted into current TE character set (see +CSCS). * If <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set (bit 6 of <fo> is 1), each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41). Class 2 messages and messages in the "store" message waiting indication group result in indication as defined in <mt>=1 .
<sn>	integer	message serial number
<mid>	integer	message ID
<dcs>	string	Data Coding Scheme
<pag>	integer	page number
<pags>	integer	total number of pages of the message
<data>	string	CBM Content of Message * If <dcs> indicates that GSM 03.38 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see +CSCS) * If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)
<mr>	integer	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<ra>	string	recipient address, string type, represented in the currently selected character set (see +CSCS)
<tora>	integer	type of number <ra> : 129 - number in national format 145 - number in international format (contains the "+")
<scts>	string	arrival time of the message to the SC
<dt>	string	sending time of the message
<st>	string	message status as coded in the PDU

-
-  DTR signal is ignored, hence the indication is sent even if the DTE is inactive (DTR signal is Low). In this case the unsolicited result code may be lost so if MODULE remains active while DTE is not, at DTE startup is suggested to check whether new messages have reached the device meanwhile with command **AT+CMGL=0** that lists the new messages received.
-

**AT+CNMI?**

Read command returns the current parameter settings for +CNMI command in the form:

+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>

**AT+CNMI=?**

Test command reports the supported range of values for the +CNMI command parameters



```
AT+CMGF=1
OK
AT+CNMI=1,2,0,1,0
OK
```

Received message from network

```
+CMT: "+821020955219",,"07/07/26,20:09:07+36"
TEST MESSAGE
```

2.5.13. AT+CMGL - List Messages

This command is used to list the messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGL[=<stat>]

Execution command reports the list of all the messages with status value <stat> stored into <memr> message storage (<memr> is the message storage for read and delete SMS as last settings of command +CPMS).

Parameter:

Name	Type	Default	Description
<stat>	mixed	-	<stat> parameter type and the command output depend on the last settings of the +CMGF command (message format to be used). There are two modes: - PDU mode - Text mode See the following Additional info sections.

Additional info:

- ▶▶ When message format is PDU mode, the <stat> parameter is:

Name	Type	Default	Description
<stat>	integer	N/A	status value

Values:

- 0 : new message
- 1 : read message
- 2 : stored message not sent yet
- 3 : stored message already sent
- 4 : all messages

- ▶▶ In case of PDU mode the representation format (see +CMGF) is:

+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[<CR><LF>
+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[...]]

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.

<stat>	integer	-	message status. See the above <stat> parameter description.
<alpha>	string	-	String type alphanumeric representation of <da> or <oa> , corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<length>	integer	-	PDU length in bytes
<pdu>	string	-	message in PDU format, according to 3GPP TS 23.040

►► When message format is TEXT mode, the **<stat>** parameter is:

Name	Type	Default	Description
<stat>	string	N/A	status value
Values:			
"REC UNREAD"		:	new message
"REC READ"		:	read message
"STO UNSENT"		:	stored message not sent yet
"STO SENT"		:	stored message already sent
"ALL"		:	all messages

►► In case of TEXT mode, the representation format for stored messages (either sent or unsent) or received messages (either read or unread, not message delivery confirm) is:

+CMGL: *<index>*,*<stat>*,*<oa/da>*,*<alpha>*,*<scts>*[,*<toa/toda>*,*<length>*]-*<CR>*-*<LF>*
<data>[*<CR>*-*<LF>*]
+CMGL: *<index>*,*<stat>*,*<oa/da>*,*<alpha>*,*<scts>*[,*<toa/toda>*,*<length>*]-*<CR>*-*<LF>*
<data>[...]]

The information written in italics will be present depending on **+CSDH** last setting.

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.
<stat>	string	-	message status. See the above <stat> parameter description.
<oa/da>	string	-	originator/destination address, represented in the currently selected character set (see +CSCS).
<alpha>	string	-	The alphanumeric representation of <da> or <oa> , corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<scts>	string	-	TP-Service Centre Time Stamp in Time String Format.
<toa/toda>	integer	N/A	type of number <oa/da>

For Verizon FW, the range of **<tooa/toda>** is 0 - 255.

Values:

- 129 : number in national format
- 145 : number in international format (contains the "+")

<length>	integer	-	text length
<data>	string	-	TP-User-Data If <dcs> indicates that 3GPP TS 23.038 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see +CSCS) If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41) If <fo> indicates that a UDH is present each 8-bit octet will be converted into two IRA character long hexadecimal number. The <length> indicates text length in characters without UDH length.

►► In case of TEXT mode, the representation format for delivery confirm messages is:

**+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>[<CR><LF>
+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>[...]]**

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.
<stat>	string	-	Message status. See the last <stat> parameter description.
<fo>	integer	-	first octet of the message PDU
<mr>	integer	-	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<ra>	string	-	recipient address, represented in the currently selected character set (see +CSCS)
<tora>	string	-	type of number <ra>
<scts>	string	-	arrival time of the message to the SC
<dt>	string	-	sending time of the message
<st>	integer	-	message status as coded in the PDU

- i** If parameter is omitted the command returns the list of SMS with **"REC UNREAD"** status.
- i** The order in which the messages are reported by **+CMGL** corresponds to their position in the memory storage.

**AT+CMGL=?**

Test command returns a list of supported **<stat>**s.

2.5.14. AT+CMGR - Read Message

This command is used to read a message.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGR=<index>

Execution command reports the message with location value <index> from <memr> message storage (<memr> is the message storage for read and delete SMs as last settings of command +CPMS).

Parameter:

Name	Type	Default	Description
<index>	integer	-	message index. The command output depends on the last settings of command +CMGF (message format to be used). There are two modes: - PDU mode - Text mode

See the following Additional info sections.

Additional info:

- ▶▶ In case of PDU mode, if there is a message in location <index>, the output has the following format:

+CMGR: <stat>,<alpha>,<length><CR><LF><pdu>

Name	Type	Default	Description
<stat>	integer	N/A	status of the message
Values:			
	0	:	new message
	1	:	read message
	2	:	stored message not yet sent
	3	:	stored message already sent
<alpha>	string	-	string type alphanumeric representation of <da> or <oa>, corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS
<length>	integer	-	PDU length in bytes
<PDU>	string	-	message in PDU format, according to 3GPP TS 23.040

- In case of Text mode, if there is a received message in location **<index>**, the output has the following format (the information written in italics will be present depending on **+CSDH** last setting):

+CMGR: *<stat>*, *<oa>*, *<alpha>*, *<scts>*
[, <tooa>, *<fo>*, *<pid>*, *<dcS>*, *<sca>*, *<tosca>*, *<length>*]*<CR><LF><data>*

In case of Text mode, if there is either a sent or an unsent message in location **<index>** the output format is:


+CMGR: *<stat>*, *<da>*, *<alpha>*
[, <toda>, *<fo>*, *<pid>*, *<dcS>*, *[<vp>]*, *<sca>*, *<tosca>*, *<length>*]*<CR><LF><data>*

In case of Text mode, if there is a Message Delivery Confirm message in location **<index>** the output format is:

+CMGR: *<stat>*, *<fo>*, *<mr>*, *<ra>*, *<tora>*, *<scts>*, *<dt>*, *<st>*

Name	Type	Default	Description
<stat>	string	N/A	status of the message
	Values:		
	"REC UNREAD"	:	new received message
	"REC READ"	:	received message read
	"STO UNSENT"	:	message stored not yet sent
	"STO SENT"	:	message stored already sent
<fo>	integer	-	first octet of the message PDU
<mr>	integer	-	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<ra>	string	-	recipient address, represented in the currently selected character set (see +CSCS)
<tora>	string	-	type of number <ra>
<scts>	string	-	arrival time of the message to the SC
<dt>	string	-	sending time of the message
<st>	integer	-	message status as coded in the PDU
<pid>	integer	-	Protocol Identifier
<dcS>	integer	-	Data Coding Scheme
<vp>	mixed	-	Validity Period; its format depends on SMS-SUBMIT <fo> setting (see +CPMS): <ol style="list-style-type: none"> 1. Not present: if <fo> tells that Validity Period Format is not present 2. Integer: if <fo> tells that Validity Period Format is relative 3. Quoted time-string type: if <fo> tells that Validity Period Format is absolute 4. Quoted hexadecimal representation of 7 octets: if <fo> tells that Validity Period Format is enhanced

<oa>	string	-	Originator address, represented in the currently selected character set (see +CSCS).
<da>	string	-	Destination address, represented in the currently selected character set (see +CSCS).
<alpha>	string	-	The alphanumeric representation of <da> or <oa> , corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<sca>	string	-	Service Centre Address
<tooa>	integer	N/A	type of number of <oa> For Verizon FW, the range of <tooa> is 0 - 255.
Values:			
	129	:	number in national format
	145	:	number in international format (contains the "+")
<toda>	integer	N/A	type of number of <da> For Verizon FW, the range of <toda> is 0 - 255.
Values:			
	129	:	number in national format
	145	:	number in international format (contains the "+")
<tosca>	integer	N/A	type of number of <sca> For Verizon FW, the range of <tosca> is 0 - 255.
Values:			
	129	:	number in national format
	145	:	number in international format (contains the "+")
<length>	integer	-	text length
<data>	string	-	TP-User-Data If <dcs> indicates that 3GPP TS 23.038 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see +CSCS) If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41) If <fo> indicates that a UDH is present each 8-bit octet will be converted into two IRA character long hexadecimal number. The <length> indicates text length in characters without UDH length.

 Both in PDU and Text Mode, if status of the message was 'received unread' before reading, then status in the storage changes to 'received read'



AT+CMGR=?

Test command returns the **OK** result code

2.5.15. AT+CNMA - New Message Acknowledgement

This command is used to confirm the correct reception of a new message.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CNMA

Execution command confirms correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE.

Acknowledge with **+CNMA** is possible only if the **+CSMS** parameter is set to 1 (**+CSMS=1**) when a **+CMT** or **+CDS** indication is shown.

If no acknowledgement is given within the network timeout (17 seconds), an **RP-ERROR** is sent to the network, the **<mt>** and **<ds>** parameters of the **+CNMI** command are then reset to zero (do not show new message indication).

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, result code **+CMS ERROR: <err>** is returned.

The AT command syntax and functionalities are different between SMS PDU Mode and SMS Text Mode, as explained in Additional info sections.

Additional info:

▶▶ PDU Mode

AT+CNMA[=<n>[,<length>[<CR>PDU is given<ctrl-Z/ESC>]]]

Either positive (**RP-ACK**) or negative (**RP-ERROR**) acknowledgement to the network is possible. Parameter **<n>** defines which one will be sent. Optionally (when **<length>** is greater than zero) an acknowledgement TPDU (**SMS-DELIVER-REPORT** for **RP-ACK** or **RP-ERROR**) may be sent to the network. The entering of PDU is done similarly as specified in command Send Message **+CMGS**, except that the SMSC address field is not present.

Name	Type	Default	Description
<n>	integer	N/A	type of acknowledgement in PDU mode
Values:			
0	:	send RP-ACK without PDU (same as TEXT mode)	
1	:	send RP-ACK with optional PDU message	
2	:	send RP-ERROR with optional PDU message	
<length>	integer	-	length of the PDU message

▶▶ Text Mode

AT+CNMA

Only positive acknowledgement to network (**RP-ACK**) is possible.



AT+CNMA=?

Test command returned information are different between SMS PDU Mode and SMS Text Mode, as explained below.

Additional info:

- ▶▶ PDU Mode
Test command returns the possible range of values for the parameter <n>.

 - ▶▶ Text Mode
Test command returns the **OK** result code.
-



In case that a directly routed message must be buffered in ME/TA (possible when **+CNMI** parameter <mode> equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using **+CMGS**), acknowledgement (RP-ACK) is sent to the network without waiting **+CNMA** command from TE.



- PDU Mode

```
AT+CSMS=1
+CSMS: 1,1,1
OK
```

```
Set PDU mode.
AT+CMGF=0
OK
```

```
AT+CNMI=2,2,0,0,0
OK
```

```
Message is received from network.
+CMT: "",70
06816000585426000480980600F170110370537284...
```

```
Send positive acknowledgement to the network.
AT+CNMA=0
OK
```

```
Message is received from network.
+CMT: "",70
06816000585426000480980600F170110370537284...
```

```
Send negative acknowledgement (Unspecified error) to the network.
AT+CNMA=2,3<CR>
> 00FF00 <Ctrl-Z>
OK
```

- Text Mode

```
AT+CSMS=1
+CSMS: 1,1,1
OK
```

```
Set Text mode.
AT+CMGF=1
OK
```

```
AT+CNMI=2,2,0,0,0
OK
```

```
Message is received from network.
+CMT: "+821020955219",,"07/07/26,20:09:07+36"
TEST MESSAGE
```

```
Send positive acknowledgement to the network.
AT+CNMA
OK
```

2.5.16. AT+CMGS - Send Short Message

The command is related to sending short messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CMGS

Execution command sends a short message to the network. It can have two syntax formats according to the SMS format: PDU or Text mode (see **+CMGF** command). If short message is successfully sent to the network, the result is shown with the following URC:

+CMGS: <mr>[,<scts>]

Additional info:

- ▶▶ In PDU mode, the **+CMGS** command has the following syntax:

AT+CMGS=<length>

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the specified number of bytes. the PDU shall be hexadecimal format (each octet of the PDU is given as two IRA character long hexadecimal number) and given in one line.

To send the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<length>	integer	N/A	length in bytes of the PDU to be sent (excluding the SMSC address octets)

Value:

7÷164 : number of bytes

- ▶▶ In Text mode, the **+CMGS** command has the following syntax:

AT+CMGS=<da>[,<toda>]

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

After this prompt, you can enter text that should be formatted as follows:

- if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; backspace can be used to delete last character and carriage returns can be used; after every **<CR>** entered by the user the sequence **<CR><LF><greater_than><space>** is sent to the TE.

- if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the 'asterisk' will be entered as 2A (IRA50 and IRA65) and this will be converted to an octet with integer value 0x2A)

To send the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS).
<toda>	string	129	type of destination address For Verizon FW, the range of <toda> is 0 - 255.

Values:

129 : number in national format


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

Unsolicited fields:

Name	Type	Description
<mr>	integer	TP-Message-Reference number as per 3GPP TS 23.040
<scts>	string	TP-Service Centre Time Stamp in Time String Format. <scts> is returned when +CSMS <service> value is 1 and network supports.

- i** The DCD signal shall be in **ON** state while data is entered. The echoing of data is controlled by echo command **E**.
- i** In PDU mode: when the length of the SMSC address equals 0, then the SMSC address set with command **+CSCA** is used; in this case the SMSC Type of Address octet shall not be present in the data.
- i** To ensure that during the command execution, which may take several seconds, no other SIM interacting commands issued, care must take.
- i** It is possible to send a concatenation of at most 16 SMS; the maximum number of chars depends on the **<dcs>**:
 - 2432 chars

- 2128 chars if 8-bit is used
- 1056 chars if UCS2 is used

 If message sending fails for some reason, then an error code is reported.



AT+CMGS=?

Test command returns the **OK** result code.



To avoid malfunctions it is suggested to wait for the **+CMGS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.



Set PDU mode

```
AT+CMGF=0  
OK
```

```
AT+CMGS=18
```

```
> 088128010099010259115507811020905512F90000A704F4F29C0E  
+CMGS: 124
```

```
OK
```

Set text mode

```
AT+CMGF=1  
OK
```

```
AT+CSMP=17,167,0,0  
OK
```

```
AT+CMGS="01090255219",129  
>TEST MESSAGE  
+CMGS:125
```

```
OK
```

2.5.17. AT+CMSS - Send Message from Storage

This command sends to the network a message which is already stored in the **<memw>** storage.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMSS=<index>[,<da>[,<toda>]]

Execution command sends to the network a message which is already stored in the **<memw>** storage (see **+CPMS**) at the location **<index>**.

Parameters:

Name	Type	Default	Description
<index>	string	-	location value in the message storage <memw> of the message to send
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS); if it is given it shall be used instead of the one stored with the message.
<toda>	integer	N/A	type of destination address For Verizon FW, the range of <toda> is 0 - 255 (3GPP format).

Values:

- 129 : number in national format
- 145 : number in international format (contains the "+")

Additional info:

- ▶▶ If message is successfully sent to the network, then the result is sent in the format:
+CMSS: <mr>

Name	Type	Default	Description
<mr>	integer	-	message reference number

- ▶▶ If message sending fails for some reason, an error code is reported:
+CMS ERROR:<err>

- i** To store a message in the **<memw>** storage see command **+CMGW**.
- i** Care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.
- i** Send a 3GPP format SMS can be aborted.

**AT+CMSS=?**

Test command returns the **OK** result code.



To avoid malfunctions is suggested to wait for the **+CMSS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.

2.5.18. AT+CMGW - Write Short Message to Memory

The command is related to writing short messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CMGW

Execution command writes a new short message in the **<memw>** memory storage (see **+CPMS**). It can have two syntax formats according to the SMS format: PDU or Text mode (see **+CMGF** command). If short message is successfully written the following URC is displayed:

+CMGW: <index>

Additional info:

- ▶▶ In PDU mode the **+CMGW** command has the following syntax:

AT+CMGW=<length>[,<stat>]

After command line is terminated with **<CR>**, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the specified number of bytes.

To write the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<length>	integer	N/A	length in bytes of the PDU to be written
Value:			
7÷164 : number of bytes			
<stat>	integer	N/A	message status
Values:			
0 : new message new message (received unread message; default for DELIVER messages (3GPP TS 23.040 SMS-DELIVER messages))			
1 : read message			
2 : stored message not sent yet (default for SUBMIT messages (3GPP TS 23.040 SMS-SUBMIT messages))			

3 : stored message already sent

<data>	hex	-	PDU bytes, given in online mode
---------------------	-----	---	---------------------------------

►► In Text mode the **+CMGW** command has the following syntax:

AT+CMGW[=<da>[,<toda>[,<stat>]]]

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

After this prompt, you can enter text that should be formatted as follows:

- if current **<dcs>** (see **+CSMP**) indicates that GSM03.38/23.038 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 03.40/23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; backspace can be used to delete last character and carriage returns can be used..

- if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the 'asterisk' will be entered as 2A (IRA50 and IRA65) and this will be converted to an octet with integer value 0x2A)

The command waits for the specified number of bytes.

To write the message issue Ctrl-Z char (0x1A hex). To exit without writing the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS).
<toda>	integer	N/A	type of destination address For Verizon FW, the range of <toda> is 0 - 255.

Values:

129 : number in national format

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

<stat>	string	"STO UNSENT"	message status
---------------------	--------	-----------------	----------------

Values:

"REC UNREAD" : new received message unread

"REC READ" : received message read

"STO UNSENT" : message stored not yet sent

"STO SENT" : message stored already sent

Unsolicited field:

Name	Type	Description
<index>	integer	message location index in the memory <memw> (see +CPMS). If message storing fails for some reason, an error code is reported.

- The DCD signal shall be in **ON** state while <data> is entered. The echoing of <data> is controlled by echo command **E**.
- In PDU mode, not only SUBMIT messages can be stored in SIM, but also DELIVER and STATUS REPORT messages (3GPP TS 23.040 SMS-STATUS-REPORT messages). SUBMIT messages can only be stored with status 2 or 3; DELIVER and STATUS REPORT messages can only be stored with status 0 or 1.
- Care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.
- It is possible to save a concatenation of at most 16 SMS; the maximum number of chars depends on <dc>:
 - 2432 chars
 - 2128 chars if 8-bit is used
 - 1056 chars if UCS2 is used
- In text mode, not only SUBMIT messages can be stored in SIM, but also DELIVER messages.

The type of saved message depends upon the current <fo> parameter (see **+CSMP**). For a DELIVER message, current <vp> parameter (see **+CSMP**) is used to set the message Service Centre Time Stamp <scts>, so it must be an absolute time string, e.g. "09/01/12,11:15:00+04".

SUBMIT messages can only be stored with status "STO UNSENT" or "STO SENT"; DELIVER messages can only be stored with status "REC UNREAD" or "REC READ".

- If message writing fails for some reason, then an error code is reported.



AT+CMGW=?

Test command returns the **OK** result code.



To avoid malfunctions it is suggested to wait for the **+CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.



```
set PDU mode
AT+CMGF=0
OK
AT+CMGW=18
> 088128010099010259115507811020905512F90000A704F4F29C0E
+CMGW: 29
```

OK

```
set text mode
AT+CMGF=1
OK
AT+CSMP=17,167,0,0
OK
AT+CSCA="821029190903",145
OK
AT+CMGW="0165872928"
> test message...
+CMGW: 28
```

OK

2.5.19. AT+CMGD - Delete Message

This command allows to delete messages from memory.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGD=<index>[,<delflag>]

Execution command deletes SMS message(s) from a selected memory storage. Storage is selected by command **+CPMS**.

Parameters:

Name	Type	Default	Description
<index>	integer	-	Message index in the selected storage; it can have values from 1 to N, where N depends on the available space in the selected storage (see +CPMS)
<delflag>	integer	0	Type of multiple message deletion

Values:

- 0 : delete message specified in <index>
- 1 : delete all read messages from selected storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched
- 2 : delete all read messages from selected storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched
- 3 : delete all read messages from selected storage, sent and unsent mobile originated messages, leaving unread messages untouched
- 4 : delete all messages from selected storage.

- i** If <delflag> is present and not set to 0 then, if <index> is greater than 0, <index> is ignored and the command follows the rules for <delflag> shown above.
- i** In case of Verizon FW, delete an empty slot with specified <index> will return **+CMS ERROR: 321** or **ERROR**.



AT+CMGD=?

Test command shows the valid memory locations <index> and the supported values of <delflag>.



```
AT+CMGD=?
+CMGD: (1,2,3,6,7,17,18,19,20,37,38,39,47),(0-4)
OK
```


2.5.20. AT#ISMSCFG - SMS Transport Configuration

This command changes the configuration parameter for mobile-originated SMS.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ISMSCFG=[<mode>]

Set command changes the configuration parameter for outgoing SMS, which will be used to route the outgoing SMS either over CPS or over IMS (IP Multimedia Core Network Subsystem).

Parameter:

Name	Type	Default	Description
<mode>	integer	1	mode to invoke SMS service

Values:

- 0 : SMS service is not to be invoked over the IP networks
- 1 : SMS service is preferred to be invoked over the IP networks



AT#ISMSCFG?

Read command returns the current domain selected to route the outgoing SMS in the format:

#ISMSCFG: <mode>



AT#ISMSCFG=?

Test command returns the supported range of values for parameter <mode>, in the format:

#ISMSCFG: (list of supported <mode>s)

2.6. Time & Alarm

2.6.1. AT+CCLK - Clock Management

The command is related to real time clock management.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CCLK=<time>

Set command sets the real-time clock of the module.

Parameter:

Name	Type	Default	Description
<time>	string	N/A	Current time as quoted string in the format: "yy/MM/dd, hh:mm:ss±zz"

Values:

- yy : year (two last digits are mandatory), range is 00..99
- MM : month (two digits are mandatory), range is 01..12
- dd : day (two digits are mandatory) The range for dd(day) depends either on the month and on the year it refers to. Available ranges are: (01..28) (01..29) (01..30) (01..31). Trying to enter an out of range value will raise an ERROR message.
- hh : hour (two digits are mandatory), range is 00..23
- mm : minute (two digits are mandatory), range is 00..59
- ss : seconds (two digits are mandatory), range is 00..59
- ±zz : time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two digits are mandatory), range is -96...+96



AT+CCLK?

Read command returns the current setting <time> of the real-time clock, in the format:

+CCLK: <time>

- i** The three last characters of <time>, i.e. the time zone information, are returned by AT+CCLK? only if the #NITZ URC 'extended' format has been enabled (see #NITZ).



AT+CCLK=?

Test command returns the **OK** result code.



```
Set date and time:  
AT+CCLK="02/09/07,22:30:00+00"  
OK  
Read date and time:  
AT+CCLK?  
+CCLK: "02/09/07,22:30:25"  
OK
```

2.6.2. AT#UPTIME - System Up Time

This command returns the elapsed time from system boot-up.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#UPTIME=<format>

This command returns elapsed time from system boot-up according to format setting.

Parameter:

Name	Type	Default	Description
<format>	integer	N/A	time format

Values:

- 0 : sec unit
- 1 : time unit



AT#UPTIME=?

Test command return all support value of the parameters <format>.

2.6.3. AT+CSDF - Setting Date Format

This command sets the date format of the date information presented to the user.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CSDF=[<mode>[,<auxmode>]]

This command sets the date format of the date information presented to the user, which is specified by use of the **<mode>** parameter. The **<mode>** affects the date format on the phone display and doesn't affect the date format of the AT command serial interface, so it has no effect on our device.

The command also sets the date format of the TE-TA interface, which is specified by use of the **<auxmode>** parameter (i.e., the **<auxmode>** affects the **<time>** of **+CCLK**).

Parameters:

Name	Type	Default	Description
<mode>	integer	1	phone display data format.
Values:			
1	:	DD-MMM-YYYY	
2	:	DD-MM-YY	
3	:	MM/DD/YY	
4	:	DD/MM/YY	
5	:	DD.MM.YY	
6	:	YYMMDD	
7	:	YY-MM-DD	
<auxmode>	integer	1	TE-TA interface data format.
Values:			
1	:	yy/MM/dd	
2	:	yyyy/MM/dd	

- i** The **<time>** format of **+CCLK** and **+CALA** is:
 5. "yy/MM/dd,hh:mm:ss+zz" when **<auxmode>**=1
 6. "yyyy/MM/dd,hh:mm:ss+zz" when **<auxmode>**=2

- i** If the parameters are omitted (**AT+CSDF=**), then this command sets the default value of **<mode>**.



AT+CSDF?

Read command reports the currently selected **<mode>** and **<auxmode>** in the format:

+CSDF: <mode>,<auxmode>

**AT+CSDF=?**

Test command reports the supported range of values for parameters **<mode>** and **<auxmode>**.



- AT+CSDF?
+CSDF: 1,1
OK

AT+CCLK?
+CCLK: "00/01/02,03:42:08+00"
OK
- AT+CSDF=1,2
OK

AT+CCLK?
+CCLK: "2000/01/02,03:42:23+00"
OK

2.6.4. AT+CTZR - Time Zone Reporting

This command enables and disables the time zone change event reporting.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CTZR=<reporting>

Set command permits to enable/disable the time zone change event reporting.

If the reporting is enabled and whenever the time zone is changed, the MT returns the unsolicited result code:

<reporting> : 1
+CTZV: <tz>

<reporting> : 2
+CTZV: <tz>,<dst>,[<time>]

Parameter:

Name	Type	Default	Description
<reporting>	integer	0	enable/disable the time zone change event reporting.

Values:

- 0 : Disable time zone change event reporting
- 1 : Enable time zone change event reporting
- 2 : Enable extended time zone change event reporting

Unsolicited fields:

Name	Type	Description
<tz>	string	New time zone.
<dst>	integer	Daylight Saving Time

Values:

- 0 : <tz> includes no adjustment for Daylight Saving Time
- 1 : <tz> includes +1 hour (equals 4 quarters in <tz>) adjustment for daylight saving time
- 2 : <tz> includes +2 hours (equals 8 quarters in <tz>) adjustment for daylight saving time

<time>	string	string type value representing the local time. The format is "YYYY/MM/DD,hh:mm:ss". This parameter can be provided by the network.
--------	--------	--



AT+CTZR?

Read command reports the currently selected <reporting> in the format:

+CTZR: <reporting>



AT+CTZR=?

Test command reports the supported range of values for parameter **<reporting>**

2.6.5. AT+CTZU - Automatic Time Zone Update

Set command enables/disables the automatic time zone update via NITZ.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CTZU=<onoff>

Parameter:

Name	Type	Default	Description
<onoff>	integer	0	enables/disables the automatic time zone update via NITZ

Values:

- 0 : disable
- 1 : enable

- The command **+CTZU** is the ETSI standard equivalent of Telit custom command **#NITZ** (for the date and time update functionality).
- Despite of the name, the command **+CTZU** enables automatic update of the date and time set by **+CCLK** command (not only time zone). This happens when a Network Identity and Time Zone (NITZ) message is sent by the network.
If the automatic date and time update functionality has been enabled by **+CTZU** or **#NITZ** (or both), NITZ message will cause a date and time update.



AT+CTZU?

Read command reports the current setting of <onoff> in the format:

+CTZU: <onoff>



AT+CTZU=?

Test command returns the supported values of parameter <onoff>.

2.6.6. AT+CSTF - Setting Time Format

Set command sets the format of the time information presented to the user.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CSTF=[<mode>]

This command sets the format of the time information presented to the user, which is specified by use of the **<mode>** parameter. The **<mode>** affects the time format on the phone display and doesn't affect the time format of the AT command serial interface, so it not actually not used.

Parameter:

Name	Type	Default	Description
<mode>	integer	1	phone display time format

Values:

- 1 : [hh]:[mm] (24 hour clock)
- 2 : [hh]:[mm] (a.m./p.m.)



Entering **AT+CSTF=** returns **OK** but has no effect.



AT+CSTF?

Read command reports the currently selected **<mode>** in the format:

+CSTF: <mode>.



AT+CSTF=?

Test command reports the supported range of values for parameter **<mode>**.

2.6.7. AT#NITZ - Network Identity and Time Zone

This command handles Network Identity and Time Zone.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#NITZ=[<val>[,<mode>]]

Set command enables/disables the automatic date/time updating and the Full Network Name applying. It enables also the **#NITZ** URC in the format:

#NITZ: <datetime>

and permits to change its format.

Parameters:

Name	Type	Default	Description
<val>	integer	7	identifies the functionalities to enable. The <val> parameter is a sum of integer values, where every value corresponds to a functionality: 1 - enables automatic date/time updating 2 - enables Full Network Name applying 4 - sets the #NITZ URC 'extended' format (see <datetime> below) 8 - sets the #NITZ URC 'extended' format with Daylight Saving Time (DST) support (see <datetime> below)

Values:

0 : disables every functionality
1÷15 : sum of integer values

<mode>	integer	0	enables/disables the #NITZ URC
--------	---------	---	---------------------------------------

Values:

0 : disables the URC
1 : enables the URC

Unsolicited field:

Name	Type	Description
<datetime>	string	string format depends on parameter <val> "yy/MM/dd,hh:mm:ss" - 'basic' format, if <val> is in (0..3) "yy/MM/dd,hh:mm:ssÂ±zz" - 'extended' format, if <val> is in (4..7) "yy/MM/dd,hh:mm:ssÂ±zz,d" - 'extended' format with DST support, if <val> is in (8..15) For the meaning of the <datetime> subfields, please check +CCLK and #CCLK commands

-
- ❗ If the DST information isn't sent by the network, then the **<datetime>** parameter will have the format "**yy/MM/dd, hh:mm:ss[±]zz**".
 - ❗ Date and time information can be sent by the network after GSM registration or after PS attach.
-

**AT#NITZ?**

Read command reports whether
automatic date/time updating
Full Network Name applying
#NITZ URC (as well as its format)
are currently enabled or not in the format:
#NITZ: <val>,<mode>

**AT#NITZ=?**

Test command returns supported values of parameters **<val>** and **<mode>**.

2.7. Packet Domain

2.7.1. AT+CGCLASS - GPRS Mobile Station Class

This command sets the GPRS class.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGCLASS=[<class>]

Set command sets the GPRS class according to <class> parameter.

Parameter:

Name	Type	Default	Description
<class>	string	"A"	GPRS class

Values:

- "A" : Class-A mode of operation (A/Gb mode), or CS/PS mode of operation (lu mode) (factory default)
- "B" : Class-B mode of operation (A/Gb mode), or CS/PS mode of operation (lu mode)
- "CG" : Class-C mode of operation in PS only mode (A/Gb mode), or PS mode of operation (lu mode)
- "CC" : Class-C mode of operation in CS only mode (A/Gb mode), or CS (lu mode)



AT+CGCLASS?

Read command returns the mode of operation set by the TE, in the format:

+CGCLASS: <class>



AT+CGCLASS=?

Test command reports the range for the parameter <class>.

2.7.2. AT+CGQREQ - Quality of Service Profile (Requested)

Set command allows to specify a Quality of Service Profile (requested) that is used when the terminal sends an Activate PDP Context Request message to the network. It specifies a profile for the context identified by the (local) context identification parameter, <cid>.



3GPP TS 27.007
3GPP TS 03.060
3GPP TS 23.060

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGQREQ=[<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>]]]]]]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identification (see +CGDCONT command).
<precedence>	integer	0	precedence class
Value:			
0÷max : use test command to know the values range			
<delay>	integer	0	delay class
Value:			
0÷max : use test command to know the values range			
<reliability>	integer	0	reliability class
Value:			
0÷max : use test command to know the values range			
<peak>	integer	0	peak throughput class
Value:			
0÷max : use test command to know the values range			
<mean>	integer	0	mean throughput class
Value:			
0÷max : use test command to know the values range			

- i** If a value is omitted for a particular class then this class, is not checked
- i** **AT+CGQREQ=<cid>** is a special set command syntax that delates the PDP context identified by <cid> index.



AT+CGQREQ?

Read command returns the current settings for each defined context in the format:

```
+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF>
+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]
```

If no PDP context has been defined, it has no effect and **OK** result code is returned.



AT+CGQREQ=?

Test command returns as a compound value the type of the current PDP context and the supported values for the sub parameters in the format:

```
+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)
```

Additional info:

▶▶ PDP type meaning.

Name	Type	Default	Description
<PDP_Type>	string	-	specifies the type of packet data protocol (see +CGDCONT command)



```
AT+CGQREQ?
+CGQREQ: 1,0,0,3,0,0
OK
```

```
AT+CGQREQ=1,0,0,3,0,0
OK
```

```
AT+CGQREQ=?
+CGQREQ: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31)
+CGQREQ: "PPP",(0-3),(0-4),(0-5),(0-9),(0-18,31)
+CGQREQ: "IPV6",(0-3),(0-4),(0-5),(0-9),(0-18,31)
OK
```

2.7.3. AT+CGDCONT - Define PDP Context

The command defines PDP Context.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2

AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAllo c>[,<emergencyInd>[,<PCSCF_discovery>[,<IM_CN_Sign_Flag>]]]]]]]]]]




Set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	PDP Context Identifier specifies a PDP context definition. 1..max - where the value of max is returned by the Test command.
Value:			
1÷max : max value is returned by the test command.			
<PDP_type>	string	N/A	Packet Data Protocol type specifies the type of packet data protocol
Values:			
"IP" : Internet Protocol			
"PPP" : Point to Point Protocol			
"IPV6" : Internet Protocol version 6			
"IPV4V6" : Virtual introduced to handle dual IP stack UE capability.			
<APN>	string	-	(Access Point Name) a string parameter which is a logical name that is used to select the GGSN or the external packet data network. If the value is empty ("") or omitted, then the subscription value will be requested.
<PDP_addr>	string	-	a string parameter that identifies the terminal in the address space applicable to the PDP. The allocated address may be read using the +CGPADDR command. When +CGPIAF is supported, itâ™s settings can influence the format of this parameter returned with the read form of +CGDCONT.
<d_comp>	integer	0	Numeric parameter that controls PDP data compression.
Values:			
0 : compression off			

			1 : compression on
			2 : V.42bis
			3 : V.44 (It is only supported on LN920)
<h_comp>	integer	0	controls PDP header compression.
			Values:
			0 : compression off
			1 : compression on
			2 : RFC1144 (applicable for SNDCCP only)
			3 : RFC2507
			4 : RFC3095 (applicable for PDCP only)
<IPv4AddrAlloc>	integer	0	a numeric parameter that controls how the MT/TA requests to get the IPv4 address information.
			Values:
			0 : IPv4 Address Allocation through NAS Signaling
			1 : IPv4 Address Allocated through DHCP
<emergencyInd>	integer	0	a numeric parameter used to indicate whether the PDP context is for emergency bearer services or not.
			Values:
			0 : PDP context is not for emergency bearer services (default)
			1 : PDP context is for emergency bearer services
<PCSCF_discovery>	integer	0	a numeric parameter influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 [89] annex B and annex L.
			Values:
			0 : Preference of P-CSCF address discovery not influenced by +CGDCONT
			1 : Preference of P-CSCF address discovery through NAS Signalling
			2 : Preference of P-CSCF address discovery through DHCP
<IM_CN_Sign_Flag>	integer	0	a numeric parameter used to indicate to the network whether the PDP context is for IM CN subsystem-related signalling only or not.
			Values:
			0 : UE indicates that the PDP context is not for IM CN subsystem-related signalling only
			1 : UE indicates that the PDP context is for IM CN subsystem-related signalling only

i a special form of the Set command, +CGDCONT=<cid>, causes the values for context number <cid> to become undefined.

-  Only IP, IPV6 and IPV4V6 values are supported for EPS(LTE) services.
-  For EPS(LTE) <PDP_addr> is omitted.
-  if <emergencyInd> is enabled, this profile can not be used attached profile.

AT+CGDCONT?

Read command returns the current settings for each defined context in the format:

```
+CGDCONT:
<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<emergencyInd
>[,<PCSCF_discovery>[,<IM_CN_Sign_Flag>]]]]][<CR><LF>
+CGDCONT:
<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<emergencyInd
>[,<PCSCF_discovery>[,<IM_CN_Sign_Flag>]]]]][...]
```

AT+CGDCONT=?

Test command returns values supported as a compound value.

```
</> AT+CGDCONT=1,"IP","APN","10.10.10.10",0,0,0,0,0
OK

AT+CGDCONT?
+CGDCONT: 1,"IP","APN","10.10.10.10",0,0,0,0,0
OK
```

2.7.4. AT+CGCONTRDP - PDP Context Read Dynamic Parameters

The execution command returns the relevant information for a PDP Context established by the network.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGCONTRDP[=<cid>]

The execution command returns the relevant information on a PDP Context established by the network with the context identifier <cid>. If the parameter <cid> is omitted, the information for all established PDP contexts is returned. The response message has the following format:

```
+CGCONTRDP:<cid>,<bearerId>,<apn>[,<ip&subnet>[,<gw_addr>[,<DNS_prim>
[,<DNS_sec>[, <P_CSCF_prim>[,<P_CSCF_sec>]]]]]]][<CR><LF>
+CGCONTRDP:<cid>,<bearerId>,<apn>[, <ip&subnet_mask>[,<gw_addr>[,<DNS_prim>
[,<DNS_sec>[, <P_CSCF_prim>[,<P_CSCF_sec>]]]]]] [...]]
```

If the context cannot be found an **ERROR** response is returned.

The response message parameters are described in the Additional info section.

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

Parameter:

Name	Type	Default	Description
<cid>	integer	-	identifies a non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

Additional info:

- ▶▶ List of the meaning of the response message parameters.

Name	Type	Default	Description
<berrerrId>	integer	-	identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.
<apn>	string	-	logical name used to select the GGSN or the external packet data network.
<ip&subnet>	string	-	IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form. For more information, see next Additional info section.
<gw_addr>	string	-	Gateway address of the MT. The string is given as dot-separated numeric (0-255) parameters.
<DNS_prim>	string	-	IP address of the primary DNS Server.
<DNS_sec>	string	-	IP address of the secondary DNS Server.
<P_CSCF_prim>	string	-	IP address of the primary P-CSCF Server.

<P_CSCF_sec> string - IP address of the secondary P-CSCF Server.

- Referring to **<ip&subnet>** parameter:
the string is given as dot-separated numeric (0-255) parameters. The format is:

for IPv4:

"a1.a2.a3.a4.m1.m2.m3.m4"

for IPv6:

"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"

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

- i** The dynamic part of the PDP context will only exist if established by the network. The test command returns a list of **<cid>**s associated with active contexts.
- i** If the MT has dual stack capabilities, two lines of information are returned per **<cid>**. First one line with the IPv4 parameters followed by one line with the IPv6 parameters.



AT+CGCONTRDP=?

Return the list of **<cid>**s associated with active contexts.



```
AT+CGACT=1,1
OK
```

```
AT+CGCONTRDP=?
+CGCONTRDP: (1)
```

```
OK
```

```
AT+CGCONTRDP =1
+CGCONTRDP: 1,5,lte.ktfwing.com,"10.52.202.76",,"211.219.86.1",,"168.126.63.1"
```

```
OK
```

2.7.5. AT+CGQMIN - Quality of Service Profile (Minimum Acceptable)

Set command allows to specify a minimum acceptable profile which is checked by the terminal against the negotiated profile returned in the Activate PDP Context Accept message.



3GPP TS 27.007
3GPP TS 03.060
3GPP TS 23.060

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identification (see +CGDCONT command)
<precedence>	integer	0	precedence class
Value:			
0÷max : use test command to know the values range			
<delay>	integer	0	delay class
Value:			
0÷max : use test command to know the values range			
<reliability>	integer	0	reliability class
Value:			
0÷max : use test command to know the values range			
<peak>	integer	0	peak throughput class
Value:			
0÷max : use test command to know the values range			
<mean>	integer	0	mean throughput class
Value:			
0÷max : use test command to know the values range			

- If a value is omitted for a class, then this class is not checked.
- A special form of the set command, **AT+CGQMIN=<cid>** causes the requested profile for context number <cid> to become undefined.



AT+CGQMIN?

Read command returns the current settings for each defined context in the format:

+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF>

+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]



If no PDP context has been defined, it has no effect and **OK** result code is returned



AT+CGQMIN=?

Test command returns as a compound value the type of the current PDP context and the supported values for the sub parameters in the format:

**+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)**

Additional info:

▶▶ PDP type meaning.

Name	Type	Default	Description
<PDP_Type>	string	-	specifies the type of packet data protocol, see +CGDCONT command Only the "IP" <PDP_Type> is currently supported.

<guarBitRateUL>	integer	0	guaranteed bitrate up link(kbits/s). This parameter should be provided if the <trafficClass> is specified as conversational or streaming.
Values:			
0	:		subscribed value
1÷568	:		kbits/s
576÷8640	:		kbits/s
8700÷42200	:		kbits/s
<guarBitRateDL>	integer	0	guaranteed bitrate down link(kbits/s). This parameter should be provided if the <trafficClass> is specified as conversational or streaming.
Values:			
0	:		subscribed value
1÷568	:		kbits/s
576÷8640	:		kbits/s
8700÷42200	:		kbits/s
<deliverOrder>	integer	2	SDU delivery order
Values:			
0	:		disable
1	:		enable
2	:		subscribed value
<maxSDUsize>	integer	0	maximum SDU size in octets
Values:			
0	:		subscribed value
10÷1500	:		size in octets
1502	:		size in octets
1510	:		size in octets
1520	:		size in octets
<SDUerrRatio>	string	0E0	SDU error ratio
mEe means $m \cdot 10^{-e}$, e.g 1E2 means $1 \cdot 10^{-2}$			
Values:			
0E0	:		$0 \cdot 10^{-0}$
1E1	:		$1 \cdot 10^{-1}$
1E2	:		$1 \cdot 10^{-2}$
7E3	:		$7 \cdot 10^{-3}$
1E3	:		$1 \cdot 10^{-3}$
1E4	:		$1 \cdot 10^{-4}$
1E5	:		$1 \cdot 10^{-5}$
1E6	:		$1 \cdot 10^{-6}$

<resBitErrRatio>	string	0E0	residual bitt error ratio
			mEe means $m \cdot 10^{-e}$, e.g. 1E2 mean $1 \cdot 10^{-2}$
		Values:	
		0E0	: $0 \cdot 10^{-0}$
		5E2	: $5 \cdot 10^{-2}$
		1E2	: $1 \cdot 10^{-2}$
		5E3	: $5 \cdot 10^{-3}$
		4E3	: $4 \cdot 10^{-3}$
		1E3	: $1 \cdot 10^{-3}$
		1E4	: $1 \cdot 10^{-4}$
		1E5	: $1 \cdot 10^{-5}$
		1E6	: $1 \cdot 10^{-6}$
		6E8	: $6 \cdot 10^{-8}$
<delErrSDUs>	integer	3	delivery of erroneous SDUs
		Values:	
		0	: disable
		1	: enable
		2	: no detect
		3	: subscribed value
<tranDelay>	integer	0	transfer delay (milliseconds)
		Values:	
		0	: subscribed value
		10÷150	: delay (milliseconds)
		200÷950	: delay (milliseconds)
		1000÷4000	: delay (milliseconds)
<traffHandPrio>	integer	0	traffic handling priority
		Values:	
		0	: subscribed value
		1÷3	: priority level
<sourStatiDesc>	integer	0	characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the <trafficClass> is specified as conversational or streaming
		Values:	
		0	: characteristics of SDUs is unknown
		1	: characteristics of SDUs corresponds to a speech source
<signInd>	integer	0	signalling content of submitted SDUs for a PDP context. This parameter should be provided if the <trafficClass> is specified as interactive.

Values:

- 0 : PDP context is not optimized for signalling
- 1 : PDP context is optimized for signalling <PDP_type> (see +CGDCONT command)

- A special form of the Set command, +CGEQREQ=<cid> causes the requested profile for context number <cid> to become undefined.
- The set command can modify the 2G QoS according to standard [2], see +CGQREQ command.



AT+CGEQREQ?

Read command returns the current settings for each defined context in the format:

```
[+CGEQREQ: <cid>,<trafficClass>,<maximumBitrateUl>,<maximumBitrateDl>,<guaranteedBitrateUl>,<guaranteedBitrateDl>,<deliveryOrder>,<maximumSduSize>,<sduErrorRatio>,<residualBitErrorRatio>,<deliveryErroneousSdus>,<transferDelay>,<trafficHandlingPriority>,<sourceStatisticsDescriptor>,<signallingIndication><CR><LF>]
```

If no PDP context has been defined it has no effect, and **OK** result code is returned.



AT+CGEQREQ=?

Test command returns as a compound value the type of the current PDP context and the supported values for the sub-parameters in the format:

```
+CGEQREQ: <pdpType>,<br>(list of supported <trafficClass>s),<br>(list of supported <maximumBitrateUl>s),<br>(list of supported <maximumBitrateDl>s),<br>(list of supported <guaranteedBitrateUl>s),<br>(list of supported <guaranteedBitrateDl>s),<br>(list of supported <deliveryOrder>s),<br>(list of supported <maximumSduSize>s),<br>(list of supported <sduErrorRatio>s),<br>(list of supported <residualBitErrorRatio>s),<br>(list of supported <deliveryErroneousSdus>s),<br>(list of supported <transferDelay>s),<br>(list of supported <trafficHandlingPriority>s),<br>(list of supported <sourceStatisticsDescriptor>s),<br>(list of supported <signallingIndication>s)
```

Additional info:

- ▶▶ PDP type

Name	Type	Default	Description
<pdpType>	string	-	specifies the type of packet data protocol (see +CGDCONT command)

2.7.7. AT+CGEQNEG - 3G Quality of Service Profile (Negotiated)

This command allows the TE to retrieve the negotiated 3G quality of service returned in the Activate PDP Context Accept/Modify message.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGEQNEG=[<cid>[,<cid>[,...]]]

Set command returns the negotiated 3G QoS profile for the specified context identifiers, <cid>s. The QoS profile consists of a number of parameters, each of which may have a separate value.

+CGEQNEG: <cid>, <Traffic class>, <Maximum bitrate 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>[<CR><LF>

+CGEQNEG: <cid>, <Traffic class>, <Maximum bitrate 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>[...]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identification (see +CGDCONT command)



AT+CGEQNEG=?

Test command returns a list of <cid>s associated with active contexts.



AT+CGEQREQ?

+CGEQREQ: 1,4,0,0,0,0,2,0,"0E0","0E0",3,0,0,0,0

OK

AT+CGACT=1,1

OK

AT+CGEQNEG=?

+CGEQNEG: (1)

OK

AT+CGEQNEG=1

+CGEQNEG: 1,3,128,384,0,0,2,1500,"1E4","1E5",3,0,1,0,0

OK

2.7.8. AT+CGPADDR - Show PDP Address

This command returns a list of PDP addresses for the specified context identifiers.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGPADDR=[<cid>[,...]]

Execution command returns a list of PDP addresses for the specified context identifiers.

Parameter:

Name	Type	Default	Description
<cid>	integer	-	specifies a PDP context definition, see +CGDCONT command. If no <cid> specified, the addresses for all defined contexts are returned.

Additional info:

- ▶▶ The command returns a row of information for every <cid> whose context has been defined. No row is returned for a <cid> whose context has not been defined. Here is the response format:

```
+CGPADDR: <cid>,<PDP_addr><CR><LF>
+CGPADDR: <cid>,<PDP_addr><CR><LF>
...
```

Name	Type	Default	Description
<PDP_addr>	string	-	identifies the terminal in an address space applicable to the PDP. The address may be static or dynamic: <ul style="list-style-type: none"> 7. for a static address, it will be the one set by the +CGDCONT command when the context was defined 8. 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>; <PDP_addr> is omitted if none is available



AT+CGPADDR=?

Test command returns a list of defined <cid>s.



```
AT+CGACT=1,3  
OK
```

```
AT+CGACT?  
+CGACT: 1,0  
+CGACT: 2,0  
+CGACT: 3,1
```

```
OK
```

```
AT+CGPADDR=3  
+CGPADDR: 3,"xxx.yyy.zzz.www"
```

```
OK
```

```
AT+CGPADDR=?  
+CGPADDR: (3)
```

```
OK
```

2.7.9. AT+CGCMOD - Modify PDP Context

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

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGCMOD=[<cid_n>[,...]]

After command has completed, the MT returns to V.250 online data state. If the requested modification for any specified context cannot be achieved, an **ERROR** or **+CME: ERROR** response is returned. Extended error responses are enabled by the **+CMEE** command.

For EPS, the modification request for an EPS bearer resource will be answered by the network by an EPS bearer Modification request. The request must be accepted by the MT before the PDP context effectively changed.

Parameter:

Name	Type	Default	Description
<cid_n>	integer	-	generic PDP context identifier.

- If no parameters are specified (no <cid_n> specified), the command modifies all active contexts.



AT+CGCMOD=?

Test command returns a list of <cid_n>s associated with active contexts.

+CGCMOD: (list of <cid_n>s associated with active contexts)

		8700÷42200	:	kbits/s
--	--	------------	---	---------

<guarBitRateDL>	integer	0		Configure the guaranteed bitrate down link(kbits/s).
	Values:			
		0	:	subscribed value
		1÷568	:	kbits/s
		576÷8640	:	kbits/s
		8700÷42200	:	kbits/s

<deliverOrder>	integer	2		SDU Delivery order.
	Values:			
		0	:	No (for default value)
		1	:	Yes - SDU
		2	:	subscribed value

<maxSDUsize>	integer	0		Maximum SDU size in octets.
	Values:			
		0	:	subscribed value
		10÷1500	:	Size in octets
		1502	:	Size in octets
		1510	:	Size in octets
		1520	:	Size in octets

<SDUerrRatio>	string	0E0		SDU error ratio. mEe mean $m \cdot 10^{-e}$, for example 1E2 mean $1 \cdot 10^{-2}$
	Values:			
		0E0	:	means $0 \cdot 10^{-0}$
		1E1	:	means $1 \cdot 10^{-1}$
		1E2	:	means $1 \cdot 10^{-2}$
		7E3	:	means $7 \cdot 10^{-3}$
		1E3	:	means $1 \cdot 10^{-3}$
		1E4	:	means $1 \cdot 10^{-4}$
		1E5	:	means $1 \cdot 10^{-5}$
		1E6	:	means $1 \cdot 10^{-6}$

<resBitErrRatio>	string	0E0		Residual bit error ratio mEe mean $m \cdot 10^{-e}$, for example 1E2 mean $1 \cdot 10^{-2}$
	Values:			
		0E0	:	means $0 \cdot 10^{-0}$
		5E2	:	means $5 \cdot 10^{-2}$
		1E2	:	means $1 \cdot 10^{-2}$
		5E3	:	means $5 \cdot 10^{-3}$
		4E3	:	means $4 \cdot 10^{-3}$

	1E3	:	means	1*10-3
	1E4	:	means	1*10-4
	1E5	:	means	1*10-5
	1E6	:	means	1*10-6
	6E8	:	means	6*10-8

<delErrSDUs>	integer	0	Delivery of erroneous SDUs.
---------------------------	---------	---	-----------------------------

Values:

0	:	no (default value)
1	:	yes
2	:	no detect
3	:	subscribed value

<tranDelay>	integer	0	Transfer delay (milliseconds)
--------------------------	---------	---	-------------------------------

Values:

0	:	subscribed value
10÷150	:	Delay (milliseconds)
200÷950	:	Delay (milliseconds)
1000÷4000	:	Delay (milliseconds)

<traffHandPrio>	integer	0	Traffic handling priority
------------------------------	---------	---	---------------------------

Values:

0	:	subscribed value
1÷3	:	priority level

<sourStatiDesc>	integer	0	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
------------------------------	---------	---	--


Values:

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

<signInd>	integer	0	Signalling content of submitted SDUs for a PDP context. This parameter should be provided if the <TrafficClass> is specified as interactive
------------------------	---------	---	--

Values:

0	:	PDP context is not optimized for signalling
1	:	PDP context is optimized for signalling

- 
 A special form of the Set command, **+CGEQMIN=<cid>** causes the requested profile for context number **<cid>** to become undefined.
 The current settings are stored in NVM.
 Set command can modify the 2G QoS according to 3GPP 23.107 (see **+CGQMIN**).

AT+CGEQMIN?

Read command returns the current settings for each defined context in the format:

```
[+CGEQMIN:
<cid>,<trafficClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliv
erOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandP
rio>,<sourStatiDesc>,<signInd><CR><LF>] [+CGEQMIN:...]
```

If no PDP context has been defined, it has no effect and **OK** result code is returned.

Parameters are described as for the set command except the parameters described in Additional info section.

AT+CGEQMIN=?

Test command returns as a compound value the type of the current PDP context and the supported values for the sub-parameters in the format:

```
+CGQMIN:<PDP_Type>,
(list of supported <traffClass>s),(list of supported <maxBitRateUL>s),
(list of supported <maxBitRateDL>s),(list of supported <guarBitRateUL>s),
(list of supported <guarBitRateDL>s),(list of supported <deliverOrder>s),
(list of supported<maxSDUsize>s),(list of supported<SDUerrRatio>s),
(list of supported<resBitErrRatio>s),(list of supported <delErrSDUs>s),
(list of supported <tranDelay>s),(list of supported <traffHandPrio>s),
(list of supported<sourStatiDesc>s), (list of supported <signInd>s)
```

<PDP_Type> parameter specifies the Packet Data Protocol type, see **+CGDCONT** command.

-  Only the "IP" Packet Data Protocol type is supported.

2.7.11. AT+CGEQOS - Define EPS Quality of Service

The command specifies the EPS Quality of Service parameters.



[1] 3GPP TS 23.203

[2] 3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGEQOS=[<cid>[,<QCI> [,<DL_GBR>,<UL_GBR> [,<DL_MBR>,<UL_MBR>]]]]

Set command specifies the EPS Quality of Service parameters.

A special form of the set command, **+CGEQOS= <cid>** causes the values for context number **<cid>** to become undefined.

Parameters:

Name	Type	Default	Description
<cid>	integer	-	it specifies a particular EPS Traffic Flows definition in EPS
<QCI>	integer	9	it specifies a class of EPS QoS, see standard [1].
Values:			
0	:	QCI is selected by network	
1÷4	:	value range for guaranteed bit rate Traffic Flows	
5÷9	:	value range for non-guaranteed bit rate Traffic Flows	
<DL_GBR>	integer	-	it indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<UL_GBR>	integer	-	indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<DL_MBR>	integer	-	it indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<UL_MBR>	integer	-	it indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].

Additional info:

►► Possible Response(s):
+CME ERROR: <err>



AT+CGEQOS?

Read command returns the current settings for each defined QoS.

```
+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=?

Test command returns the ranges of the supported parameters:

```
+CGEQOS: (list 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)
```

2.7.12. AT+CGPIAF - Printing IP Address Format

This command selects the printout format of the IPv6 address.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGPIAF=[<IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>,<Pv6_CompressZeros>]]]

Parameters:

Name	Type	Default	Description
<IPv6_AddressFormat>	integer	0	selects the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address.
Values:			
0	:		use IPv4-like dot-notation. IP addresses, and subnetwork mask if applicable, are dot-separated.
1	:		use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space.
<IPv6_SubnetNotation>	integer	0	selects the subnet-notation for remote address and subnet mask. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		both IP address, and subnet mask are started explicitly, separated by a space.
1	:		the printout format is applying /(forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation.
<IPv6_LeadingZeros>	integer	0	selects whether leading zeros are omitted or not. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		leading zeros are omitted.
1	:		leading zeros are included.
<Pv6_CompressZeros>	integer	0	selects whether 1-n instances of 16-bit- zero values are replaced by only "::". This applies only once. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		no zero compression.
1	:		use zero compression.

**AT+CGPIAF?**

Read command returns the current parameter setting.

**AT+CGPIAF=?**

Test command returns values supported as compound values.



```
AT+CGPIAF=0,0,0,0
```

```
OK
```

```
AT+CGACT=1,1
```

```
OK
```

```
AT+CGPADDR =
```

```
+CGPADDR: 1,"252.1.171.171.205.205.239.224.0.0.0.0.0.0.1"
```

```
OK
```

```
AT+CGPIAF=1,0,0,0
```

```
OK
```

```
AT+CGACT=1,1
```

```
OK
```

```
AT+CGPADDR =
```

```
+CGPADDR: 1,"FC01:ABAB:CDCD:EFE0:0:0:0:1"
```

```
OK
```

2.7.13. AT+CGEREP - Packet Domain Event Reporting

This command enables or disables the presentation of unsolicited result codes.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CGEREP=[<mode>[,<bfr>]]

Set command enables/disables sending of unsolicited result codes in case of certain events occurring in the module or in the network. The URC formats and related events are shown in the Additional info sections.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	controls the processing of URCs specified with this command.

Values:

- 0 : buffer unsolicited result codes in the TA. If TA result code buffer is full, the oldest one can be discarded. No codes are forwarded to the TE.
- 1 : discard 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 when TA-TE link becomes available; otherwise forward them directly to the TE.

<bfr>	integer	0	controls the effect on buffered codes when <mode> 1 or 2 is entered.
-------	---------	---	--

Values:

- 0 : TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered.
- 1 : TA 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)

Additional info:

- ▶▶ A network request for PDP context activation occurred when the TA was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.

+CGEV: REJECT <PDP_type>, <PDP_addr>

- ▶▶ The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to TA.

+CGEV: NW REACT <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 TA.

+CGEV: NW_DEACT <PDP_type>, <PDP_addr>, [<cid>]

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

+CGEV: ME_DETACH

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

+CGEV: NW_DETACH

- ▶▶ The mobile equipment has forced a change of MS class. The highest available class is reported (see **+CGCLASS**).

+CGEV: ME CLASS <class>

Unsolicited fields:

Name	Type	Description
<PDP_type>	string	Packet Data Protocol type, which specifies the type of packet data protocol
<PDP_addr>	string	identifies the terminal in the address space applicable to the PDP
<cid>	integer	PDP Context Identifier



AT+CGEREP?

Read command returns the current **<mode>** and **<bfr>** settings, in the format:

+CGEREP: <mode>,<bfr>



AT+CGEREP=?

Test command reports the supported range of values for the **+CGEREP** command parameters.

2.7.14. AT+CGATT - PS Attach or Detach

This execution command is used to register (attach) the terminal to or deregister (detach) the terminal from the Packet Domain service.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGATT=<state>

Parameter:

Name	Type	Default	Description
<state>	integer	N/A	state of PS attachment

Values:

- 0 : detached
- 1 : attached



AT+CGATT?

Read command returns the current PS state in the format:

+CGATT: <state>



AT+CGATT=?

Test command returns the values range of the <state> parameter.



```
AT+CGATT?
+CGATT: 0
OK
```

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

```
AT+CGATT=1
OK
```

2.7.15. AT+CGTFT - Traffic Flow Template

This command allows the TE to specify a Packet Filter - PF for a Traffic Flow Template - TFT that is used in the GGSN in UMTS/GPRS and Packet GW in EPS for routing of packets onto different QoS flows towards the TE.



3GPP TS 27.007
3GPP TS 03.60/23.060

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2

➔ **AT+CGTFT=[<cid>,<packet filter identifier>,<evaluation precedence index>,<source address and subnet mask>,<prot num(ipv4)/next hdr(ipv6)>,<destination port range>,<source port range>,<ipsec sec param index (spi)>,<tos(ipv4) TP class(ipv6)&mask>,<flow label (ipv6)>]]]]]]]]]]**

The concept further described in the 3GPP TS 23.060 [47]. A TFT consists of from one and up to 16 Packet Filters, each identified by a unique <packet filter identifier>. A Packet Filter also has an <evaluation precedence index> that is unique within all TFTs associated with all PDP contexts that are associated with the same PDP address.

The set command specifies a Packet Filter that whom added to the TFT stored in the MT and used for the context identified by the (local) context identification parameter, <cid>. The specified TFT will be stored in the GGSN in UMTS/GPRS and Packet GW in EPS only at activation or MS-initiated modification of the related context. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGTFT command is effectively an extension to these commands. The Packet Filters consist of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGTFT= <cid> causes all of the Packet Filters in the TFT for context number

<cid> to become undefined. At any time there may exist only one PDP context with no associated TFT amongst all

PDP contexts associated to one PDP address. At an attempt to delete a TFT, which would violate this rule, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

Possible Response(s):

OK
ERROR

Parameters:

Name	Type	Default	Description
<cid>	integer	-	a numeric parameter which specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). The following parameters are defined in 3GPP TS 23.060 [47]:
<packet filter identifier>	integer	-	The value range is from 1 to 16.
<evaluation precedence index>	integer	-	The value range is from 0 to 255.

<source address and subnet mask>	string	-	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.
<prot num(ipv4)/ next hdr(ipv6)>	integer	-	The value range is from 0 to 255.
<destination port range>	string	-	The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".
<source port range>	string	-	The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".
<ipsec sec param index (spi)>	integer	-	The value is in hexadecimal format. The value range is from 0 to FFFFFFFF.
<tos(ipv4) TP class(ipv6) &mask>	string	-	The string is given as dot-separated numeric (0-255) parameters on the form "t.m".
<flow label (ipv6)>	integer	-	The numeric value is in hexadecimal format. The value range is from 0 to FFFFF. Valid for IPv6 only.

Additional info:

- ▶▶ Some of the above listed attributes may coexist in a Packet Filter while others mutually exclude each other, the possible combinations are shown in 3GPP TS 23.060 [47].

AT+CGTFT?

The read command returns the current settings for all Packet Filters for each defined context.


AT+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)> [

AT+CGTFT=?

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type returned on a separate line. TFTs shall be used for PDP-type IP and PPP only. For PDP-type PPP a TFT is applicable only when IP traffic is carried over PPP. If PPP carries header-compressed IP packets, then a TFT cannot be use.

AT+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) [<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) [...]]

-  The possible combinations listed on 3GPP TS 23.060 [47].

2.7.16. AT+CGEQOSRDP - EPS Quality of Service Read Dynamic Parameters

The command returns the parameters related to the Quality of Service.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGEQOSRDP=[<cid>]

The execution command returns the Quality of Service parameters <QCI>, [<DL_GBR> and <UL_GBR>] and

[<DL_MBR> and <UL_MBR>] of the active secondary or non secondary PDP context associated to the provided context identifier <cid>.

If the parameter <cid> is omitted, the Quality of Service parameters for all secondary or non secondary active PDP contexts are returned.

Parameter:

Name	Type	Default	Description
<cid>	integer	-	it specifies a particular Traffic Flows definition in EPS and a PDN connection definition in UMTS/GPRS.

Additional info:

►► Possible Response(s):

```
+CGEQOSRDP:<cid>,<QCI>,<DL_GBR>,<UL_GBR>,<DL_MBR>,<UL_MBR>][<CR>>LF>
+CGEQOSRDP:<cid>,<QCI>,<DL_GBR>,<UL_GBR>,<DL_MBR>,<UL_MBR>][...]
```

►► Defined values:

Name	Type	Default	Description
<QCI>	integer	-	specifies a class of EPS QoS. (see 3GPP TS 23.203 [85])0 QCI is selected by network [1..4] value range for guaranteed bit rate Traffic Flows [5..9] value range for non-guaranteed bit rate Traffic Flows.
<DL_GBR>	integer	-	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	-	indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])
<DL_MBR>	integer	-	indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])
<UL_MBR>	integer	-	indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

**AT+CGEQOSRDP=?**

+CGEQOSRDP: (list of <cid>s associated with secondary or non secondary active contexts)

Parameters of both network and MT/TA initiated PDP contexts returned.

2.7.17. AT+CGTFTRDP - Traffic Flow Template Read Dynamic Parameters

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



3GPP TS 27.007; 3GPP TS 03.60/23.060

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2

AT+CGTFTRDP=[<cid>]

The execution command returns the relevant information about Traffic Flow Template for an active secondary or non secondary PDP context specified by <cid> together with the additional network assigned values when established by the network.

If the parameter <cid> is omitted, the Traffic Flow Templates for all active secondary and non secondary PDP contexts are returned.

Parameters of both network and MT/TA initiated PDP contexts returned.

Possible Response(s):

+CGTFTRDP: <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>, <NW packet filter Identifier>[<CR><LF>

+CGTFTRDP: <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>,<NW packet filter Identifier> [...]

Parameter:

Name	Type	Default	Description
<cid>	integer	-	a numeric parameter which specifies a particular PDP context definition or Traffic Flows definition.

Additional info:

►►List of the meaning of the response message parameters.

Name	Type	Default	Description
<packet filter identifier>	integer	N/A	packet filter identifier
Value:			
	1÷16	:	supported range
<evaluation precedence	integer	N/A	evaluation precedence index


<source index>			
	Value:		
	0÷255	:	supported range
<source address and subnet mask>	string	-	source address and subnet mask 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.
<protocol number/next header>	string	N/A	protocol number for ipv4 or next header for ipv6
	Value:		
	0÷255	:	supported range
<destination port range>	string	-	The string is given as dot-separated numeric (0-65535) parameters on the form "f.t"
<source port range>	string	-	The string is given as dot-separated numeric (0-65535) parameters on the form "f.t"
<ipsec spi>	hex	N/A	ipsec security parameter index (spi) in hexadecimal format
	Value:		
	00000000÷FFFFFFF	:	supported range
<tos/traffic class and mask>	string	-	type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask The string given as dot-separated numeric (0-255) parameters on the form "t.m"
<flow label (ipv6)>	hex	N/A	valid for IPv6 only
	Value:		
	00000÷FFFFF	:	supported range
<direction>	string	N/A	specifies the transmission direction in which the Packet Filter shall be applied
	Values:		
	0	:	Pre Release 7 TFT Filter (see 3GPP TS 24.008, table 10.5.162)
	1	:	Uplink

- 2 : Downlink
- 3 : Bidirectional (Used for Uplink and Downlink)

<NW packet filter Identifier> integer N/A in EPS the value is assigned by the network when established

Value:

1÷16 : supported range

-  Some of the above listed attributes can coexist in a Packet Filter while others mutually exclude each other. The possible combinations listed on 3GPP TS 23.060 [47].

 **AT+CGTFTRDP=?**

+CGTFTRDP: (list of <cid>s associated with active secondary or non secondary contexts)



Some of the above listed attributes can coexist in a Packet Filter while others mutually exclude each other. The possible combinations listed on 3GPP TS 23.060 [47].

2.7.18. AT+CGSCONTRDP - Secondary PDP Context Read Dynamic Parameters

This command returns parameters for a given `<cid>`.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGSCONTRDP[=<cid>]

The execution command returns `<p_cid>` and `<bearer_id>` parameters for a given `<cid>`. If the context cannot be found an **ERROR** response is returned. If the parameter `<cid>` is omitted, the `<cid>`, `<p_cid>` and `<bearer_id>` are returned for all established PDP contexts. Format of the returned message:

```
+CGSCONTRDP:<cid>,<p_cid>,<bearer_id>[<CR><LF>
+CGSCONTRDP:<cid>,<p_cid>,<bearer_id>[...]]
```

Parameter:

Name	Type	Default	Description
<code><cid></code>	integer	-	specifies a particular PDP context or Traffic Flows definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

Additional info:

▶▶ Here is the list of the parameters meanings returned by the **+CGSCONTRDP** command.

Name	Type	Default	Description
<code><p_cid></code>	integer	-	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.
<code><bearer_id></code>	integer	-	identifies the bearer, EPS Bearer in EPS and NSAPI in GPRS.



AT+CGSCONTRDP=?

The test command returns a list of `<cid>`s associated with active contexts:

+CGSCONTRDP: (list of <cid>s associated with active contexts)



Parameters for network-initiated PDP contexts returned as well. The dynamic part of the PDP context will only exist if established by the network.

2.7.19. AT+CGREG - GPRS Network Registration Status

Set command controls the presentation of the **+CGREG**: unsolicited result code



3GPP TS 27.007
3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CGREG=[<mode>]

Set command enables/disables the **+CGREG**: unsolicited result code, and selects one of the available formats:

short format:

+CGREG:<stat>

long format:

+CGREG:<stat>[,<lac>,<ci>[,<AcT>,<rac>]]

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code (URC), and selects one of the available formats. The following events trigger the URC: URC short format is displayed every time there is a change in the network registration status. URC long format is displayed, according to <mode> value, every time there is a change of the network cell.

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and selects the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)

Unsolicited fields:

Name	Type	Description
<stat>	integer	registration status of the module

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to
- 3 : registration denied

		4 : unknown
		5 : registered, roaming
<lac>	string	the parameter reports: 9. Local Area Code when <AcT> =0 or 2 10. Tracking Area Code when <AcT> =7
<ci>	string	cell ID in hexadecimal format
<AcT>	integer	access technology of the registered network. Values: 0 : GSM 2 : UTRAN 7 : E-UTRAN
<rac>	string	routing area code (one byte) in hexadecimal format 11. Routing Area Code when <AcT> =0 or 2 12. Mobile Management Entity code when <AcT> =7

- <lac>**, **<ci>**, **<AcT>**, and **<rac>** network information is reported by URC only if **<mode>**=2, and the module is registered on some network cell.
<lac> and **<rac>** values will change **<tac>** and **<mme_code>** values in LTE.



AT+CGREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the network information (**<lac>**, **<ci>**, **<AcT>**, and **<rac>**) according to the used **<mode>** parameter value.

+CGREG: <mode>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]]

<lac>, **<ci>**, **<AcT>**, and **<rac>** network information is reported only if **<mode>**=2 or 4 and the module is registered on some network cell.

<lac> and **<rac>** values will change **<tac>** and **<mme_code>** values in LTE.



AT+CGREG=?

Test command returns supported values for parameter **<mode>**.

2.7.20. AT#SINGLEAPNSWITCH - set APN param change

This command sets APN param change.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SINGLEAPNSWITCH=<mode>

If it is enabled and an APN network identifier or APN-related parameter is updated, Modem can re-activate PDN context with changed APN if there are no application working on the activated PDN context and APN name is changed. If the PDN context is for LTE attach, UE will attempt to reattach with changed APN. In other systems, this command works as if it is disabled.

If it is disabled, the changed APN will go into effect at the moment when the PDN context is deactivated and then re-activated. Power recycling is one of operations that will have new APN activated.

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	Set enable or disable

Values:

- 0 : Disable
- 1 : Enable

- Value set by command is directly stored in NVM and available at next reboot.
- default value is depended on network vendor. VZW/TELSTRA is 1.
- no application means that user did not use #SGACT=1,1.



AT#SINGLEAPNSWITCH?

Read command reports current configuration.



AT#SINGLEAPNSWITCH=?

Test command reports the supported range of values.

2.8. SIM

2.8.1. AT+CPIN - Enter the PIN

The command allows sending the SIM PIN, a numeric code necessary before the SIM card is accessible and the modem can register to the mobile network.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT+CPIN=<pin>[,<newpin>]

Set command sends to the device a numeric code which is necessary before the module can access the SIM card and can register to the mobile network (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN required is SIM PUK or SIM PUK2, then **<newpin>** is required. The **<newpin>** code will replace the old pin in the SIM.

Parameters:

Name	Type	Default	Description
<pin>	string	-	PIN required or old PIN if the command is used to change the SIM PIN
<newpin>	string	-	new PIN that will replace old pin



AT+CPIN?

Read command reports the PIN/PUK/PUK2 request status of the device in the form:

+CPIN: <code>

Additional info:

▶▶ Parameters:

Name	Type	Default	Description
<code>	string	N/A	PIN/PUK/PUK2 request status code

Values:

READY	:	ME is not pending for any password
SIM PIN	:	ME is waiting SIM PIN to be given
SIM PUK	:	ME is waiting SIM PUK to be given
PH-SIM PIN	:	ME is waiting phone-to-SIM card password to be given
PH-FSIM PIN	:	ME is waiting phone-to-very first SIM card password to be given
PH-FSIM PUK	:	ME is waiting phone-to-very first SIM card unblocking password to be given

SIM PIN2	:	ME is waiting SIM PIN2 to be given; this <code> is returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17)
SIM PUK2	:	ME is waiting SIM PUK2 to be given; this <code> is returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18)
PH-NET PIN	:	ME is waiting network personalization password to be given
PH-NET PUK	:	ME is waiting network personalization unblocking password to be given
PH-NETSUB PIN	:	ME is waiting network subset personalization password to be given
PH-NETSUB PUK	:	ME is waiting network subset personalization unblocking password to be given
PH-SP PIN	:	ME is waiting service provider personalization password to be given
PH-SP PUK	:	ME is waiting service provider personalization unblocking password to be given
PH-CORP PIN	:	ME is waiting corporate personalization password to be given
PH-CORP PUK	:	ME is waiting corporate personalization unblocking password to be given

- i** Pin pending status at startup depends on PIN facility setting; to change or query the default power up setting use the command **AT+CLCK**.



AT+CPIN=?

Test command returns **OK** result code.



```
AT+CME=1
OK
```

```
AT+CPIN?
+CME ERROR: 10 //error: you have to insert the SIM
```

```
AT+CPIN?
+CPIN: READY //you inserted the SIM and module is not waiting for PIN
OK
```


2.8.2. AT+ICCID - Read ICCID

Execution command reads on SIM the Integrated Circuit Card Identification (ICCID). It is the card identification number that provides a unique identification number for the SIM card.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+ICCID

The command returns the following message:

```
+ICCID: <ICCID>
```



AT+ICCID=?

Test command returns the **OK** result code.



AT+ICCID

```
+ICCID: 89861109091740011006
```

```
OK
```

2.8.3. AT+CIMI - International Mobile Subscriber Identity (IMSI)

This command returns the International Mobile Subscriber Identity (IMSI).



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CIMI

Execution command returns the value of the International Mobile Subscriber Identity stored in the SIM without command echo.

i If the SIM is not inserted, the command returns **ERROR**.



AT+CIMI=?

Test command returns **OK** result code.



```
AT+CIMI
22201701202507
OK
```

2.8.4. AT#SIMDET - SIM Detection Mode

This command specifies the SIM detection mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SIMDET=<mode>

Set command specifies the SIM detection mode.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	SIM detection mode

Values:

- 0 : switch to SIM slot1
- 1 : switch to SIM slot2



AT#SIMDET?

Read command returns the currently selected SIM detection mode in the format:

#SIMDET: <mode>,<simin>

Additional info:

▶▶ Response parameters

Name	Type	Default	Description
<mode>	integer	-	SIM detection mode
<simin>	integer	N/A	SIMIN pin real status

Values:

- 0 : SIM is not inserted
- 1 : SIM is inserted



If no SIMIN pin supported in product, <simin> will always be '0'.



AT#SIMDET=?

Test command reports the supported range of values for parameter <mode>.

2.8.5. AT+CRSM - Restricted SIM access

The command transmits to the UICC some specific commands and their required parameters.



3GPP TS 11.11
3GPP TS 31.101
3GPP TS 31.102

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>]]]

Set command transmits to the UICC the specific command and its required parameters. The command response shows the status words and response data returned by the UICC in the format:

+CRSM: <sw1>,<sw2>[,<response>]

For parameters meanings see Additional info section.

Parameters:

Name	Type	Default	Description
<command>	integer	N/A	command passed on to the UICC
	Values:		
	176	:	READ BINARY
	178	:	READ RECORD
	192	:	GET RESPONSE
	214	:	UPDATE BINARY
	220	:	UPDATE RECORD
	242	:	STATUS
<fileId>	integer	-	identifier of an elementary data file on UICC; mandatory for every command except STATUS
<P1>	integer	N/A	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
	Value:		
	0÷255	:	parameter P1 passed on to the UICC in a command APDU
<P2>	integer	N/A	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
	Value:		
	0÷255	:	parameter P2 passed on to the UICC in a command APDU
<P3>	integer	N/A	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
	Value:		

	0÷255	:	parameter P3 passed on to the UICC in a command APDU
<data>	string	-	information to be read from UICC or written to the UICC (hexadecimal character format).

Additional info:

▶▶ Response data fields:

Name	Type	Default	Description
<sw1>	integer	-	information from the UICC about the execution of the actual command (successful or failed)
<sw2>	integer	-	information from the UICC about the execution of the actual command (successful or failed)
<response>	hex	-	on a successful completion of the previously issued command it shows the response data. It is not returned after a successful UPDATE BINARY or UPDATE RECORD command



AT+CRSM=?

Test command returns the **OK** result code



Read binary, ICCID(2FE2)

```
AT+CRSM=176,12258,0,0,10
+CRSM: 144,0,982850702001107686F4
OK
```

Read record, ADN(6F3A)

```
AT+CRSM=178,28474,1,4,40
+CRSM: 144,0,42434A554EFFFFFFFFFFFFFFFFFFFFFFFF06811056789282FFFFFFFFFFFFFFF
OK
```

Update Binary, KcGPRS(6F52)

```
AT+CRSM=214,28539,0,0,8,C69018C7958C87
+CRSM: 144,0
OK
```

Update Record, ADN(6F3A)

```
AT+CRSM=220,28474,9,4,30,657469FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFF
+CRSM: 144,0
OK
```

Status, FPLMN(6F7B)

```
AT+CRSM=242,28539
+CRSM:144,0,623C820238218410A0000000871002FFFFFFFF89040300FFA51180013181030
10A3282011E8304000030E08A01058B032F0609C6099001C0830101830181
OK
```

2.8.6. AT+CSIM - Generic SIM Access

This command sends a generic command to the UICC.



- [1] 3GPP TS 11.11
- [2] 3GPP TS 31.101
- [3] 3GPP TS 31.102

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSIM=<length>,<command>

Set command transmits to the MT the <command>, it then shall send as it is to the SIM. As response to the command, MT sends back the actual UICC <response> to the TA as it is. The response message of the command is in the format:

+CSIM: <length>,<response>

Error case:

+CME ERROR: <err>

The response messages parameters are described in the Additional info section.

Parameters:

Name	Type	Default	Description
<length>	integer	-	characters number of the <command> sent to UICC (two times the actual length of the command)
<command>	string	-	command passed on by the MT to the UICC in the format as described in 3GPP TS 51.011 (hexadecimal character format, refer to +CSCS)

Additional info:

- ▶▶ List of the meaning of the response messages parameters.

Name	Type	Default	Description
<length>	integer	-	characters number of the <response> sent to TE (two times the actual length of the response)
<response>	string	-	response to the command passed on by the UICC to the TE in the format as described in 3GPP TS 51.011 (hexadecimal character format; refer +CSCS)
<err>	string	-	error values (numeric format followed by verbose format)



AT+CSIM=?

Test command returns the **OK** result code.

2.8.7. AT+CCHO - Open Logical Channel

Open Logical Channel



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CCHO=<dfname>

Execution 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 <sessionId> as the response. The ME shall restrict the communication between the TE and the UICC to this logical channel.

The response message of the command is in the format:

+CCHO: <sessionId>

The <sessionId> is described in the Additional info section.

Error case:

+CME ERROR: <err>

Parameter:

Name	Type	Default	Description
<dfname>	string	-	all selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes

Additional info:

▶▶ Response parameter

Name	Type	Default	Description
<sessionId>	integer	-	a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism

- i** The logical channel number is contained in the CLASS byte of an APDU command, thus implicitly contained in all APDU commands sent to a UICC. In this case it will be up to the MT to manage the logical channel part of the APDU CLASS byte and to ensure that the chosen logical channel is relevant to the <sessionId> indicated in the AT command.
- i** This <sessionId> is to be used when sending commands with Generic UICC Logical Channel access **+CGLA** commands.



AT+CCHO=?

Test command returns the **OK** result code.

2.8.8. AT+CCHC - Close Logical Channel

Close Logical Channel



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CCHC=<sessionId>

Execution command asks the ME 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.

Error case:

+CME ERROR: <err>

Parameter:

Name	Type	Default	Description
<sessionId>	integer	-	a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism



AT+CCHC=?

Test command returns the **OK** result code.

2.8.9. AT+CGLA - Generic UICC Logical Channel Access

This command is used to control the currently selected UICC on the TE.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGLA=<sessionId>,<length>,<command>

Set command transmits to the MT the <command> it then shall send as it is to the selected UICC. In the same manner the UICC <response> shall be sent back by the MT to the TA as it is. This command allows a direct control of the currently selected UICC by a distant application on the TE. The TE shall then take care of processing the received UICC information.

The response of the command is in the format:

+CGLA: <length>,<response>

Error case:

+CME ERROR: <err>

The response messages parameters are described in the Additional info section.

Parameters:

Name	Type	Default	Description
<sessionId>	integer	-	the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0").
<length>	integer	-	length of the characters that are sent to TE in <command> (two times the actual length of the command)
<command>	string	-	command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 (hexadecimal character format; refer +CSCS).

Additional info:

- ▶▶ List of the meaning of the response messages parameters.

Name	Type	Default	Description
<length>	integer	-	length of the characters that are sent to TE in the <response> (two times the actual length of the response)
<response>	string	-	response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 (hexadecimal character format; refer +CSCS).

<code><err></code>	string	-	error values (numeric format followed by verbose format)
--------------------------	--------	---	--

**AT+CGLA=?**

Test command returns the **OK** result code.

2.8.10. AT+CUAD - UICC Application Discovery

This command asks the MT to discover what applications are available for selection on the UICC.



3GPP TS 27.007
ETSI TS 102.221

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CUAD

This command asks the MT to discover what applications are available for selection on the UICC. The ME shall access and read the EF_{DIR} file in the UICC and return the values that are stored in the records.

Response syntax:

+CUAD: <response>

The parameter is described in the Additional info section.

Additional info:

▶▶ the parameter meaning

Name	Type	Default	Description
<response>	string	-	the content of the EF _{DIR} ; hexadecimal character format



AT+CUAD=?

Test command returns the **OK** result code.

2.8.11. AT#SIMPR - SIM Presence Status

This command enables/disables the SIM presence status unsolicited indication.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#SIMPR=<mode>

Set command enables/disables the SIM presence status unsolicited indication in the ME. If notification is enabled, the ME informs the SIM status change through the following URC:

#SIMPR: <active_SIM>,<status>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	type of the notification

Values:

- 0 : disabled; It's possible only to query the current SIM status through read command.
- 1 : enabled; The ME informs the active SIM status change through the unsolicited indication.

Unsolicited fields:

Name	Type	Description
<active_SIM>	integer	current active SIM slot
Values:		
0	:	SIM slot1
1	:	SIM slot2
<status>	integer	current SIM status
Values:		
0	:	SIM not inserted
1	:	SIM inserted



AT#SIMPR?

Read command reports the SIM presence status, both SIM slot1 and slot2, in the following format:

#SIMPR: <mode>,0,<status><CR><LF>
#SIMPR: <mode>,1,<status>



AT#SIMPR=?

Test command reports the range for the parameter <mode>.



If no SIMIN pin supported in product, **<status>** will always be '0'.



If SIMIN pin are supported and SIM are inserted in both SIM slot1 and slot2,

AT#SIMPR?

#SIMPR: 0,0,1

#SIMPR: 0,1,1

OK

2.8.12. AT#QSS - Query SIM Status

Query SIM Status.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#QSS=<mode>

Set command enables/disables the query SIM status unsolicited indication in the ME. The format of the unsolicited indication is the following:

#QSS: <status>,<active_slot>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	type of the notification

Values:

- 0 : disabled; It is only possible to query the current SIM status through read command.
- 1 : enabled; The ME informs SIM status change through the basic unsolicited indication where <status> range is 0...1.
- 2 : enabled; The ME informs SIM status change through the basic unsolicited indication where <status> range is 0...3.

Unsolicited fields:

Name	Type	Description
<status>	integer	current SIM status

Values:

- 0 : SIM not inserted
- 1 : SIM inserted
- 2 : SIM inserted and PIN unlocked
- 3 : SIM inserted and READY (SMS and Phonebook access are possible)

<active_slot>	integer	current active SIM slot
Values:		
0	:	SIM slot1
1	:	SIM slot2

- i** It is strongly suggested to set <mode>=2 and save the value in the user profile, then power off the module. The proper SIM status will be available at the next power on.

**AT#QSS?**

Read command reports whether the unsolicited indication **#QSS** is currently enabled or not, along with the SIM status, in the format:

#QSS: <mode>,<status>,<active_slot>

**AT#QSS=?**

Test command returns the supported range of values for parameter **<mode>**.



If AT#SIMDET=0,

AT#QSS?

#QSS:0,1,0

OK

If AT#SIMDET=1,

AT#QSS?

#QSS: 0,1,1

OK

2.8.13. AT#HSEN - Hot-Swap Enable

This command enables/disables the hot-swap function on SIM slot.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#HSEN=<mode>,<slot>

Set command enables/disables the hot-swap function on SIM slot.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	hot-swap mode
Values:			
0	:	disable	
1	:	enable	
<slot>	integer	N/A	SIM slot
Values:			
0	:	SIM slot1	
1	:	SIM slot2	

- For PTCRB/GCF certification, the default value of <mode> is 1 when #FWSWITCH is 0 or 1.
Please set as disable if you want not to use this feature.
- If SIMIN pin is not connected, <mode> should be set to 0.



AT#HSEN?

Read command reports the hot-swap status on SIM slot, in the format:

```
#HSEN: <mode>,0<CR><LF>
#HSEN: <mode>,1
```



AT#HSEN=?

Test command reports the supported range of values for parameter <mode> and <slot>.



If SIMIN pin is not connected, the hot-swap function cannot be supported.



SIMIN pin is connected and SIM is inserted in SIM slot1.

```
AT#HSEN?  
#HSEN: 0,0  
#HSEN: 0,1  
OK  
AT#SIMPR?  
#SIMPR: 1,0,1  
#SIMPR: 1,1,0  
OK
```

Enable the hot-swap function of SIM slot1.

```
AT#HSEN=1,0  
OK  
AT#REBOOT  
OK  
AT#HSEN?  
#HSEN: 1,0  
#HSEN: 0,1  
OK
```

Remove SIM card on SIM slot 1.

```
#SIMPR: 0,0
```

Insert SIM card on SIM slot 1.

```
#SIMPR: 0,1
```

2.8.14. AT#SIMINCFG - SIMIN Pin Configuration

This command configures the SIM detection mode on the SIMIN pin.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SIMINCFG=<SIM_id>,<SIMIN_det_mode>

Set command sets the SIM detection mode on the SIMIN pin to detect the presence of a SIM.

Parameters:

Name	Type	Default	Description
<SIM_id>	integer	N/A	SIM slot index
Values:			
1	:	SIM slot1	
2	:	SIM slot2	
<SIMIN_det_mode>	integer	1	status of SIMIN pin for SIM detection
Values:			
0	:	SIMIN pin LOW means SIM inserted, HIGH means SIM removed (for normal SIM holder).	
1	:	SIMIN pin LOW means SIM removed, HIGH means SIM inserted (for micro SIM holder)	



AT#SIMINCFG?

Read command reports the detection mode of the configured SIMIN pin in the format:

```
#SIMINCFG: 1,<SIMIN_det_mode><CR><LF>
#SIMINCFG: 2,<SIMIN_det_mode>
```



AT#SIMINCFG=?

Test command reports supported values of parameters <SIM_id> and <SIMIN_det_mode>.



If SIMIN pin is not connected, the hot-swap function cannot be supported.



SIM is inserted in card slot1. The SIMIN is GND when SIM is inserted.

```
AT#SIMINCFG=1,0
OK
AT#SIMINCFG=2,0
OK
AT#REBOOT
OK
AT#SIMPR?
#SIMPR: 0,0,1
#SIMPR: 0,1,0
OK
```

Remove SIM in card slot1.

```
AT#SIMPR?
#SIMPR: 0,0,0
#SIMPR: 0,1,0
OK
```

SIM is inserted in card slot1. The SIMIN is GND when SIM is not inserted.

```
AT#SIMINCFG=1,1
OK
AT#SIMINCFG=2,1
OK
AT#REBOOT
OK
AT#SIMPR?
#SIMPR: 0,0,1
#SIMPR: 0,1,0
OK
```

Remove SIM in card slot1.

```
AT#SIMPR?
#SIMPR: 0,0,0
#SIMPR: 0,1,0
OK
```

2.9. SIM Toolkit

2.9.1. AT#STIA - SIM/USIM Toolkit Interface Action

The SIM/USIM Application Toolkit (SAT/USAT) provides an interface to the applications existing in the SIM/USIM device. The module must support the mechanisms required by the SIM/USIM applications.



- [1] 3GPP TS 23.038
- [2] 3GPP TS 31.111
- [3] Telit SIM/USIM Application Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#STIA=[<mode>[,<timeout>]]

Set command is used to enable/disable the SIM/USIM Application Toolkit (SAT/USAT). In addition, the command can enable the URCs sending.

Parameters:

Name	Type	Default	Description
<mode>	integer	1	<p>enables/disables SAT/USAT.</p> <p>In addition, <mode> parameter enables the:</p> <ul style="list-style-type: none"> - #STN URCs notifying the user that the SIM/USIM application has issued a proactive command. Some proactive commands require a user response. - #STN URCs that are the SIM/USIM device responses concerning actions initiated by the user, refer to Additional info section. <p>If <mode>=2, the URC format depends on the <cmdType> as described in the Additional info sections. For <cmdType>, and all other URC parameters refer to #STGI command. The <mode> parameter values are listed below.</p>
<p>Values:</p> <ul style="list-style-type: none"> 0 : disable SAT/USAT 1 : enable SAT/USAT without #STN URC 2 : enable SAT/USAT and extended #STN URC 3 : enable SAT/USAT and reduced #STN URC 17 : enable SAT/USAT without #STN URC and the alphabet used 18 : enable SAT/USAT, extended #STN URC, and the alphabet used 19 : enable SAT/USAT, reduced #STN URC, and the alphabet used 33 : enable SAT/USAT without #STN URC and the UCS2 alphabet used 34 : enable SAT/USAT, extended #STN URC, and the UCS2 alphabet used 35 : enable SAT/USAT, reduced #STN URC, and the UCS2 alphabet used 			
<timeout>	integer	2	<p>When an ongoing proactive command, requiring a user response, is not answered before <timeout> minutes, it is automatically aborted. In this case, the terminal response from the module is either "ME currently unable to process</p>

command" or, if applicable, "No response from user". In addition, the following URC is sent on the AT interface. For parameter meaning of the URC refer to Unsolicited fields section.

#STN:<cmdTerminateValue>

Value:

1,2 : timeout expressed in minutes

Additional info:

- ▶▶ <mode>=3, the URC has the following reduced format:
#STN: <cmdType>

- ▶▶ <mode>=2, and <cmdType>=1 (REFRESH), the URC has the following extended format:
#STN: 1,<refreshType>

- ▶▶ <mode>=2, and <cmdType>=5 (SET UP EVENT LIST), the URC has the following extended format:
#STN: 5[,<eventListMask>]

- ▶▶ <mode>=2, and <cmdType>=16 (SET UP CALL), the URC has the following extended format:
#STN: 16,<cmdDetails>[,<confirmationText>],<calledNumber>

- ▶▶ <mode>=2, and one of the following proactive command:
 <cmdType>=17 (SEND SS)
 <cmdType>=18 (SEND USSD)
 <cmdType>=19 (SEND SHORT MESSAGE)
 <cmdType>=20 (SEND DTMF)
 <cmdType>=32 (PLAY TONE)
 <cmdType>=64 (OPEN CHANNEL)
 <cmdType>=65 (CLOSE CHANNEL)
 <cmdType>=66 (RECEIVE DATA)
 <cmdType>=67 (SEND DATA)

 the URC has the following extended format:
#STN: <cmdType>[,<alphaIdentifier>]
 If <cmdType>=19 (SEND SHORT MESSAGE) fails, the **#STN: 119** URC is sent to the module.

- ▶▶ <mode>=2, and <cmdType>=33 (DISPLAY TEXT), the URC is sent if allowed by SIM/USIM, the extended format is:
#STN: 33[,<cmdDetails>[,<alphaIdentifier>]]
 If bit 7 of <cmdDetails>=1, the response with the **#STSR** command is required.

- ▶▶ **<mode>=2**, and **<cmdType>=34** (GET INKEY), the URC has the following extended format:
#STN: 34,<cmdDetails>,<text>

- ▶▶ **<mode>=2**, and **<cmdType>=35** (GET INPUT), the URC has the following extended format:
#STN: 35,<cmdDetails>,<text>,<responseMin>,<responseMax>[,<defaultText>]

- ▶▶ **<mode>=2**, and **<cmdType>=36** (SELECT ITEM), the URC has the following extended format:
the first line of output is:
#STN: 36,<cmdDetails>,<numOfItem>[,<titleText>]<CR><LF>
one line follows for every item, repeated **<numOfItems>** times:
#STN: 36,<itemId>,<itemText>[,<nextActionId>]

- ▶▶ **<mode>=2**, and **<cmdType>=37** (SET UP MENU), the URC has the following extended format:
the first line of output is:
#STN: 37,<cmdDetails>,<numOfItem>,<titleText><CR><LF>
one line follows for every item, repeated for **<numOfItems>**:
#STN: 37,<itemId>,<itemText>[,<nextActionId>]

- ▶▶ **<mode>=2**, and **<cmdType>=40** (SET UP IDLE MODE TEXT), the URC has the following extended format:
#STN: 40[,<idleModeTextString>]

- ▶▶ This Additional info section deals with the action initiated by the user (no proactive commands activated by the SIM/USIM device).
If the call control or SMS control facility present in the SIM/USIM device is activated, when the user application makes an outgoing call, or sends a SS or USSD, or a SMS, the following **#STN** URC could be sent to indicate whether the outgoing call has been accepted, rejected or modified by the SIM, or if the SMS service center address or destination has been changed. For parameters meaning refer to Unsolicited fields section.
#STN:
<cmdControlResponse>,<Result>[,<alphanumericIdentifier>[,<Number>[,<MODestAddr>]]]

Unsolicited fields:

Name	Type	Description
<cmdTerminateValue>	integer	is defined as <cmdType> + terminate offset. Terminate offset = 100

<cmdControlResponse>	integer	response of the SIM/USIM device Values: 150 : SMS control response 160 : call/SS/USSD response
<Result>	integer	identify the result of the Call or SMS control performed by SIM/USIM device Values: 0 : Call/SMS not allowed 1 : Call/SMS allowed 2 : Call/SMS allowed with modification
<alphaIdentifier>	string	optional text provided by the SIM/USIM device in ASCII format
<Number>	string	Called number, Service Center Address or SS String in ASCII format
<MODestAddr>	string	MO destination address in ASCII format

- i** The settings are saved on user profile and available on following reboot. SIM/USIM Toolkit activation/deactivation is only performed at power on according to the saved setting.
- i** If **AT#ENS=1**, the **<mode>** parameter is set to 2.
- i** Just one instance at a time, the one which first issued **AT#STIA=<mode>** (with **<mode>** not equal to 0), is allowed to issue SAT/USAT commands, and this is valid till the same instance issues **AT#STIA=0**. After reboot, SAT/USAT can be used on another instance.
- i** A typical SAT/USAT session on AT interface starts after an **#STN: 37** unsolicited code is received, if enabled (see above). At that point usually an **AT#STGI=37** command is issued (see **#STGI**), and after the SAT main menu has been displayed on TE an **AT#STSR=37,0,x** command is issued to select an item in the menu (see **#STSR**).



AT#STIA?

Read command can be used to get information about the SAT/USAT interface. The message format is:

#STIA: <state>,<mode>,<timeout>,<SatProfile>


Additional info:

- ▶▶ Returned parameters.

Name	Type	Default	Description
<state>	integer	0	state of the sending of the SET UP MENU proactive command (37)
Values:			
0	:		SIM/USIM has not sent the SET UP MENU proactive command (37)

1 : SIM/USIM has sent the SET UP MENU proactive command (37)

<mode>	integer	-	refer to Set section
<timeout>	integer	-	refer to Set section
<SatProfile>	string	-	SAT/USAT Terminal Profile. Is the list of SIM/USIM Application Toolkit facilities supported by the ME. The profile cannot be changed by the TA.

-  In SAT/USAT applications an SMS message is usually sent to the network provider containing service requests, e.g. to send the latest news. The provider returns a message with the requested information. Before activating SAT/USAT, it is recommended to set the SMS text mode with the **AT+CMGF=1** command and enable URC for incoming SMS messages with **+CNMI** command.



AT#STIA=?

Test command returns the range of available values for the parameters **<mode>** and **<timeout>**.

2.9.2. AT#STGI - SIM Toolkit Get Information

This command interfaces to the SIM/USIM Application Toolkit to get information on the ongoing proactive command.



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SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#STGI=[<cmdType>]

Set command gets parameters of the ongoing proactive command. The command can be used after the reception of the #STN: <cmdType> URC. If no proactive command is ongoing, it returns an **ERROR** message.

Parameter:

Name	Type	Default	Description
<cmdType>	integer	N/A	proactive command code. For each proactive command listed below, the response format is described in the Additional info sections.

Values:

- 1 : REFRESH
- 5 : SET UP EVENT LIST
- 16 : SET UP CALL
- 17 : SEND SS
- 18 : SEND USSD
- 19 : SEND SHORT MESSAGE
- 20 : SEND DTMF
- 32 : PLAY TONE
- 33 : DISPLAY TEXT
- 34 : GET INKEY
- 35 : GET INPUT
- 36 : SELECT ITEM
- 37 : SET UP MENU
- 40 : SET UP IDLE MODE TEXT

Additional info:

▶▶ <cmdType>=1 (REFRESH)

the response format:

#STGI: 1,<refreshType>

Name	Type	Default	Description
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<refreshType>	integer	N/A	identifies the refresh type
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Values:

- 0 : SIM Initialization and Full File Change Notification
 - 1 : File Change Notification
 - 2 : SIM Initialization and File Change Notification
 - 3 : SIM Initialization
 - 4 : SIM Reset
 - 5 : NAA Application Reset
 - 6 : NAA Session Reset
 - 7 : Steering of Roaming
 - 8 : Steering of Roaming WLAN
-

▶▶ **<cmdType>=5 (SET UP EVENT LIST)**

the response format:

#STGI: 5,<eventListMask>

Name	Type	Default	Description
<eventListMask>	hex	N/A	<p>identifies the list of events to monitor.</p> <p>The <eventListMask> (two bytes long) is a bit mask where each bit, when set, indicates that the corresponding event must be monitored (e.g. if <eventListMask> is 0x0001, it means that MT call must be monitored).</p> <p>bit 0 = MT call</p> <p>bit 1 = Call connected</p> <p>bit 2 = Call disconnected</p> <p>bit 3 = Location status</p> <p>bit 4 = User activity</p> <p>bit 5 = Idle screen available</p> <p>bit 6 = Card reader status (if class "a" is supported)</p> <p>bit 7 = Language selection</p> <p>bit 8 = Browser Termination (if class "c" is supported)</p> <p>bit 9 = Data available (if class "e" is supported)</p> <p>bit 10 = Channel status (if class "e" is supported)</p> <p>bits 11 - 15 = reserved for future use</p>

Value:

0x0001÷0x01FF : mask

▶▶ **<cmdType>=16 (SET UP CALL)**

the response format:

#STGI: 16,<cmdDetails>,[<confirmationText>],<calledNumber>

Name	Type	Default	Description
<cmdDetails>	integer	N/A	identifies the command details
Values:			
0	:	set up call, but only if not currently busy on another call	
1	:	set up call, but only if not currently busy on another call, with redial	
2	:	set up call, putting all other calls (if any) on hold	
3	:	set up call, putting all other calls (if any) on hold, with redial	
4	:	set up call, disconnecting all other calls (if any)	
5	:	set up call, disconnecting all other calls (if any), with redial	
<confirmationText>	string	-	string for user confirmation stage
<calledNumber>	string	-	string containing called numbers

►► This section is dedicated to the following proactive commands:

<cmdType>=17 (SEND SS)
 <cmdType>=18 (SEND USSD)
 <cmdType>=19 (SEND SHORT MESSAGE)
 <cmdType>=20 (SEND DTMF)
 <cmdType>=32 (PLAY TONE)

the response format:

#STGI: <cmdType>[,<alphalIdentifier>]

Name	Type	Default	Description
<alphalIdentifier>	string	-	optional text provided by the SIM/USIM device in ASCII format

►► <cmdType>=33 (DISPLAY TEXT)

the response format:

#STGI: 33,<cmdDetails>[,<text>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - normal priority 1 - high priority bits 1-6: reserved for future use bit 7: 0 - clear message after a delay 1 - wait for user to clear message

Value:

0x00÷0xFF : mask

<text>	string	-	text provided by the SIM/USIM device in ASCII format
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▶▶ **<cmdType>=34 (GET INKEY)**

the response format:

#STGI: 34,<cmdDetails>,<text>

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - digits only (0-9, *, # and +) 1 - alphabet set bit 1: 0 - SMS default alphabet (GSM character set) 1 - UCS2 alphabet bit 2: 0 - character sets defined by bit 0 and bit 1 are enabled 1 - character sets defined by bit 0 and bit 1 are disabled and the "Yes/No" response is requested bits 3-6: 0 bit 7: 0 - no help information available 1 - help information available

Value:

0x00÷0x87 : mask

<text>	string	-	string as prompt for test
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▶▶ **<cmdType>=35 (GET INPUT)**

the response format:

#STGI: 35,<cmdDetails>,<text>,<responseMin>,<responseMax>[,<defaultText>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - digits only (0-9, *, #, and +) 1 - alphabet set bit 1: 0 - SMS default alphabet (GSM character set) 1 - UCS2 alphabet bit 2: 0 - ME may echo user input on the display 1 - user input shall not be revealed in any way. Hidden entry mode is only available when

using digit input. In hidden entry mode only characters ('0'-'9', '*' and '#') are allowed.

bit 3:

0 - user input to be in unpacked format
1 - user input to be in SMS packed format

bits 4-6:

0

bit 7:

0 - no help information available
1 - help information available

Value:

0x00÷0x8F : mask

<text>	string	-	string as prompt for text
<responseMin>	integer	N/A	minimum number of characters of the user input

Value:

0÷255 : minimum length of user input.

<responseMax>	integer	N/A	maximum number of characters of the user input.
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Value:

0÷255 : maximum length of user input

<defaultText>	string	-	string supplied as default response text
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▶▶ **<cmdType>=36 (SELECT ITEM)**

the response format:

the first line of output is:

#STGI: 36,<cmdDetails>,<numOfItem>[,<titleText>]<CR><LF>

one line follows for every item, repeated **<numOfItems>** times:

#STGI: 36,<itemId>,<itemText>[,<nextActionId>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	<p>a bit mask where each bit position, according to its value, has a specific meaning:</p> <p>bit 0: 0 - presentation type is not specified 1 - presentation type is specified in bit 1</p> <p>bit 1: 0 - presentation as a choice of data values if bit 0 = 1 1 - presentation as a choice of navigation options if bit 0 is 1</p> <p>bit 2: 0 - no selection preference 1 - selection using soft key preferred</p> <p>bits 3-6: 0</p>

			bit 7: 0 - no help information available 1 - help information available
	Value:		
	0x00÷0x87	:	mask
<numOfItems>	integer	-	number of items in the list
<titleText>	string	-	menu title string
<itemId>	integer	N/A	item identifier
	Value:		
	1÷numOfItems	:	item identifier range
<itemText>	string	-	item title string
<nextActionId>	integer	-	is the code of next proactive command to be issued upon execution of the menu item. If <nextActionId> =0, no next action information available.

▶▶ **<cmdType>**=37 (SET UP MENU)

the response format:

the first line of output is:

#STGI: 37,<cmdDetails>,<numOfItem>,<titleText><CR><LF>

one line follows for every item, repeated for **<numOfItems>**:

#STGI: 37,<itemId>,<itemText>[,<nextActionId>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - no selection preference 1 - selection using soft key preferred bit 1-6: 0 bit 7: 0 - no help information available 1 - help information available

	Value:		
	0x00÷0x81	:	mask
<numOfItems>	integer	-	number of items in the list
<titleText>	string	-	menu title string
<itemId>	integer	N/A	item identifier
	Value:		
	1÷numOfItems	:	item identifier range
<itemText>	string	-	item title

<nextActionId>	integer	-	numerical code of next proactive command type to be issued upon execution of the menu item. If <nextActionId>=0 , no next action information available.
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▶▶ **<cmdType>=40** (SET UP IDLE MODE TEXT)

the response format:

#STGI: 40,<idleModeTextString>

Name	Type	Default	Description
<idleModeTextString>	string	-	text provided by the SIM/USIM device in ASCII format

The proactive commands are only those command types that use the AT interface. SAT/USAT commands which are not using the AT interface (not MMI related SAT commands, e.g. PROVIDE LOCAL INFORMATION) are executed without sending any indication to the user.



AT#STGI?

Read command returns the ongoing proactive command and the SAT/USAT state. The message format is:

#STGI: <state>,<cmdType>

Additional info:

▶▶ Returned parameters:

Name	Type	Default	Description
<state>	integer	-	state of the sending of the SET UP MENU proactive command (37), refer to AT#STIA? command
<cmdType>	integer	-	ongoing proactive command code



AT#STGI=?

Test command returns the supported values of parameters **<state>** and **<cmdType>**.



A typical SAT/USAT session, running on AT interface, starts when the user receives the **#STN: 37** URC. The unsolicited result code must be previously enabled by the **#STIA** command. The **#STN: 37** notifies the user that the main menu of the SIM/USIM Application has been sent to TA, and TA has stored the just received menu. Later, at any time, you can type in the **AT#STGI=37** command to display the main menu of the SIM/USIM Application on TE.

Upon receiving the **#STGI** response, you must enter the **#STSR** command to confirm the execution of the proactive command and provide any required user response. In this case, you must enter the **AT#STSR=37,0,x** command to select the **x** item of the SIM/USIM Application menu.

The **#STN: 237** URC indicates that the main menu of the SIM/USIM Application has been removed from TA, and it is no longer available. In this case, **AT#STGI=37** command returns **ERROR** message.

2.9.3. AT#STSR - SIM Toolkit Send Response

This command allows the user to provide a response to confirm the execution of the ongoing proactive command.



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SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#STSR=[<cmdType>[,<userAction>[,<data>]]]

Set command allows the user to provide a response action to the ongoing proactive command when the action is required by the command itself.

Parameters:

Name	Type	Default	Description
<cmdType>	integer	-	proactive command code, refer to #STGI command to have information on the <cmdType>
<userAction>	integer	0	identify the user action
Values:			
	0	:	the user accepts the ongoing proactive command
	16	:	proactive SIM/USIM session terminated by user
	17	:	backward move in the proactive SIM/USIM session requested by the user
	18	:	no response from user
	19	:	help information required by the user
	20	:	USSD/SS Transaction terminated by user
	32	:	TA currently unable to process command
	34	:	user has denied SIM/USIM call setup request
	35	:	user cleared down SIM/USIM call before connection or network release
<data>	string	-	data entered by user, see Additional info section

Additional info:

▶▶ <data> parameter is used according to <cmdType>, and when <userAction>=0:

▶▶ <cmdType>=34 (GET INKEY)
<data> contains the key pressed by the user. The character set is selected by +CSCS command.

If the ongoing proactive command requires to the user a binary choice (yes/no), the valid content of <data> is:

- "Y" or "y" (positive answer) and "N" or "n" (negative answer) for "IRA", "8859-1", "PCCP437" character sets
- "0079" or "0059" (positive answer) and "006E" or "004E" (negative answer) for UCS2 alphabet

The ongoing proactive command to require a binary choice sets bit 2 of the **<cmdDetails>** parameter to 1, see **#STGI** command.

▶▶ **<cmdType>=35** (GET INPUT).
<data> contains the string of characters entered by the user.

▶▶ **<cmdType>=36** (SELECT ITEM).
<data> contains the item identifier selected by the user.

- i** **<userAction>=0** is used, for example, to
 - accept a call when the ongoing proactive command is SET UP CALL, **<cmdType>=16**
 - start a connection when the ongoing proactive command is OPEN CHANNEL, **<cmdType>=64**

- i** Use of icons is not supported. All icon related actions will respond with no icon available.



AT#STSR?

Read command returns the ongoing proactive command and the SAT/USAT interface state. The format message is:

#STSR: <state>,<cmdType>

If there is no ongoing proactive command, an **ERROR** message is returned.

Additional info:

- ▶▶ Returned parameters.

Name	Type	Default	Description
<state>	integer	-	state of the sending of the SET UP MENU proactive command (37), refer to AT#STIA? command
<cmdType>	integer	-	proactive command code, refer to #STGI command to have information on the <cmdType>



AT#STSR=?

Test command returns the range for the parameters **<state>** and **<cmdType>**.

2.9.4. AT#SDM - Set SIM Toolkit Display Mode

This command is used to set normal/high priority standby display mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SDM=<priority>

Set command sets to normal/high priority standby display mode.

Parameter:

Name	Type	Default	Description
<priority>	integer	0	priority

Values:

0 : normal

1 : high



AT#SDM?

Read command returns the current value of the <priority> parameter.



AT#SDM=?

Test command returns the range of values for parameter <priority>.

2.9.5. AT#STIME - Set SIM Toolkit timeout value

This command sets the timeout value for STK timeout test of GCF/PTCRB.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#STIME=[<mode>]

Set command sets a unit of STK timeout value.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	a unit of STK timeout value

Values:

- 0 : in minute
- 1 : in second



AT#STIME?

Read command returns the current <mode>.



AT#STIME=?

Test command returns the supported range of values for parameter <mode>.



AT#STIA command is not set to a second unit. When you test "No response from user" and "timeout" of STK test, you must change to a second unit to timeout value of STK.



Set STK timeout value to a second unit.

```
AT#STIME=1
OK
```

Timeout value is 30 second

```
AT#STIA=2,30
OK
```

Set STK timeout value to a minute unit.

```
AT#STIME=0
OK
```

Timeout value is 1 minute

```
AT#STIA=2,1
OK
```

2.10. Power Down

2.10.1. AT#REBOOT - Module Reboot

The command triggers immediate module reboot.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#REBOOT

Execution command reboots immediately the unit.

It can be used to reboot the system after a remote update of the script in order to have the new one running.

- i** If **#REBOOT** follows an AT command that stores some parameters in NVM, it is recommended to insert a delay of at least 5 seconds before to issue **#REBOOT**, to permit the complete NVM storing.
- i** **#REBOOT** is an obsolete AT command; please refer to **#ENHRST** to perform a module reboot.



AT#REBOOT=?

Test command returns **OK** result code.



- Reboot the module
AT#REBOOT
OK
(the module reboots)

2.10.2. AT#ENHRST - Periodic Reset

The command enables or disables the one shot or periodic unit reset

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENHRST=<mode>[,<delay>]

Set commands enables/disables the unit reset after the specified <delay> in minutes

Parameters:

Name	Type	Default	Description
<mode>	integer	0	Enable\Disable mode

Values:

- 0 : disables the unit reset
- 1 : enables the unit reset only one time (one shot reset)
- 2 : enables periodically unit reset

<delay>	integer	-	time interval in minutes after that the unit reboots; numeric value in minutes
---------	---------	---	--

- Not available setting <delay> to 0 with <mode>=2. When the command is set with <mode>=2, it could take more time than the <delay> value due to booting time.
- The settings are saved automatically only if old or new <mode> value is 2, i.e. unit set in periodic reset mode. Therefore, any change from 0 to 1 or conversely is not stored.
- The command **AT#ENHRST=1,0** causes the immediate module reboot. If it follows an AT command that stores some parameters in NVM, it is strongly recommended to insert a delay of at least 5 sec before issuing it, to permit the complete NVM storing process.



AT#ENHRST?

Read command reports the current parameter settings in the following format:

#ENHRST: <mode>[,<delay>,<remainTime>]

Additional info:

- ▶▶ Read command parameter for <mode> is 1 or 2.

Name	Type	Default	Description
<remainTime>	integer	-	time remaining before next reset



AT#ENHRST=?

Test command reports supported range of values for parameters <mode> and <delay>.



Example of #ENHRST usage and expected unit behavior.

- **AT#ENHRST=1,60**
...
Module reboots after 60 minutes
- **AT#ENHRST=1,0**
Module reboots immediately
- **AT#ENHRST=2,60**
...
Module reboots after 60 minutes and indefinitely after every following power on

2.10.3. AT#SHDN - Software Shutdown


The command triggers software shutdown

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SHDN

Execution command causes device detachment from the network and shut down.
Before definitive shut down an **OK** response is returned.

-  After the issuing of this command any previous activity is terminated and the device will not respond to any further command.



AT#SHDN=?

Test command returns the **OK** result code.



If hardware pin FULL_CARD_POWER_OFF_N is maintained to High, module will turn on automatically after shutdown.

2.10.4. AT#FASTSHDN - Fast Shutdown Configuration

This command can be used as a set command to configure a GPIO pin performing a fast shutdown when the pin is forced a “High to Low” or “Low to High” level transition. It can also be used as an execute command to immediately force a fast shutdown.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FASTSHDN[=<enable>[,<GPIO>[,<trigger>]]]

Set command to configure fast power down. Module enters power off autonomously if fast power down is enabled and GPIO event is triggered after modem boot done.

Parameters:

Name	Type	Default	Description
<enable>	integer	0	enable/disable the fast shutdown execution via a GPIO pin.
Values:			
0 : disabled			
1 : enabled			
<GPIO>	integer	-	GPIO number used to execute the fast shutdown. Can check the available GPIO range from #FASTSHDN=? command. This parameter is no meaning when <mode> is 0.
<trigger>	integer	0	GPIO trigger level used for fast shutdown execution. This parameter is no meaning when <mode> is 0.
Values:			
0 : execute fast shutdown when the selected GPIO pin goes from High to Low level			
1 : execute fast shutdown when the selected GPIO pin goes from Low to High level			

Additional info:

- ▶▶ The execution command **AT#FASTSHDN** forces the module to execute immediately the fast shutdown regardless of the fast shutdown configuration.

- ⓘ Depending on <trigger>, the selected <GPIO> pin is automatically configured as below.
 <trigger> = 0, <GPIO> pin set as Pull-up
 1, <GPIO> pin set as Pull-down

- ⓘ Configuration values are stored on module and will keep on next power cycle.



AT#FASTSHDN?

Read command reports the currently selected configuration in the format:

#FASTSHDN: <enable>,<GPIO>[,<trigger>]

**AT#FASTSHDN=?**

Test command returns the supported range of values for all the parameters.



Enable fast shutdown on GPIO_05

```
AT#FASTSHDN=1,5  
OK
```

```
AT#FASTSHDN?  
#FASTSHDN: 1,5
```

```
OK
```

Force immediate fast shutdown

```
AT#FASTSHDN  
OK
```

2.11. HW and Radio Control

2.11.1. AT#I2CDIS - I2C disable

This command is used to disable I2C bus.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#I2CDIS=<mode>

Set command enable/disable the I2C bus.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	mode

Values:

0 : enable I2C

1 : disable I2C



The setting is saved in system and available on following reboot



AT#I2CDIS?

Read command reports the currently selected <mode> in the format:

#I2CDIS: <mode>



AT#I2CDIS=?

Test command returns the supported range of values of parameter <mode>.



I2C is default enable and uses GPIO_09, GPIO_10 for I2C.

When I2C is disabled, GPIO_09, GPIO_10 can be used as GPIO pins.

2.11.2. AT+CBC - Battery Charge

This command allows to read the current Battery Charge status.



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT+CBC

Execution command returns the current Battery Charge status.

Additional info:

- ▶▶ Battery Charge status is shown in the format:
+CBC: <bcs>,<bcl>

Name	Type	Default	Description
<bcs>	integer	N/A	battery status
Values:			
0	:		ME is powered by the battery
1	:		ME has a battery connected, and charger pin is being powered
2	:		ME does not have a battery connected
3	:		Recognized power fault, calls inhibited
<bcl>	integer	N/A	battery charge level, only if <bcs>=0
Values:			
0	:		battery is exhausted, or ME does not have a battery connected
25	:		battery charge remained is estimated to be 25%
50	:		battery charge remained is estimated to be 50%
75	:		battery charge remained is estimated to be 75%
100	:		battery is fully charged

- i** **<bcs>=1** indicates that the battery charger supply is inserted and the battery is being recharged if necessary with it. Supply for ME operations is taken anyway from VBATT pins.
- i** Without battery/power connected on VBATT pins or during a power fault the unit is not working, therefore values **<bcs>=2** and **<bcs>=3** will never appear.
- i** **<bcl>** indicates battery charge level only if battery is connected and charger is not connected.

**AT+CBC=?**

Test command returns parameter values supported as a compound value.



The ME does not make differences between being powered by a battery or by a power supply on the VBATT pins, so it is not possible to distinguish between these two cases.



```
AT+CBC
+CBC: 0,75
OK
```

2.11.3. AT#GPIO - General Purpose Input/Output Pin Control

The command sets the value of the GPIO (general purpose input/output) pins.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#GPIO=<pin>,<mode>[,<dir>[,<save>]]

Execution command sets the value or reads current state of the GPIO(general purpose input/output) pin.

Parameters:

Name	Type	Default	Description
<pin>	integer	-	GPIO pin number. The supported range is hardware dependent. Use AT#GPIO=? test command to know available range.
<mode>	integer	4	sets GPIO pin configuration, its action depends on <dir> value. Refer to Additional info sections.

Values:

- 0 : set GPIO pin to 0(Low) if <dir>=1(Output), otherwise has no meaning
- 1 : set GPIO pin to 1(High) if <dir>=1(Output), otherwise has no meaning
- 2 : reports current direction and value of GPIO pin
- 3 : set internal pull-up if <dir>=0(Input), otherwise has no meaning
- 4 : set internal pull-down if <dir>=0(Input), otherwise has no meaning
- 5 : set internal no-pull if <dir>=0(Input), otherwise has no meaning

<dir>	integer	0	sets the GPIO pin in input or output. Refer to Additional info sections.
-------	---------	---	--

Values:

- 0 : pin set as input
- 1 : pin set as output

<save>	integer	0	GPIO pin save configuration.
--------	---------	---	------------------------------

Values:

- 0 : GPIO pin configuration is not saved
- 1 : GPIO pin configuration is saved

Additional info:

- ▶▶ When <mode>=2, reports current direction and value of <pin> in the below format and in this mode, <dir> and <save> can be omitted.

#GPIO: <dir>,<stat>[,<mode>]

Name	Type	Description
<dir>	integer	current direction of the selected GPIO<pin>. 0 : GPIO is input

1 : GPIO is output
 2 - 10 : GPIO is assigned as Alternate function
 the parameter can be:
 logic value read from GPIO<pin> in the case the pin <dir> is set to input.
 <stat> integer logic value present in output of the GPIO<pin> in the case the pin <dir> is currently set to output.
 no meaning value for the pin GPIO<pin> in the case the pin <dir> is set to alternate function.
 shown if GPIO<pin> is input:
 <mode> integer
 3 : internal pull-up
 4 : internal pull-down
 5 : internal no-pull

►► <dir> values from 2 to 8 means the GPIO is assigned as alternate function respectively from ALT1 to ALT7.

ALTx	Function associated to ALTx
ALT1 (<dir>=2)	reserved
ALT2 (<dir>=3)	the GPIO is assigned as DVI for Audio
ALT3 (<dir>=4)	the GPIO is mapped to #TEMPSENS
ALT4 (<dir>=5)	the GPIO is mapped to #FASTSHDN
ALT5 (<dir>=6)	the GPIO is mapped to #SHDNIND
ALT6 (<dir>=7)	the GPIO is assigned as Dying Gasp trigger pin
ALT7 (<dir>=8)	the GPIO is assigned as I2C

While using the pins in the alternate function, the GPIO read/write access to that pin is not accessible and must be avoided.



AT#GPIO?

Read command reports the current direction and value of all GPIO pins, in the format:

#GPIO: <dir>,<stat>[<CR><LF>#GPIO: <dir>,<stat>[...]]

If <mode>=3, 4 or 5, the output format is:

#GPIO: <dir>,<stat>,<mode>[<CR><LF>#GPIO: <dir>,<stat>,<mode>[...]]



AT#GPIO=?

Test command reports the supported range of values of the command parameters <pin>, <mode>, <dir> and <save>.



Check the available values ranges

```
AT#GPIO=?  
#GPIO: (1-11),(0-5),(0-1),(0,1)
```

OK

Set GPIO_03 as output, and set logical value HIGH

```
AT#GPIO=3,1,1  
OK
```

Set GPIO_04 as output, value HIGH a save setting

```
AT#GPIO=4,1,1,1  
OK
```

Report GPIO_03 state

```
AT#GPIO=3,2  
#GPIO: 1,1
```

OK

Read command

```
AT#GPIO?  
#GPIO: 1,1 // GPIO_01 is output, value is HIGH  
#GPIO: 0,0,4 // GPIO_02 is input with internal pull down  
#GPIO: 1,1  
#GPIO: 0,0,4  
#GPIO: 0,1,3 // GPIO_05 is input with internal pull up, value is HIGH  
#GPIO: 1,0 // GPIO_06 is output, value is LOW  
#GPIO: 0,0,4  
#GPIO: 0,0,4  
#GPIO: 8,0,0  
#GPIO: 8,0,0  
#GPIO: 0,0,4
```

OK

2.11.4. AT#WWANLED - WWLAN_LED GPIO Setting

This command is used to set the GPIO for WWLAN LED control.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#WWANLED=<mode>,<status>[,<on_duration>[,<off_duration>]]

Set command sets the behavior of the WWLAN_LED GPIO.

Parameters:



Name	Type	Default	Description
<mode>	integer	N/A	Modem status desired WWLAN_LED blink.
Values:			
0	:	Low power mode	
1	:	Offline	
2	:	No service	
3	:	In Service, Roaming	
4	:	Data Active	
<status>	integer	0	On/Off WWLAN_LED blink pattern for selected <mode>.
Values:			
0	:	Off mode	
1	:	On mode	
<on_duration>	integer	0	The duration of period in which WWLAN_LED signal is tied to Low for selected <mode>
Value:			
0÷100	:	In tenth of seconds	
<off_duration>	integer	0	The duration of period in which WWLAN_LED signal is tied to High for selected <mode>.
Value:			
0÷100	:	In tenth of seconds	

i The value of 0 means "deactivate" in the <on_duration> and <off_duration>. Therefore, the value 0 can be used for this LED always on/off.

i The following table shows factory default setting

Low Power Mode	OFF - Dark
Offline	OFF - Dark
No Service	OFF - Dark
In Service	OFF - Dark
Data Active	OFF - Dark

Roaming : Blinking ON 5s, OFF 200ms.

-  The blink pattern of roaming is fixed and it cannot be modified. However, the roaming status also set to disabled as a factory default setting and it will be activated when "In Service" mode's status is on.
-  Current consumption could increase depends on LED scenario.



AT#WWANLED?

Read command returns the WWLAN_LED GPIO current setting, in the format:

```
#WWANLED:<mode0>,<status0>,<on_duration0>,<off_duration0><CR><LF>
...
#WWANLED:<mode4>,<status4>,<on_duration4>,<off_duration4>
```



AT#WWANLED=?

Test command reports the supported range of values for parameters <mode>,<status>,<on_duration> and <off_duration>.



```
AT#WWANLED=0,0,0,0
OK
: Set always off the LED when low power mode
AT#WWANLED=2,1,1,0
OK
: Set always on the LED when no service mode
AT#WWANLED=3,1,10,10
OK
: Set Blinking the LED when in service mode
```

2.11.5. AT#I2CWR - Write to I2C

This command is used to send data to an I2C peripheral connected to the module.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#I2CWR=<sdaPin>,<sciPin>,<deviceId>,<registerId>,<len>

Execution command sends data to an I2C peripheral connected to module GPIOs. After the writing activity has been accomplished, the GPIOs will not be restored to the original setting. Use **#GPIO** command to see the status of the used GPIOs. To have information on GPIO pins refer to document [1].

Parameters:

Name	Type	Default	Description
<sdaPin>	integer	-	GPIO number for SDA. To know the range use #I2CWR test command.
<sciPin>	integer	-	GPIO number for SCL. To know the range use #I2CWR test command.
<deviceId>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/write command, it doesn't matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x.

Value:

0÷3FF : addressing range extended to 10 bit

<registerId>	hex	N/A	register to write data to
--------------	-----	-----	---------------------------

Value:

0÷FF : value must be written in hexadecimal form without 0x

<len>	integer	N/A	number of data to send
-------	---------	-----	------------------------

Value:

1÷254 : number of data to send

Additional info:

- ▶▶ After entering the command, the module returns the prompt ">" and waits for the data to send. To complete the operation, send **Ctrl-Z** char (**0x1A** hex); to exit without writing the message send **ESC** char (**0x1B** hex). Data must be written in hexadecimal form.

If data are successfully sent, the response is **OK**, otherwise an error code is reported.

**AT#I2CWR=?**

Test command returns the range of available values for parameters <sdPin>, <scIPin>, <deviceld>, <registerld>, <len>.



Set GPIO_9 as SDA, and GPIO_10 as SCL. Device I2C address is 0x20; 0x10 is the address of the first register where to write I2C data; 14 data bytes will be written starting from register 0x10.

```
AT#I2CWR=9,10,20,10,14
> 00112233445566778899AABBCCDD<ctrl-z>
OK
```

2.11.6. AT#I2CRD - Read from I2C

This command is used to read data from an I2C peripheral connected to module.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#I2CRD=<sdaPin>,<sciPin>,<devicId>,<registerId>,<len>

Execution command reads data from an I2C peripheral connected to module GPIOs. After the reading activity has been accomplished, the GPIOs will not be restored to the original setting. Use **#GPIO** command to see the status of the used GPIOs. To have information on GPIO pins refer to document [1].

Parameters:

Name	Type	Default	Description
<sdaPin>	integer	-	GPIO number for SDA. To know the range use #I2CRD test command.
<sciPin>	integer	-	GPIO number for SCL. To know the range use #I2CRD test command.
<devicId>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/write command, it doesn't matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x.

Value:

0÷3FF : addressing range extended to 10 bit

<registerId>	hex	N/A	Register to read data from
--------------	-----	-----	----------------------------

Value:

0÷FE : value must be written in hexadecimal form without 0x

<len>	integer	N/A	Number of data to receive 13. Data Read from I2C will be dumped in hexadecimal format 14. If data requested are more than data available in the device, dummy data (normally 0x00 or 0xff) will be dumped
-------	---------	-----	---

Value:

1÷254 : number of data to receive



AT#I2CRD=?

Test command returns the range of available values for parameters <sdaPin>, <sciPin>, <devicId>, <registerId>, <len>.



Read 12 bytes from I2C device with address 0x20, starting from register address 0x10. SDA is mapped on GPIO_09, SCL is mapped on GPIO_10.

```
AT#I2CRD=9,10,20,10,12
#I2CRD: 00112233445566778899AABBCC
OK
```


2.11.7. AT#RXDIV - Enable RX Diversity and Set DARP

This command enables RX Diversity and sets DARP.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#RXDIV=<DIV_enable>[,<DARP_mode>]

Set command enables/disables RX Diversity and sets DARP.

Parameters:

Name	Type	Default	Description
<DIV_enable>	integer	1	enable/disable the RX Diversity
Values:			
0	:	disable	
1	:	enable	
<DARP_mode>	integer	0	select DARP mode
Values:			
0	:	DARP not supported	
1	:	DARP phase 1	

- The values set by command are available at next power-on.
- The values set by command are directly stored in NVM.
- LM960, FN980 and LN920 modules do NOT support GSM tech, so DARP mode is not support (only for backward compatibility).
- Case of #RXTOGGLE already set "1", #RXDIV don't set "1" (Error return).



AT#RXDIV?

Read command reports the currently selected <DIV_enable> and <DARP_mode> parameters in the format:

#RXDIV: <DIV_enable>,<DARP_mode>



AT#RXDIV=?

Test command reports the supported values of parameters <DIV_enable> and <DARP_mode>.

2.11.8. AT#LRXDIV - Enable LTE RX Diversity

This command enables LTE RX Diversity and switches the LTE-RX receiver input accordingly.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#LRXDIV=<Ldiv_enable>

Set command enables/disables the LTE RX Diversity and switches the LTE-RX receiver input, enabling the diversity antenna.

Parameter:

Name	Type	Default	Description
<Ldiv_enable>	integer	1	enable/disable the specific antenna for LTE Rx diversity

Values:

- 0 : enables the only Rx0 antenna. (Only use Rx0)
- 1 : enables the ALL LTE Rx. (Factory default)
- 2 : enables the only Rx1 antenna. (only use Rx1)

Additional info:

- ▶▶ * RX0 (Main Antenna)
- * RX1 (Diversity Antenna)

▶▶

	#LRXDIV=0	#LRXDIV=1	#LRXDIV=2
RX0	Enable	Enable	Disable
RX1	Disable	Enable	Enable
TX	Enable	Enable	Enable

* #LRXDIV = 0: Use RX0 for TX and only RX0 enables for RX

* #LRXDIV = 1: Use RX0 for TX and all RX paths enable for RX

* #LRXDIV = 2: Use RX0 for only TX and only RX1 enables for RX

- The value set by command operate both real time and power cycle.
- For switch back all enable rx path, modem should reboot.
- This command only have to use for the purpose of test.
- Ensure that the call is connected and that all chains are running before triggering any of commands.



AT#LRXDIV?

Read command reports the currently selected <Ldiv_enable> parameters in the format:

#LRXDIV: <Ldiv_enable>



AT#LRXDIV=?

Test command reports the supported range of values for parameter **<Ldiv_enable>**.



For real time operation:

AT#LRXDIV?

#LRXDIV: 1 (RX0 and RX1 enable)

AT#LRXDIV=0 (RX0 enable only)

AT#LRXDIV=2 (RX1 enable only)

AT#LRXDIV=1 (Set to RX0 and RX1 enable)

AT#REBOOT (for RX0 and RX1 enable)

After rebooting, operation

AT#LRXDIV?

#LRXDIV: 1 (RX0 and RX1 enable)

OK

2.11.9. AT#TEMPSENS - Temperature Monitor

This command is used to set the module temperature monitor.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#TEMPSENS=<mod>[,<interval>[,<action>,<low_temp>,<high_temp>[,<gpio>]]]

Set command sets the module temperature monitor operation.

Parameters:

Name	Type	Default	Description
<mod>	integer	0	temperature monitor mode
Values:			
0 : disables the periodic reporting			
1 : enables the periodic reporting			
2 : instantaneous reporting of the module temperature			
<interval>	integer	0	duration in seconds of the interval between next measurement. It has meaning only if <mod> is 1.
Value:			
1÷60 : measurement interval in seconds			
<action>	integer	N/A	bit 0 - it enables the presentation of the temperature monitor URC periodically. Default value if <action> is not specified. bit 1 - it enables the presentation of the temperature notification URC, whenever the module internal temperature reaches either <low_temp> or <high_temp> levels. bit 2 - Output pin <gpio> is tied HIGH when set temperature bounds are reached; when the temperature is back to normal the output pin <gpio> is tied LOW. It is mandatory to set the <gpio> parameter too to set this <action> .
Value:			
1÷7 : bit calculation of actions			
<low_temp>	integer	N/A	temperature lower bound in Celsius Degrees.
Value:			
-40÷0 : temperature lower bound in Celsius Degrees			
<high_temp>	integer	N/A	temperature upper bound in Celsius Degrees
Value:			
0÷100 : temperature upper bound in Celsius Degrees			
<gpio>	integer	-	GPIO number. Use test command to know available range. This parameter is required only if <action>=4, 5, 6 or 7 .

Additional info:

- ▶▶ when **<mode>**=2, the unsolicited message is in the format:
#TEMPSENS: <sensor>,<value>

where:

<sensor> - temperature sensor name

<value> - actual temperature expressed in Celsius degrees

- ▶▶ the notification message is in the format:
#TEMPNOTI: <level>,<value>

where:

<level> - threshold level

-1 - module temperature is under **<low_temp>**

0 - normal temperature

1 - module temperature is upper **<high_temp>**

- i** the module cannot enter sleep while **<mod>**=1.
- i** **<low_temp>** and **<high_temp>** values are TSENS criteria.



AT#TEMPSENS?

Read command reports the current parameter settings in the format:

#TEMPSENS: <mod>,<interval>[,<action>,<low_temp>,<high_temp>,<gpio>]



AT#TEMPSENS=?

Test command reports supported range of values for parameters

<mod>,<interval>,<action>,<low_temp>,<high_temp> and **<gpio>**.



- AT#TEMPSENS=2
#TEMPSENS: TSENS,37
#TEMPSENS: PA_THERM,33
OK

2.11.10. AT#TMLVL - Thermal Mitigation Level

Report Thermal Mitigation Level

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#TMLVL=<device_id>

Reports a current thermal mitigation level of specific <device_id>.

Parameter:

Name	Type	Default	Description
<device_id>	integer	N/A	Device to get level of mitigation.

The report message is in the format:

#TMLVL: <level>

Where:

<level> - thermal mitigation level

0 - normal

1 - level1

2 - level2

3 - level3

Values:

1 : Thermal mitigation device MODEM

2 : Thermal mitigation device PA



AT#TMLVL?

Reports a current thermal mitigation level of all devices in the format:

#TMLVL: MODEM,<level>

#TMLVL: PA,<level>

OK



AT#TMLVL=?

Returns the supported range of values for parameter <device_id>.



Examples for set and read sections.

- AT#TMLVL=2
#TMLVL: 1
OK
- AT#TMLVL?
#TMLVL: MODEM,1
#TMLVL: PA,1
OK

2.11.11. AT#CAINFO - Show LTE CA Information

This command indicates the LTE carrier aggregation information of PCC and SCC

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2

◀ AT#CAINFO?

Read command extract carrier aggregation information for PCC and SCC.

Additional info:

▶▶<On 2CA>

#CAINFO :

<band_class>,<rx_channel>,<dl_bw>,<pci>,<rsrp>,<rssi>,<rsrq>,<sinr>,<tac>,<tx_power>,<uplink_modulation>,<downlink_modulation>,<band_class>,<rx_channel>,<dl_bw>,<pci>,<rsrp>,<rssi>,<rsrq>,<sinr>,<state>,<uplink_modulation>,<downlink_modulation>

<On 3CA>

#CAINFO :

<band_class>,<rx_channel>,<dl_bw>,<pci>,<rsrp>,<rssi>,<rsrq>,<sinr>,<tac>,<tx_power>,<uplink_modulation>,<downlink_modulation>,<band_class>,<rx_channel>,<dl_bw>,<pci>,<rsrp>,<rssi>,<rsrq>,<sinr>,<state>,<uplink_modulation>,<downlink_modulation>,<band_class>,<rx_channel>,<dl_bw>,<pci>,<rsrp>,<rssi>,<rsrq>,<sinr>,<state>,<uplink_modulation>,<downlink_modulation>

Name	Type	Default	Description
<band_class>	integer	N/A	LTE band class

Values:

120 : BAND 1
 121 : BAND 2
 122 : BAND 3
 123 : BAND 4
 124 : BAND 5
 125 : BAND 6
 126 : BAND 7
 127 : BAND 8
 128 : BAND 9
 129 : BAND 10
 130 : BAND 11
 131 : BAND 12
 132 : BAND 13
 133 : BAND 14
 134 : BAND 17
 135 : BAND 33

-
- 136 : BAND 34
 - 137 : BAND 35
 - 138 : BAND 36
 - 139 : BAND 37
 - 140 : BAND 38
 - 141 : BAND 39
 - 142 : BAND 40
 - 143 : BAND 18
 - 144 : BAND 19
 - 145 : BAND 20
 - 146 : BAND 21
 - 147 : BAND 24
 - 148 : BAND 25
 - 149 : BAND 41
 - 150 : BAND 42
 - 151 : BAND 43
 - 152 : BAND 23
 - 153 : BAND 26
 - 154 : BAND 32
 - 155 : BAND 125
 - 156 : BAND 126
 - 157 : BAND 127
 - 158 : BAND 28
 - 159 : BAND 29
 - 160 : BAND 30
 - 161 : BAND 66
 - 162 : BAND 250
 - 163 : BAND 46
 - 166 : BAND 71
 - 167 : BAND 47
 - 168 : BAND 48

<rx_channel>	integer	N/A	E-UTRA absolute radio frequency channel number of the serving cell
	Value:		
	0-68935 : Channel		

<dl_bw>	integer	N/A	Bandwidth
	Values:		
	0 : 1.4 MHz bandwidth		
	1 : 3 MHz bandwidth		

			2 : 5 MHz bandwidth
			3 : 10 MHz bandwidth
			4 : 15 MHz bandwidth
			5 : 20 MHz bandwidth
<pci>	integer	N/A	Physical Cell Id
	Value:		
	0÷503	:	Cell ID
<rsrp>	string	N/A	Current RSRP
	Value:		
	-44÷-140	:	dbm
<rssi>	string	N/A	Current RSSI
	Value:		
	0÷-120	:	dbm
<rsrq>	string	N/A	Current RSRQ
	Value:		
	-3÷-20	:	dbm
<sinr>	string	N/A	Measured SINR. This value is mapped to dB. 0 = -20dB 1 = -19.8dB ... 249 = 29.8dB 250 = 30dB
	Value:		
	0÷250	:	SINR
<tac>	string	-	Tracking area code information for LTE
<tx_power>	string	N/A	Current uplink TX power. The tx_power value is only meaningful when the device is in traffic. When there is no traffic, tx_power is "0".
	Value:		
	-50÷33	:	When there is no traffic, tx_power is "0"
<state>	integer	N/A	Current SCC state
	Values:		
	0	:	INIT
	1	:	CONFIGURED
	2	:	ACTIVE
<uplink_modulation>	integer	N/A	Uplink Modulation
	Values:		
	0	:	BPSK

```

1 : QPSK
2 : 16QAM
3 : 64QAM
4 : 256QAM
5 : UNKOWN

```

<downlink_modulation>	integer	N/A	Downlink Modulation
------------------------------------	---------	-----	---------------------

Values:

```

0 : BPSK
1 : QPSK
2 : 16QAM
3 : 64QAM
4 : 256QAM
5 : UNKOWN

```

- i The first block from **<band_class>** to **<downlink_modulation>** is PCC information. The next information block which are from **<band_class>** to **<downlink_modulation>** is information of SCC. Additional SCC information could add in the rear of first SCC. If the LTE information of SCC is not valid, it always returns 0. If it acquires the UMTS or GSM technology, this command will display "**ERROR**".

? **AT#CAINFO=?**

Test command returns **OK**

2.11.12. AT#TESTMODE - Test Mode Configuration

Set module in test mode for configuring and testing the POWER level.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TESTMODE=<cmd>

The command allows setting module in not signaling mode. The functionality has to be first activated by sending **AT#TESTMODE="TM"** and **AT#TESTMODE="INIT4G"**, which set the module in Test Mode. Only after this set, **AT#TESTMODE** can be used with the other allowed commands. To exit from Test Mode and go back to Operative Mode, the command **AT#TESTMODE="OM"** must be sent.

Parameters:

Name	Type	Default	Description
<cmd>	string	N/A	Current command as quoted string in the format: "<cmd>"

Values:

- "TM" : Forces the module in Test Mode.
- "OM" : Forces the module in Operative Mode.
- "TCH" : Starts the non-stop module transmission.
- "ESC" : Exits the current non-stop sequence (stop TX transmission) and disable RX chain.

<cmd>	string	N/A	Current command as quoted string in the format: "<cmd>" 4G commands
-------	--------	-----	---

Values:

- "SETLTEBAND" : Sets the LTE band
- "LTXBW" : Sets TX bandwidth (Default: 10MHz)
- "LRXBW" : Sets RX bandwidth (Default: 10MHz)
- "CH" : Sets the EUARFCN
- "LTXWAVEFORM" : Sets the WAVEFORM transmission
- "LPASTATE" : Sets the PA STATE to high gain state
- "LPABIASSET" : Sets the PA BIAS
- "LTXGAIN" : Refer to Note 14
- "LNA4G" : Sets 4G LNA GAIN STATE
- "PRXRL4G" : Reads the 4G RX power level of primary path for selected channel. Refer to Note 16.
- "DRXRL4G" : Reads the 4G RX power level of diversity path for selected channel. Refer to Note 16.

<cmd>	string	N/A	Current command as quoted string in the format: "<cmd>" 3G commands
-------	--------	-----	---

Values:

- "SETWCDMABAND" : Sets the WCDMA band

- "CH" : Sets the UARFCN
- "WTXWAVEFORM" : Sets the WAVEFORM transmission
- "WPASET" : Sets the PA high gain
- "WPABIASSET" : Sets the PA BIAS
- "TXPDM " : Sets the value for desired TX power strength. Refer to Note 15
- "LNA 3G" : Sets 3G LNA Gain state. <LNA GAIN STATE> value must set 0.
- "RL3G" : Provide the 3G Rx power level for selected channel. Refer to the Note 16.

<cmd> string N/A Current command as quoted string in the format: "<cmd>"
GNSS command

Value:

"GNSS" : Start GNSS RF receive path test for L1 Band.

Additional info:

►► Recommend "CH<EARFCN UL>"

LTE Band	EARFCN UL	Recommend
1	18000 ~ 18599	18300
2	18600 ~ 19199	18900
3	19200 ~ 19949	19575
4	19950 ~ 20399	20175
5	20400 ~ 20649	20525
7	20750 ~ 21449	21100
8	21450 ~ 21799	21625
12	23010 ~ 23179	23095
13	23180 ~ 23279	23230
14	23280 ~ 23379	23330
17	23730 ~ 23849	23790
18	23850 ~ 23999	23925
19	24000 ~ 24149	24075
20	24150 ~ 24449	24300
25	26040 ~ 26689	26365
26	26690 ~ 27039	26865
28	27210 ~ 27659	27435
29(Rx only)	9660 ~ 9769	9715
30	27660 ~ 27759	27710
38	37750 ~ 38249	38000
39	38250 ~ 38649	38450
40	38650 ~ 39649	39150
41	39650 ~ 41589	40620
42	41590 ~ 43589	42590
43	43590 ~ 45589	46090
48	55240 ~ 59089	55990
66	131972~132671	132322
71	133122~133471	133297

Recommend "TXGAIN_IDX" value

MODEL	BAND	TXGAIN_IDX	TX Power
LN920	1	63	23dBm
	2	59	

	3	57	
	4	56	
	5	54	
	7	64	
	8	60	
	12	55	
	13	55	
	14	53	
	17	56	
	18	53	
	19	54	
	20	54	
	25	58	
	26	56	
	28	55	
	29	NA (Rx only)	
	30	63	
	38	63	
	39	58	
	40	68	
	41	63	
	42	49	
	43	49	
	48	48	
	66	58	
	71	57	

Recommend "CH <CARFCN>"

Band(3G)	UARFCN UL	recommend
1	9612 ~ 9888	9750
2	9262 ~ 9538	9400
4	1312 ~ 1513	1413
5	4132 ~ 4233	4183
8	2712 ~ 2863	2788
9	8762 ~ 8912	8837
19	312 ~ 363	338

Recommend "TXPDM" value.

MODEL	BAND	TXPDM	TX POWER
LN920	1	53	23dBm
	2	53	
	4	53	
	5	50	
	8	56	
	9	54	
	19	51	

- Recommend GNSS test sequence is below :
Check the GNSS Antenna Port type (See **AT\$GPSANTPORT**) in L1 Band case

AT\$GPSANTPORT?
\$GPSANTPORT: 3

OK

For dedicated GNSS connector

- **AT\$GPSANTPORT=2**

For shared Diversity/GNSS connector

- **AT\$GPSANTPORT=1**

Note: After testing, the default value should be restored.

Use either the dedicated GNSS connector or the shared Diversity/GNSS connector.

To test the GNSS receive path:

CW Signal generator setup:

Frequency=1575.52 MHz (1575.42 MHz + 100KHz offset)

CW Level= -110dBm

Test the signal C/No level at the GNSS receiver:

- **AT#TESTMODE="TM"**

- **AT#TESTMODE="GNSS"**

- Repeat **AT#TESTMODE="GNSS"** five to ten times to ensure the measurements are repeatable and stable.

- **AT#TESTMODE="OM"**

The response to **AT#TESTMODE="GNSS"** for a good connection should show C/No within 60dB +/- 5dB and Freq (frequency offset) within 100000 Hz +/- 3150 Hz.

- i** Bands support varies depending on the product
- i** Note 1: This command should be checked individually.
- i** Note 2: LN920 3G Supported bands - WCDMA 1,2,4,5,8,9,19.
- i** Note 3: LN920 4G Supported bands - LTE: FDD 1,2,3,4,5,7,8,12,13,14,17,18,19,20,25,26,28,29,30,66,71. / TDD 38,39,40,41,42,43,48.
- i** Note 4: In Test Mode, the other AT commands don't use.
- i** Note 5: The Test Mode Status is stored in NVM
- i** Note 6: "TM" command only can set on the Online mode.
- i** Note 7: Must issuing #TESTMODE according to recommended test sequence.
- i** Note 8: In case of "RL3G" command, we only guarantee readable RX -60dBm , because chipset has limitation.
- i** Note 9: In case of "PRXRL4G" and "DRXRL4G" command, we only guarantee readable RX -60dBm , because chipset has limitation.
- i** Note 10: In case of 4G, Signal generator CW(unmodulated) signal must be set Frequency to "Fc + 500kHz"
500kHz offset from center frequency should be set to avoid DC(0 Hz).
- i** Note 11: In case of 3G, Signal generator CW(unmodulated)signal must be set Frequency to "Fc + 200kHz"
200kHz offset from center frequency should be set to avoid DC(0 Hz)
- i** Note 12: After One band check is finished, must set the "ESC" and "OM"
- i** Note 13: After #TESTMODE command process finish, modem must reboot.

- Note 14 : TXGAIN_IDX range is around 50~65(FDD) or 40~70(TDD) for 23dBm and some deviation for each module.
- Note 15 : TXPDM range is around 45~60 for 23dBm and some deviation for each module.
- Note 16 : PRXRL4G, DRXRL4G, and RL3G have a difference +/- 5dBm based on input RX power.
- Note 17 : Customer should consider the UL EARFCN settings base on the BW 10MHz.(Refer to the 3GPP TS 36.508)



AT#TESTMODE?

Read command reports the currently selected **<command>** in the format:

#TESTMODE: <testModeStatus>

Additional info:

▶▶ Parameter meaning:

Name	Type	Default	Description
<testModeStatus>	integer	0	status

Values:

- 0 : module is in Operative Mode
- 1 : module is in Test Mode



AT#TESTMODE=?

Test command returns the **OK** result code



1. Recommend 4G TX test sequence is below :

Spectrum analyzer setup:
 Frequency=1747.6MHz
 RBW=1MHz
 Span=100MHz
 Manual Attenuation = 30dB
 Ref level Offset = depends on a cable loss
 Use the trigger video to fix the measurement
 Use the peak search marker

**LTE band 3 and set EARFCN = 19575,
 LTXGAIN = 39 and TX max power level about +23dBm.**

```
- AT#TESTMODE="TM"
- AT#TESTMODE="SETLTEBAND 3"
- AT#TESTMODE="LTXBW"
- AT#TESTMODE="LRXBW"
- AT#TESTMODE="CH 19575"
- AT#TESTMODE="TCH"
- AT#TESTMODE="LTXWAVEFORM"
- AT#TESTMODE="LPASET"
- AT#TESTMODE="LPABIASET"
- AT#TESTMODE="LTXGAIN 39"
- AT#TESTMODE="ESC"
- AT#TESTMODE="OM"
- AT#REBOOT
```

2. Recommend 4G RX test sequence is below :

[FDD LTE Band]
 Signal generator setup:
 Frequency = 1842.5MHz + 500KHz offset
 Level = -60dBm
 CW is sent (RF on, MOD off)
 Offset = depends on a cable loss

LTE band3 and set EARFCN = 19575,

```
- AT#TESTMODE="TM"
- AT#TESTMODE="SETLTEBAND 3"
- AT#TESTMODE="LTXBW"
- AT#TESTMODE="LRXBW"
- AT#TESTMODE="CH 19575"
- AT#TESTMODE="LNA4G"
- AT#TESTMODE="PRXRL4G" -> for check primary antenna path.
  PRXRL4G: -60 -> Return the 4G RX Level of primary antenna path
- AT#TESTMODE="DRXRL4G" -> for check secondary antenna path.
  DRXRL4G: -60 -> Return the 4G RX Level of secondary antenna path
- AT#TESTMODE="ESC"
- AT#TESTMODE="OM"
- AT#REBOOT
```

[TDD LTE BAND]

Signal generator setup:

Frequency = 2595MHz + 500KHz offset
 Level = -60dBm
 CW is sent (RF on, MOD off)
 Offset = depends on a cable loss

LTE band38 and set EARFCN = 38000,

- AT#TESTMODE="TM"
- AT#TESTMODE="SETLTEBAND 38"
- AT#TESTMODE="LTXBW"
- AT#TESTMODE="LRXBW"
- AT#TESTMODE="CH 38000"
- AT#TESTMODE="LNA4G"
- AT#TESTMODE="PRXRL4G" -> for check primary antenna path.
 PRXRL4G: -60 -> Return the 4G RX Level of primary antenna path
- AT#TESTMODE="DRXRL4G" -> for check secondary antenna path.
 DRXRL4G: -60 -> Return the 4G RX Level of secondary antenna path
- AT#TESTMODE="ESC"
- AT#TESTMODE="OM"
- AT#REBOOT

3. Recommend 3G TX test sequence is below :

Spectrum analyser setup:
 Frequency=1950MHz
 RBW=1MHz
 Span=100MHz
 Manual Attenuation = 30dB
 Ref level Offset = depends on a cable loss
 Use the trigger video to fix the measurement
 Use the peak search marker

3G band 1 and set UARFCN = 9750,

3G TXPDM = 49 and TX max power level about +23dBm.

- AT#TESTMODE="TM"
- AT#TESTMODE="SETWCDMABAND 1"
- AT#TESTMODE="CH 9750"
- AT#TESTMODE="TCH"
- AT#TESTMODE="WTXWAVEFORM"
- AT#TESTMODE="WPASET"
- AT#TESTMODE="WPABIASSET"
- AT#TESTMODE="TXPDM 49"
- AT#TESTMODE="ESC"
- AT#TESTMODE="OM"
- AT#REBOOT

4. Recommend 3G RX test sequence is below :

Signal generator setup:
 Frequency = 2140MHz+200kHz offset
 Level = -60dBm
 CW is sent (RF on, MOD off)
 Offset = depends on a cable loss

3G band 1 and set EARFCN = 9750,

- AT#TESTMODE="TM"
- AT#TESTMODE="SETWCDMABAND 1"
- AT#TESTMODE="CH 9750"
- AT#TESTMODE="LNA3G 0"
- AT#TESTMODE="RL3G" -> for check primary antenna path.
RL3G: -60
- AT#TESTMODE="ESC"
- AT#TESTMODE="OM"
- AT#REBOOT

2.11.13. AT#LAPS - LTE Antenna Ports Signals

This command returns LTE antenna ports signal for RSRP and RSRQ.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LAPS

Execution command indicates RSRP and RSRQ signals in LTE separated antenna ports.

#LAPS: <rsrp_0>,<rsrq_0>,<rsrp_1>,<rsrq_1>

Additional info:



Name	Type	Default	Description
<rsrp_0>	integer	-	Reference Signal Received Power of RX path 0 Primary Antenna 0 or 1 : It depends on specific band
<rsrq_0>	integer	-	Reference Signal Received Quality of RX path 0 Primary Antenna 0 or 1 : It depends on specific band
<rsrp_1>	integer	-	Reference Signal Received Power of RX path 1 Secondary Antenna 0 or 1 : It depends on specific band
<rsrq_1>	integer	-	Reference Signal Received Quality of RX path 1 Secondary Antenna 0 or 1 : It depends on specific band

- Current reference signal receive power in dBm. (-44 - -140)
- The value set by command operate after mode reboot. (-3 - -20)
- Please refer to HW USER GUIDE for detailed information of antenna ports.



AT#LAPS?

Read command operates as execution command.

- This command type needs for backward compatibility.



AT#LAPS=?

Test command returns OK.



Please refer to H/W user guide to get the LTE antenna ports information.

2.11.14. AT#LCFC - LTE Carrier Aggregation Frequencies and Combinations

Command reads LTE Carrier Aggregation Frequencies and Combinations.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LCFC

Execution command indicates supported CA frequencies and Combinations of current mode(variant).

#LCFC: <mode>,<freq>,<combo>

Additional info:



Name	Type	Default	Description
<mode>	integer	N/A	Current mode(variant)
Values:			
0	:	mode is	GENERIC
1	:	mode is	ATT
2	:	mode is	VZW
3	:	mode is	EU
4	:	mode is	SPRINT
5	:	mode is	TMUS
6	:	mode is	SKT
7	:	mode is	NTT
8	:	mode is	KDDI
9	:	mode is	TELSTRA
10	:	mode is	ANATEL
<freq>	string	N/A	Supported frequencies
Values:			
1 (2100)	:	LTE Band	1
2 (1900)	:	LTE Band	2
3 (1800)	:	LTE Band	3
4 (1700)	:	LTE Band	4
5 (850)	:	LTE Band	5
7 (2600)	:	LTE Band	7
8 (900)	:	LTE Band	8
12 (700a)	:	LTE Band	12

13 (700c)	:	LTE Band 13
14 (700ps)	:	LTE Band 14
17 (700b)	:	LTE Band 17
18 (800)	:	LTE Band 18
19 (800)	:	LTE Band 19
20 (800)	:	LTE Band 20
25 (1900)	:	LTE Band 25
26 (850)	:	LTE Band 26
28 (700)	:	LTE Band 28
29 (700d)	:	LTE Band 29
30 (2300)	:	LTE Band 30
32 (1500)	:	LTE Band 32
34 (TD2000)	:	LTE Band 34
38 (TD2600)	:	LTE Band 38
39 (TD1900)	:	LTE Band 39
40 (TD2300)	:	LTE Band 40
41 (TD2500)	:	LTE Band 41
42 (TD3500)	:	LTE Band 42
43 (TD3700)	:	LTE Band 43
46 (TD Unlicensed)	:	LTE Band 46
48 (TD3600)	:	LTE Band 48
66 (1700)	:	LTE Band 66
71 (600)	:	LTE Band 71

<combo>	string	-	Supported combinations
----------------------	--------	---	------------------------



AT#LCFC=?

Test command returns the **OK** result code.

2.11.15. AT#CACTL - LTE Carrier Aggregation enable and disable

This command is able to set enable/disable the LTE carrier aggregation.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CACTL=<mode>

Set command enable/disable the LTE Carrier Aggregation.

Parameter:

Name	Type	Default	Description
<mode>	integer	1	

Values:

- 0 : CA disable
- 1 : CA enable



The value set by command operate after mode reboot.



AT#CACTL?

Read command reports the current selected <mode> in the format:

#CACTL: <mode>



AT#CACTL=?

Test command reports the supported range of values.



For carrier aggregation disable

AT#CACTL=0

AT#REBOOT

For carrier aggregation enable

AT#CACTL=1

AT#REBOOT

2.11.16. AT#SHDNIND - Shutdown Indication

This command used to enable/disable shutdown GPIO indicator.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SHDNIND=<enable>[,<gpio>]

Set command enable/disable shutdown GPIO indicator. Shutdown GPIO indicator acts as a notification to host with translation to low when the modem is finished a shutdown process and power removal is possible.

Parameters:

Name	Type	Default	Description
<enable>	integer	0	enable/disable shutdown GPIO indicator

Values:

- 0 : disable
- 1 : enable indicator when shut down
- 2 : enable indicator when fast shutdown
- 3 : enable indicator when shut down and fast shutdown

<gpio>	integer	-	GPIO number will be used for indicator. Use AT#SHDNIND=? test command to know available range. This parameter is no meaning when <enable> is 0.
--------	---------	---	--

Additional info:

- ▶▶ shutdown indication GPIO also acts as BOOT_OK pin. this pin translates to high when module enters idle state after booting.

- don't need to set <gpio> when disable indicator using <enable> is 0.
- the stored configuration is maintained even when firmware update or switching.



AT#SHDNIND?

Read command reports a current configuration in the format:

#SHDNIND: <enable>,<gpio>

- <gpio> shown as '0' when shutdown indicator is disabled.



AT#SHDNIND=?

Test command returns the supported range of values for parameter <enable> and <gpio>.



- AT#SHDNIND=3,3
OK
- AT#SHDNIND?
#SHDNIND: 3,3
OK

2.11.17. AT#RXTOGGLE - Swap RX from Main to Diversity

This command swaps the receiver from the main antenna to the diversity antenna.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#RXTOGGLE=<TOGGLE_enable>

Parameter:

Name	Type	Default	Description
<TOGGLE_enable>	integer	0	toggle between normal to diversity antenna

Values:

- 0 : set the RX to the main antenna
- 1 : set the RX to the diversity antenna

- Please disable usage of two antennas (AT#RXDIV=0) before swap antennas.
- Case of Diversity receiver path(RD) already set(#RXDIV=1), #RXTOGGLE command don't set "1"(Error return).
- The values set by command are directly stored in NVM.
- They are available at next power on.(Solution provider's Limitation.)



AT#RXTOGGLE?

Read command reports the currently selected <TOGGLE_enable> in the format:

#RXTOGGLE: <TOGGLE_enable>



AT#RXTOGGLE=?

Test command reports the supported range of values.



```
AT#RXDIV?  
#RXDIV: 1,1  
AT#RXTOGGLE=1 (When RXDIV=1, RXTOGGLE command return ERROR.)  
ERROR  
AT#RXDIV=0  disable the RX Diversity  
OK  
AT#RXTOGGLE=1  set the RX to the diversity antenna  
OK  
AT#REBOOT reboot the module  
OK  
AT+COPS=0  register to the 3G network  
OK  
AT+CREG=1  enable network registration unsolicited result code  
OK  
AT+CREG?  read <mode> and <stat> parameters  
+CREG: 1,1  
OK
```

2.11.18. AT#CBC - Battery and Charger Status

This command returns the current Battery and Charger state.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CBC

Execution command returns the current Battery and Charger state. The response is in the format:

#CBC: <ChargerState>,<BatteryVoltage>

Additional info:

- ▶▶ The response has its fields described below.

Name	Type	Default	Description
<ChargerState>	integer	0	Battery charger state
Values:			
0	:	charger not connected	
1	:	charger connected and charging	
2	:	charger connected and charge completed	
<BatteryVoltage>	integer	-	battery voltage in units of 10 mV: it is the real battery voltage only if charger is not connected; if the charger is connected this value depends on the charger voltage



AT#CBC=?

Test command returns the **OK** result code.

2.11.19. AT#SKIPGCF - SKIPGCF mode enable / disable for thermal test

This command allows to set for skip the GCF mode when performing thermal tests with a callbox and GCF SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SKIPGCF=<mode>

Set command enables/disables GCF mode for thermal tests with callbox and GCF SIM.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable the skip GCF mode

Values:

- 0 : Disable the skip GCF mode. (Factory Default)
- 1 : Enable the skip GCF mode.

- Qualcomm described that Thermal management is active only when using a non-GCF SIM, i.e., a SIM that is not programmed with MCC-MNC(1-1).
- The values set by command stored in NVM and this value be applied after rebooting the modem.



AT#SKIPGCF?

Read command reports the current stored parameter:

#SKIPGCF: <mode>



AT#SKIPGCF=?

Test command returns the supported range of value for parameter <mode>.

2.12. IPEasy

2.12.1. AT#ICMP - Ping Support

This command enables/disables ICMP Ping support.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ICMP=<mode>

Set command enables/disables ICMP Ping support.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	ICMP mode selection.

Values:

- 0 : disable ICMP Ping support
- 1 : enable firewalled ICMP Ping support (Not available)
- 2 : enable free ICMP Ping support; the module is sending a proper ECHO_REPLY to every IP Address pinging it.



AT#ICMP?

Read command returns whether the ICMP Ping support is currently enabled or not, in the format:

#ICMP: <mode>



AT#ICMP=?

Test command reports the supported range of values for the <mode> parameter.

2.13. Easy Scan

2.13.1. AT#CSURV - Network Survey

The command allows to perform a network survey through band channels.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	Yes	-	2



AT#CSURV[=[<s>,<e>]]

Execution command allows to perform a quick survey through channels belonging to the band selected by last #BND command issue, starting from channel <s> to channel <e>. Issuing AT#CSURV<CR>, a full band scan is performed.

After issuing the command the device responds with the string:

Network survey started...

The network survey information text lines parameters are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel
<e>	integer	-	ending channel

Additional info:

▶▶ 3G Network survey information text lines:

```
uarfcn: <uarfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> scr code: <scrcode>
cellId: <cellId> lac: <lac> cellStatus: <cellStatus> rscp: <rscp> ecio: <ecio>
<CR><LF><CR><LF><CR><LF>
```

Name	Type	Default	Description
<uarfcn>	integer	-	The carrier frequency is designated by the UTRA Absolute Radio Frequency Channel Number.
<rxLev>	integer	-	decimal number; it is the reception level (in dBm).
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code.
<mnc>	hex	-	hexadecimal 2/3 digits number; it is the mobile network code.
<scrcode>	integer	-	decimal number; it is the scrambling code.
<cellId>	mixed	-	cell identifier
<lac>	mixed	-	location area code
<cellStatus>	string	N/A	string type; it is the cell status

Values:

```
CELL_SUITABLE : the cell is a suitable cell.
CELL_LOW_PRIORITY : the cell is low priority based on the
received system information.
```

CELL_FORBIDDEN	:	the cell is forbidden.
CELL_BARRED	:	the cell is barred based on the received system information.
CELL_LOW_LEVEL	:	the cell <rxLev> is low.
CELL_OTHER	:	none of the above (e.g. exclusion timer running, no BCCH available, etc.).

<rsrp>	integer	-	decimal number; it is the received signal code power (in dBm)
<ecio>	integer	-	decimal number; it is the chip energy per total wideband power (in dBm)

- 4G Network survey information text lines:
Currently work only if module camped on LTE cell.

For serving cell:

earfcn: <earfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> cellId: <cellId> tac: <tac>
phyCellId: <pci> cellStatus: <cellStatus> rsrp: <rsrp> rsrq: <rsrq> bw:<bandwidth>

For neighbor cell:




earfcn: <earfcn> rxLev: <rxLev> phyCellId: <pci> cellStatus: <cellStatus> rsrp:
<rsrp> rsrq: <rsrq>

Name	Type	Default	Description
<earfcn>	integer	-	E-UTRA Assigned Radio Channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2/3 digits number; it is the mobile network code
<cellId>	mixed	-	cell identifier
<tac>	mixed	-	Tracking Area Code
<pci>	mixed	-	physical cell identifier
<cell Status>	string	N/A	it is the cell status

Values:

CELL_SUITABLE	:	C0 is a suitable cell.
CELL_LOW_PRIORITY	:	the cell is low priority based on the received system information.
CELL_FORBIDDEN	:	the cell is forbidden.
CELL_BARRED	:	the cell is barred based on the received system information.
CELL_LOW_LEVEL	:	the cell <rxLev> is low.
CELL_OTHER	:	none of the above e.g. exclusion timer running, no BCCH available... etc

<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<bandwidth>	integer	-	E-UTRA bandwidth of serving cell

-  The bandwidth, **<bandwidth>**, of LTE neighbor cells(intra/inter) cannot be appeared.
 -  The CELL_LOW_PRIORITY of **<cellStatus>** for LTE is not supported.
 -  The command is executed within max. 3 minute.
-

**(WCDMA)**

AT#CSURV

Network survey started ...

uarfcn: 10737 rxLev: -51 mcc: 450 mnc: 05 scr code: 224 cellId: 63808800 lac: 86
73 cellStatus: CELL_SUITABLE rscp: -58 ecio: -6.0

uarfcn: 10836 rxLev: -70 mcc: 450 mnc: 08 scr code: 1488 cellId: 14909569 lac: 7
170 cellStatus: CELL_FORBIDDEN rscp: -73 ecio: -4.5

Network survey ended

OK

(LTE)

AT#CSURV

Network survey started ...

earfcn: 1350 rxLev: -60 mcc: 450 mnc: 05 cellId: 7321403 tac: 12556 phyCellId: 99 cellStatus:
CELL_SUITABLE rsrp: -98 rsrq: -16 bw: 20

earfcn: 2500 rxLev: -49 mcc: 450 mnc: 05 cellId: 448779 tac: 12556 phyCellId: 273 cellStatus:
CELL_SUITABLE rsrp: -75 rsrq: -9 bw: 10

earfcn: 2850 rxLev: -62 mcc: 450 mnc: 05 cellId: 7323799 tac: 12556 phyCellId: 64 cellStatus:
CELL_SUITABLE rsrp: -99 rsrq: -17 bw: 20

earfcn: 1350 rxLev: -62 mcc: 450 mnc: 05 cellId: 7323719 tac: 12556 phyCellId: 64 cellStatus:
CELL_SUITABLE rsrp: -99 rsrq: -17 bw: 20

earfcn: 1694 rxLev: -61 mcc: 450 mnc: 08 cellId: 2486293 tac: 26 phyCellId: 245 cellStatus:
CELL_FORBIDDEN rsrp: -85 rsrq: -7 bw: 10

earfcn: 1550 rxLev: -55 mcc: 450 mnc: 08 cellId: 2486275 tac: 26 phyCellId: 245 cellStatus:
CELL_FORBIDDEN rsrp: -87 rsrq: -12 bw: 20

earfcn: 3200 rxLev: -69 mcc: 450 mnc: 05 cellId: 7321523 tac: 12556 phyCellId: 99 cellStatus:
CELL_SUITABLE rsrp: -106 rsrq: -20 bw: 10

earfcn: 9410 rxLev: -62 mcc: 450 mnc: 30 cellId: 1155074 tac: 12300 phyCellId: 21 cellStatus:
CELL_FORBIDDEN rsrp: -86 rsrq: -7 bw: 10

earfcn: 66536 rxLev: -63 mcc: 450 mnc: 06 cellId: 51999244 tac: 8471 phyCellId:87 cellStatus:
CELL_FORBIDDEN rsrp: -94 rsrq: -11 bw: 20

earfcn: 1350 rxLev: -70 phyCellId: 47 cellStatus: CELL_SUITABLE rsrp: -102 rsrq:-20

earfcn: 2850 rxLev: -76 phyCellId: 99 cellStatus: CELL_SUITABLE rsrp: -100 rsrq:-16

Network survey ended

OK

2.13.2. AT#CSURVC - Network Survey (Numeric Format)

This command allows to perform a network survey through band channels with output in numeric format.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	Yes	-	2



AT#CSURVC[=[<s>,<e>]]

Execution command allows to perform a quick survey through channels belonging to the band selected by last #BND command issue, starting from channel <s> to channel <e>. Issuing AT#CSURVC<CR>, a full band scan is performed.

After issuing the command the device responds with the string:

Network survey started...

The network survey information text lines parameters are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel
<e>	integer	-	ending channel

Additional info:

►►3G Network survey information text lines:

```
<uarfcn>,<rxLev>,<mcc>,<mnc>,<scrcode>,<cellId>,<lac>,<cellStatus>,<rscp>,<ecio>
<CR><LF><CR><LF><CR><LF>
```

Name	Type	Default	Description
<uarfcn>	integer	-	the cell carrier frequency designated by UTRA Absolute Radio Frequency Channel Number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits/3-digits number; it is the mobile network code
<scrcode>	integer	-	decimal number; it is the scrambling code
<cellId>	integer	-	cell identifier
<lac>	integer	-	location area code
<cellStatus>	string	N/A	string type; it is the cell status

Values:

- 0 : the cell is a suitable cell (CELL_SUITABLE).
- 1 : the cell is low priority based on the received system information (CELL_LOW_PRIORITY).
- 2 : the cell is forbidden (CELL_FORBIDDEN).

- 3 : the cell is barred based on the received system information (CELL_BARRED).
- 4 : the cell <rxLev> is low (CELL_LOW_LEVEL).
- 5 : none of the above (e.g. exclusion timer running, no BCCH available,etc.) (CELL_OTHER).

<rscp>	integer	-	decimal number; it is the RSCP level (in dBm)
<ecio>	integer	-	decimal number; it is the EC/IO ratio level (in dB)

►►4G Network survey information text lines:
 Currently work only if module camped on LTE cell.

For serving cell:

<earfcn>,<rxLev>,<mcc>,<mnc>,<cellId>,<tac>,<pci>,<cellStatus>,<rsrp>,<rsrq>,<bandwidth>

For neighbor cell:

<earfcn>,<rxLev>,<pci>,<cellStatus>,<rsrp>,<rsrq>

Name	Type	Default	Description
<earfcn>	integer	-	E-UTRA Assigned Radio Channel.
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2/3 digits number; it is the mobile network code
<cellId>	mixed	-	cell identifier
<tac>	mixed	-	Tracking Area Code
<pci>	mixed	-	physical cell identifier
<cellStatus>	integer	N/A	it is the cell status

Values:

- 0 : C0 is a suitable cell (CELL_SUITABLE).
- 1 : the cell is low priority based on the received system information (CELL_LOW_PRIORITY).
- 2 : the cell is forbidden (CELL_FORBIDDEN).
- 3 : the cell is barred based on the received system information (CELL_BARRED).
- 4 : the cell <rxLev> is low (CELL_LOW_LEVEL).
- 5 : none of the above e.g. exclusion timer running, no BCCH available...etc.. (CELL_OTHER).

<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<bandwidth>	integer	-	E-UTRA bandwidth of serving cell

- i** The bandwidth, **<bandwidth>**, of LTE neighbor cells(intra/inter) cannot be appeared.
- i** The CELL_LOW_PRIORITY of **<cellStatus>** for LTE is not supported.
- i** The command is executed within max. 3 minute.
- i** The information provided by **#CSURVC** is the same as that provided by **#CSURV**. The difference is that the output of **#CSURVC** is in numeric format only.

**(WCDMA)**

AT#CSURVC

Network survey started ...

10836,-71,450,08,1488,14909569,7170,2,-73,-6.5

10737,-53,450,05,224,63808800,8673,0,-59,-5.0

Network survey ended

OK

(LTE)

AT#CSURVC

Network survey started ...

1350,-62,450,05,7321403,12556,99,0,-99,-15,20

2850,-65,450,05,7321483,12556,99,0,-103,-18,20

1694,-58,450,08,2486293,26,245,2,-83,-8,10

1550,-56,450,08,2486275,26,245,2,-87,-11,20

3200,-73,450,05,7323839,12556,64,0,-101,-11,10

9410,-63,450,30,1155074,12300,21,2,-86,-6,10

2500,-49,450,05,448779,12556,273,0,-73,-7,10

1350,-73,64,0,-98,-15

Network survey ended

OK

2.14. IoT Portal

2.14.1. AT+ODIS - Commands for Saving and Retrieving ODIS Parameters

This command allows the end-user to handle the Host ODIS parameters. When the AT&T LwM2M agent is running, the command is executed internally to the LwM2M client, updating this client about the values change (i.e.: the server will be notified about this change if the observation on these items is active).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+ODIS=<instance>,<hostUniqueDevId>,<hostManufacturer>,<hostModel>,<hostSwVersion>

Parameters:

Name	Type	Default	Description
<instance>	integer	N/A	Instance number
Values:			
	0	:	Instance #0
	1	:	Instance #1
<hostUniqueDevId>	string	-	contains a string, between double quotes, with the host unique device identifier HUID0, default value
<hostManufacturer>	string	-	contains a string, between double quotes, with the host manufacturer identifier. HMAN0, default value
<hostModel>	string	-	contains a string, between double quotes, with the host model identifier. HMOD0, default value
<hostSwVersion>	string	-	contains a string, between double quotes, with the host software version identifier. HSW0, default value

- The odis setting requires all the odis values to be set each time the command is issued, therefore, to change only one odis parameters it is recommended to read all the values first, and then compose the command input string accordingly.
- Since the odis items are 4, it is quite unlikely but possible that some the storing of some of them fails. In this case, the new values, where succeeded, are kept. An advice is that, in case of storing failure, the +ODIS? command is used to verify what are the odis items changed, if any.



AT+ODIS?

Read command reports the current odis values in the format:

+ODIS: <instance#0>,<hostManufacturer#0>,<hostModel#0>,<hostSwVersion#0>

+ODIS: <instance#1>,<hostManufacturer#1>,<hostModel#1>,<hostSwVersion#1>

- As per AT&T specification, the <hostUniqueDevId> odis parameter could be set but it cannot be read by AT commands.

**AT+ODIS=?**

Test command reports the supported range of values for all parameters



```
AT+ODIS?
```

```
+ODIS: 0,"HMAN0","HMOD0","HSW0"
```

```
+ODIS: 1,"HMAN1","HMOD1","HSW1"
```

```
OK
```

```
AT+ODIS=0,"HUID12","HMAN34","HMOD56","HSW78"
```

```
OK
```

```
AT+ODIS?
```

```
+ODIS: 0,"HMAN34","HMOD56","HSW78"
```

```
+ODIS: 1,"HMAN1","HMOD1","HSW1"
```

```
OK
```

2.15. FOTA & OMA

2.15.1. FOTA Legacy

2.15.1.1. AT#OTAUPW - OTA Delta Write

Execution command starts injection of a delta file into the device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#OTAUPW[=<size>]

This command will only write the file to the device to be ready for installation.

In order to install the delta file, it is mandatory to send the command **#OTAUP**.

You can send **#OTAUPW** with or without <size> parameter.

Once the command **#OTAUPW** is received, the device prints the "**CONNECT**" reply wait for data to received.

Send escape sequence **+++** to end data transmission (which will result in **OK** response)

If <size> parameter value was specified, the command will report **OK** once all size is received.

Parameter:

Name	Type	Default	Description
<size>	integer	-	size in bytes of data to be injected



AT#OTAUPW=?

Test command returns **OK** result code.



```
// Send the command #OTAUPW to start the
// injection of the Delta FW into module's
// flash memory
AT#OTAUPW
CONNECT
// Send the Delta FW to the module via
// user's USB/SERIAL interface
// remind to use hardware flow control while
// sending the file
// Once the sending of the file has been
// terminated, close the connection through
// the escape sequence (+++).
+++
OK
```


2.15.2. OMA-DM

2.15.2.1. AT#HOSTODIS - Host ODIS Parameters Management

The command manages the Host ODIS parameters related to AT&T OMA LwM2M Client.



[1] <CDR-DVM-4543> of AT&T, revision 19.2

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#HOSTODIS=<Param>,<Action>[,<Value>[,<Instance>]]

The set command allows the end-user to handle the Host Odis parameters for AT&T OMA LwM2M client

Parameters:

Name	Type	Default	Description
<Param>	integer	N/A	selects the specific item on which work.
Values:			
0	:	Host Manufacturer name	
1	:	Host model Name	
2	:	Host Software application version	
3	:	Host Device Unique ID	
<Action>	integer	N/A	selects the action to be performed on the item selected by <Param>
Values:			
0	:	"SET" action	
1	:	"GET" action	
2	:	"RESET" action	
<Value>	string	-	contains a string, between double quotes, with data to be set. Maximum string length is 64 characters. It is valid only if <Action> = 0 ("SET" action)
<Instance>	integer	0	instance number
Value:			
0,1	:	allowed values	

- Host Manufacturer, Host Model and Host Software application version do not change after an OTA firmware upgrade
- "GET" action is not allowed on Host Device Unique ID.
- Default values, according to specification [1], are:
Instance 0:

-
15. HUID0 (for Host Device Unique ID)
 16. HMAN0 (for Host Manufacturer)
 17. HMOD0 (for Host Model)
 18. HSW0 (for Host Software version)

Instance 1:

19. HUID1 (for Host Device Unique ID)
 20. HMAN1 (for Host Manufacturer)
 21. HMOD1 (for Host Model)
 22. HSW1 (for Host Software version)
-



AT#HOSTODIS=?

Test command returns the supported values ranges of the parameters.



Get the currently set values (i.e.: Host Model)

```
AT#HOSTODIS=1,1  
#HOSTODIS:"HMOD1"  
OK
```

Set a new Host Model value

```
AT#HOSTODIS=1,0,"Model #4 - 2nd version"  
OK
```

Get the currently set value

```
AT#HOSTODIS=1,1  
#HOSTODIS: 0,"Model #4 - 2nd version"  
OK
```

Reset the Model value

```
AT#HOSTODIS=1,2  
OK
```

Get again the currently set value

```
AT#HOSTODIS=1,1  
#HOSTODIS:"HMOD1"  
OK
```

2.16. GNSS

2.16.1. GNSS Configuration

2.16.1.1. AT\$GPSNVRAM - Delete GNSS NVRAM Parameters

The command deletes GPS NVRAM parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSNVRAM=<bitField>,<action>

Execution command is used to delete the GPS information stored in NVRAM.

Parameters:

Name	Type	Default	Description
<bitField>	integer	15	The assistance data mask for the type(s) of GPS data to read/delete with the following meaning: 1: Ephemeris 2: Location 4: Time 8: Almanac Value: 1÷15 : data mask value
<action>	integer	0	command action Value: 0 : delete data described in bitfield



AT\$GPSNVRAM?

Read command reports the current value of the <bitField> parameter, in the format:

\$GPSNVRAM: <bitField>



AT\$GPSNVRAM=?

Test command returns the supported range of values for parameters <bitField> and <action>.



The current setting is stored through **\$GPSSAV** command.



```
AT$GPSNVRAM=15,0
OK
```

2.16.1.2. AT\$LCSSLP - Update SLP Address

The command allows to update the SLP address and port number.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LCSSLP=<slp_address_type>[,<slp_address>[,<slp_port_number>]]

Set command allows to update the SLP address and SLP port number.

Parameters:

Name	Type	Default	Description
<slp_address_type>	integer	2	SLP address type
Values:			
	0	:	IPv4
	1	:	FQDN
	2	:	IMSI
	3	:	IPv6 (if the IPv6 is supported)
<slp_address>	string	-	SLP address in FQDN format or IPv4/IPv6 format
<slp_port_number>	integer	-	SLP port number. Default value is 7275.

- If <slp_address_type> is 0, 1 or 3, then <slp_address> is a mandatory.
- If <slp_address_type> is 2, then <slp_address> and <slp_port_number> are not required.



AT\$LCSSLP?

Read command returns the current SLP address.



AT\$LCSSLP=?

Test command returns the supported values of parameter <slp_address_type>.

2.16.1.3. AT\$LCSTER - Update Terminal Information

This command updates terminal information, such as IMSI, MSISDN or IPv4/IPv6 address.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$LCSTER=<id_type>[,<id_value>[,<pref_pos_mode>[,<tls_mode>]]]

Set command updates the terminal information such as IMSI, MSISDN or IPv4/IPv6 address.

Parameters:

Name	Type	Default	Description
<id_type>	integer	1	a number which can have any of the following values
	Values:		
	0	:	MSISDN
	1	:	IMSI
	2	:	IPv4 address
	3	:	IPv6 address (if IPv6 is supported)
	4	:	Invalid
<id_value>	string	-	as defined in <id_type>
<pref_pos_mode>	integer	0	preferred position mode
	Values:		
	0	:	default position mode
	1	:	none preferred position mode
<tls_mode>	integer	1	indicates if TLS mode should/should not be used by the SET
	Values:		
	0	:	non-TLS mode
	1	:	TLS mode

- i** The following parameters are included only for backward compatibility and have no effect. <id_type>, <id_value> and <pref_pos_mode>
- i** If <id_type> is MSISDN ,IPv4 address or IPv6 address, then <id_value> shall be entered.

2.16.1.4. AT\$LCSLRMT - Mobile Terminated Location Request (MT-LR)

The network can request the current location of a target MS: this command allows to enable the unsolicited response that inform that an MT location request has arrived.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LCSLRMT=<mode>

Set command is used to enable/disable unsolicited response. The URC format is:

\$LCSLRMT: <TransportProtocol>,<NotifType>,<LocEstimateType>,<ClientId>,<ClientNameEncodingType>,<ClientNameType>,<ClientName>,<RequestorIdEncodingType>,<RequestorIdType>,<RequestorId>,<Codeword>,<ServiceTypeId>,<ReqId>

Parameter:

Name	Type	Default	Description
<mode>	integer	1	enable\disable unsolicited

Values:

- 0 : disable unsolicited
- 1 : enable unsolicited

Unsolicited fields:

Name	Type	Description
<TransportProtocol>	integer	Transport protocol used

Values:

- 0 : C-Plane Protocol
- 1 : SUPL Protocol
- 2 : Invalid

<NotifType>	integer	Notify type
-------------	---------	-------------

Values:

- 0 : Notify
- 1 : Verify request (no response will be treated as permission granted, see \$LCSLRV)
- 2 : Verify request (no response will be treated as permission denied, see \$LCSLRV)

<LocEstimateType>	integer	Location estimate type
-------------------	---------	------------------------


Values:

- 0 : Current location
- 1 : Current or Last Location Known
- 2 : Initial location

<RequestorIdEncodingtype>	integer	Client Identification
---------------------------	---------	-----------------------

Values:

		0	:	UCS2
		1	:	GSM default format
		2	:	UTF-8 format
		3	:	invalid format
<ClientNameEncodingType>	integer	Encoding type of the Client Name		
		Values:		
		0	:	UCS2
		1	:	GSM default format
		2	:	UTF-8 format
		3	:	invalid format
<ClientNameType>	integer	Type of Client Name		
		Values:		
		0	:	logical name
		1	:	email-address
		2	:	MSISDN
		3	:	URL of client
		4	:	SIP URL
		5	:	MIN
		6	:	MDN
		7	:	IMS Public Identity
		8	:	invalid type
<RequestorIdType>	integer	Type of the Requestor Id		
		Values:		
		0	:	logical name
		1	:	email-address
		2	:	MSISDN
		3	:	URL of client
		4	:	SIP URL
		5	:	MIN
		6	:	MDN
		7	:	IMS Public Identity
		8	:	invalid type
<ClientName>	string	Name of Client displayed as per data coding scheme		
<RequestorId>	string	Requestor Id displayed as per data coding scheme		
<CodeWord>	string	Codeword displayed as per data coding scheme		
<ServiceTypeId>	integer	Id of service Type (0-127)		
<ReqId>	integer	Identification of the request		

 **<ReqId>** uniquely identifies the MT-LR sent by the network and the same **<reqid>** shall be used in **\$LCSLRV** command in case the **<Notif_type>** is of type "Verify request".

**AT\$LCSLRMT?**

Read command returns the current value of parameter **<mode>**.

**AT\$LCSLRMT=?**

Test command returns the range of values for parameter **<mode>**.

2.16.1.5. AT\$LTC - LCS Certificate

This command is used to pass the security objects (e.g. certificate, key) to the Transport Layer Security Protocol, via binary string.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LTC=<string>,<total_message_length>,<seq_no>,<security_object_type>

Set command is used to pass the security objects (e.g. certificate, key) to the Transport Layer Security Protocol (binary string). The certificate shall be in hexadecimal format (each octet of the certificate is given as two IRA character long hexadecimal number).

Parameters:

Name	Type	Default	Description
<string>	string	-	string certificate segment. The maximum value of accepted characters is 300 characters per segment.
<total_message_length>	integer	N/A	total certificate size to be received
Value:			
		1÷4096	: overall number of Certificate characters
<seq_no>	integer	N/A	sequence number of the segment
Value:			
		1÷13	: sequence number
<security_object_type>	integer	0	security object typology.
Value:			
		0	: Root Certificate

Execution command deletes the certificates stored in NVM.



AT\$LTC?

Read command provides the first 300 characters of each valid certificate stored in NVM in the format:

\$LTC: <string>,<total_message_length>,1,<security_object_type>

If no certificate is stored, the read command provides:

\$LTC: "",0,1,<security_object_type>



AT\$LTC=?

Test command returns the range of values for parameters <total_message_length>, <seq_no> and <security_object_type>.



The last two certificates are stored in NVM.

2.16.1.6. AT\$GPSQOS - GPS Quality of Service

This command configures the GPS Quality of Service.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2

➔ **AT\$GPSQOS=[<horiz_accuracy>,<vertic_accuracy>,<rsp_time>,<age_of_location_info>,<location_type>,<nav_profile>,<velocity_request>]]]]]]]]**

Set command used to set the GPS Quality of Service (QoS).

Parameters:

Name	Type	Default	Description
<horiz_accuracy>	integer	1800000	horizontal accuracy (in meter)
Values:			
0÷50	:	50m; 0 is highest accuracy.	
51÷500	:	500m	
501÷1800000	:	1km; 1800000 is lowest accuracy	
<vertic_accuracy>	integer	990	vertical accuracy
Value:			
0÷990	:	0 is highest accuracy, 990 is lowest accuracy (in meters)	
<rsp_time>	integer	14400	response time
Value:			
0÷14400	:	0 is the low delay and 14400 is the highest delay in seconds	
<age_of_location_info>	integer	0	maximum age of location
Value:			
0÷1966020	:	Value 0 means that stored location information should not be used. Value 1966020 indicates the maximum tolerable age of the stored location information. The valid range of interval for SUPL (Transport protocol) is [0 - 65535] seconds & [0 - 1966020] seconds for C-plane (Transport protocol).	
<location_type>	integer	0	type of location required. Used only in case of C-Plane
Values:			

- 0 : Current Location
- 1 : Current or Last known location
- 2 : Invalid Location, indicates that this parameter shall not be used

<nav_profile>	integer	0	navigation profile
----------------------------	---------	---	--------------------

Values:

- 0 : Car navigation profile
- 1 : Personal profile
- 2 : Low speed profile
- 3 : Invalid profile, indicates that this parameter shall not be used

<velocity_request>	integer	1	velocity information is needed.
---------------------------------	---------	---	---------------------------------

Values:

- 0 : FALSE
 - 1 : TRUE; It is always supported with TRUE.
-

- The following parameters are included only for backward compatibility and have no effect. **<vertic_accuracy>**, **<age_of_location_info>**, **<location_type>**, **<nav_profile>**, and **<velocity_request>**
- The **<rsp_time>** is supported as 0-255. If **<rsp_time>** is bigger than 255 seconds, the value is supported as the highest 255 seconds.

AT\$GPSQOS?

Read command returns the current QoS values, in the format:

AT\$GPSQOS:
<horiz_accuracy>,**<vertic_accuracy>**,**<rsp_time>**,**<age_of_location_info>**,**<location_type>**,**<nav_profile>**,**<velocity_request>**

AT\$GPSQOS=?

Test command returns the list of supported QoS values for each field.

\$GPSQOS: (0-1800000),(0-990),(0-14400),(0-1966020),(0-2),(0-3),(0,1)



The current setting is stored through **\$GPSSAV**.



```
AT$GPSQOS=1800000,990,150,0,0,0  
OK
```

2.16.1.7. AT\$GPSSTOP - Stop Location Service Request

This command is used to stop location service request.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSSTOP=<abort_cause>

Set command stops the Receiver in Autonomous or A-GPS mode initiated through \$GPSSLSR set command.

Parameter:

Name	Type	Default	Description
<abort_cause>	integer	1	set abort cause

Values:

- 0 : user denies the request
- 1 : unspecified cause for abort
- 2 : cause Invalid

- The <abort_cause> can be recovered by \$GPRST.
- The current setting is stored through \$GPSSAV.
- The <abort_cause> option isn't supported. It has no effect and is included only for backward compatibility.



AT\$GPSSTOP?

Read command returns the current value of parameter <abort_cause>.



AT\$GPSSTOP=?

Test command returns **OK** result code.

2.16.1.8. AT\$GPSSLSR - Start Location Service Request

This command configures the GPS Start Location Service Request.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2

➔ **AT\$GPSSLSR=<transport_protocol>[,<pos_mode>[,<client_id>,<clientid_type>[,<mlc_number>,<mlcnumber_type>[,<interval>[,<service_type_id>[,<pseudonym_indicator>]]]]]]]**

Execution command used to start the Receiver in Autonomous or A-GPS mode.

Parameters:

Name	Type	Default	Description
<transport_protocol>	integer	2	Configure transport protocol.
	Values:		
	0 : CPlane		
	1 : SUPL		
	2 : Invalid		
<pos_mode>	integer	3	Configure MS Based mode.
	Values:		
	0 : Pure MS Assisted - Location estimate from the network (MS Assisted mode)		
	1 : MS Based - Assistance Data from the network (MS Based mode)		
	2 : Not supported		
	3 : Autonomous – Autonomous GPS mode of operation		
<client_id>	string	-	String parameter containing the ID of the LCS-Client to which the location estimate is to be transferred. Max length is 64 bytes.
<clientid_type>	integer	N/A	Configure client ID type.
	Values:		
	0 : MSISDN		
	1 : Invalid		
<mlc_number>	string	-	String parameter containing the address of the GMLC through which the location estimate is to be sent to the LCS-Client.
<mlcnumber_type>	integer	N/A	Configure mlc type.
	Values:		
	0 : MSISDN		
	1 : Invalid		
<interval>	integer	1	Configure interval period.
	Value:		

0÷7200 : GPS reporting period in seconds (will be sent unsolicited). if the value is 0 then a single shot NMEA Message will be provided Any value different from 0 sets the period (in seconds) between each NMEA Sentence.

<service_type_id>	integer	255	Configure service type id.
Value:			
0÷255	:	where 255 indicates that this parameter shall not be used	
<pseudonym_indicator>	integer	N/A	Enable/disable display user name.
Values:			
0	:	display user name at the external client	
1	:	display user name as anonymous at the external client	

Additional info:

- ▶▶ If C-PLANE or SUPL session is not successfully completed, it will be stopped, and unsolicited indication reports the error cause in the following formats:

\$GPSSLSR: C-PLANE ERROR,<error_code>

or

\$GPSSLSR: SUPL ERROR,<error_code>

<error_code>	
1	Session failed.
2	Fix request failed because the session timed out.
3	Fix request failed due to bad parameters in the request.
4	Fix request failed because the phone is offline.
5	Fix request failed because the engine is locked.

- i** If **<pos_mode>** is Autonomous, the **<transport_protocol>** should be invalid.
If **<transport_protocol>** is C-plane and **<pos_mode>** is Pure MS Assisted, then **<interval>** should be 0 (or omitted).
- i** If **<interval>** is not set, it is assumed to be 0.
The Unsolicited NMEA sentences have to be enabled with the commands **\$GPSNMUN**.
- i** The following parameters are included only for backward compatibility and have no effect.
<client_id>, **<clientid_type>**, **<mlc_number>**, **<mlcnumber_type>**, **<service_type_id>** and **<pseudonym_indicator>**

AT\$GPSSLSR?

Read command returns the current settings, in the format:

\$GPSSLSR: <transport_protocol>[,<pos_mode> >[,<client_id>,<clientid_type>[,<mlc_number>,<mlcnumber_type>[,< interval>[,<service_type_id>[,<pseudonym_indicator>]]]]]]]

AT\$GPSSLSR=?

Test command returns the list of supported SLSR values for each field.

```
$GPSSLSR: (0-2),(0-3),(64),(0,1),(64),(0,1),(0-7200),(0-255),(0,1)
```



The current setting is stored through **\$GPSSAV**.



```
AT$GPSSLSR= 2,3,,,,,1  
OK
```

2.16.1.9. AT\$LCSLRV - Location Request Verification

This command performs a location request verification.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LCSLRV=<permission>,<reqid>

Set command is used to verify a location request coming from the network. The verification is sent back to the network with request id.

Parameters:

Name	Type	Default	Description
<permission>	integer	0	set the permission
Values:			
	0	:	permission denied
	1	:	permission granted
<reqid>	string	-	uniquely identifies the MT-LR sent by the network



AT\$LCSLRV=?

Test command returns the range of values for parameter <permission>.



The <reqid> must use the identical value as <reqid> of following \$LCSLRMT (see \$LCSLRMT).

2.16.1.10. AT\$GPSAPN - Set GPS APN Profile

This command sets the GPS APN profile.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GPSAPN=<profile>[,<pdptype>,<apnname>]

Set command sets the GPS APN profile.

Parameters:

Name	Type	Default	Description
<profile>	integer	0	GPS APN profile type
	Value:		
	0	:	SUPL APN profile
<pdptype>	integer	N/A	GPS APN PDP type
	Values:		
	0	:	IPV4
	1	:	IPV6
	2	:	IPV4V6
<apnname>	string	-	GPS APN name; The maximum length is 100.



AT\$GPSAPN?

Read command returns the current GPS APN profile in the format:

\$GPSAPN: <profile>,<pdptype>,<apnname>



AT\$GPSAPN=?

Test command returns the supported range of parameters <profile> and <pdptype> and the maximum length of <apnname> in the format:



\$GPSAPN: (the supported range of <profile>),(the supported range of <pdptype>),<apnname_length>

Additional info:

▶▶ response fields

Name	Type	Default	Description
<apnname_length>	integer	-	the maximum length of field <apnname>



-  If the parameter **<profile>** only exists, the profile is deleted.
-  The GPS APN profile for SUPL session should be defined with same APN of **+CGDCONT** command. (See **+CGDCONT**)

2.16.1.11. AT\$AGPSEN - Set GNSS capability supporting to module

This command sets GNSS capability supporting to module.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$AGPSEN=<mode>

Set command sets GPS/A-GPS/A-GLOASS capability supporting on the module.

Parameter:

Name	Type	Default	Description
<mode>	integer	1	GNSS capability

Values:

- 0 : Standalone GPS only
- 1 : Full GPS capability (Standalone GPS, A-GPS)
- 2 : Full GPS (Standalone GPS, A-GPS) and A-GLONASS capability
- 3 : Not support GPS

- The default value depends on operator.
For Fx980, LN920 series,
- Generic: **2**
- Others: **1**



AT\$AGPSEN?

Read command returns the currently selected GNSS capability in the format:

\$AGPSEN: <mode>



AT\$AGPSEN=?

Test command reports the supported range of values for parameter(s) <mode>.

\$AGPSEN: (the supported range of <mode>)

2.16.1.12. AT\$LCSLPP - Set Configuration Information for LPP Protocol

This command sets the configuration information for LPP Protocol.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LCSLPP=<mode>

Set command sets the configuration information for LPP (LTE Poisoning Protocol).

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	configuration for LPP

Values:

- 0 : RRLP in LTE
- 1 : LPP user plane in LTE
- 2 : LPP control plane in LTE
- 3 : LPP UP/CP in LTE



The default value depends on operator.

For LM9x0 series,

- VZW / T-Mobile: **3**
- Others: **2**

For Fx980/LN920 series,

- Generic / VZW / T-Mobile / NTT / TELSTRA: **3**
- KDDI : **1**
- Others: **2**



AT\$LCSLPP?

Read command returns the currently selected configuration for LPP protocol in the format:

\$LCSLPP: <mode>



AT\$LCSLPP=?

Test command reports the supported range of values for parameter(s) <mode>.

\$LCSLPP: (the supported range of <mode>)

2.16.1.13. AT\$LCSAGLO - Selection of Positioning protocols for A-GLONASS

This command sets selection of positioning protocols (RRLP, RRC, LPP) for A-GLONASS.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$LCSAGLO=<mask>

Set command sets the selection of positioning protocols for A-GLONASS.

Parameter:

Name	Type	Default	Description
<mask>	integer	0	protocol mask of A-GLONASS 0: Not selected 1: RRC control plane (In case AT&T, Default) 2: RRLP user plane 4: LPP user plane 8: LPP control plane

Value:

0÷15 : protocol mask of A-GLONASS



The default value depends on operator.

For LM9x0 / LE910Cx series,

- AT&T: **1**

- Others: **0**

For Fx980/LN920 series,

- AT&T: **1**

- Generic: **15**

- Others: **0**



AT\$LCSAGLO?

Read command returns the currently selected protocol mask of A-GLONASS in the format:

\$LCSAGLO: <mask>





AT\$LCSAGLO=?

Test command reports the supported range of values for parameter(s) <mask>.

\$LCSAGLO: (the supported range of <mask>)



-  This command is only applicable for A-GLONASS capable setting. (see **\$AGPSEN**)
-  The **<mask>** 4 and 8 must be set in the LPP configuration for this to take effect. (see **\$LCSLPP**)

2.16.1.14. AT#LOCAUTOSTART - GNSS Auto Start Configuration

This command enables and configures GNSS auto start.



Refer to QMI Command Reference Guide.

- QMI_GMS_LOC_GET_AUTO_START
- QMI_GMS_LOC_SET_AUTO_START

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#LOCAUTOSTART=<function>,<fix_type>,<max_time>,<max_dist>,<fix_rate>

Set command sets the GNSS auto start configuration.

Parameters:

Name	Type	Default	Description
<function>	integer	2	setting to indicate when modem should start an automatic
Values:			
0 : disable			
1 : AT bootup			
2 : when NMEA port is opened (Default with OEM PRI setting)			
<fix_type>	integer	4	Type of GNSS fix
Values:			
1 : default engine mode			
2 : MS-based			
3 : MS-assisted			
4 : Standalone (Default with OEM PRI setting)			
<max_time>	integer	255	maximum time allowed for the receiver to get a fix in seconds
Value:			
1÷255 : Default with OEM PRI setting: 255			
<max_dist>	integer	1000	maximum uncertainty of a fix measured by distance in meters
Value:			
1÷4294967280 : Default with OEM PRI setting: 1000			
<fix_rate>	integer	1	time between fixes in seconds
Value:			
1÷65535 : Default with OEM PRI setting: 1			

- This settings affect the current GNSS settings.
 - **<fix_type>**: <transport_protocol> and <pos_mode> of \$GPSSLSR
 - **<fix_rate>**: <interval> of \$GPSSLSR
 - **<max_time>**: <rsp_time> of \$GPSQOS
 - **<max_dist>**: <horiz_accuracy> of \$GPSQOS
- The Defaults or parameters are values after applying OEM PRI setting.



AT#LOCAUTOSTART?

Read command returns the current GNSS Auto Start setting, in the format:

#LOCAUTOSTART: <function>,<fix_type>,<max_time>,<max_dist>,<fix_rate>

Default response without OEM PRI settings:

#LOCAUTOSTART: 255,,,,,

Additional info:

▶▶ where

Name	Type	Default	Description
<function>	integer	255	setting to indicate when modem should start an automatic

Values:

- 0 : disable
- 1 : AT bootup
- 2 : when NMEA port is opened
- 255 : not reported by modem (Default without OEM PRI setting)



AT#LOCAUTOSTART=?

Test command returns the supported range of values for parameters <function>, <fix_type>, <max_time>, <max_dist> and <fix_rate>.

2.16.1.15. AT#LOCNMEATYPE - NMEA Type Configuration

This command configures NMEA type.



Refer to QMI Command Reference Guide.
- QMI_GMS_LOC_SET_NMEA_TYPE

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#LOCNMEATYPE=<nmea_mode_ind>[,<nmea_type>]

Set command sets the NMEA type configuration.

Parameters:

Name	Type	Default	Description
<nmea_mode_ind>	integer	N/A	Execute the Location Fix start or stop. Indicate whether NMEA port is opened or not

Values:

- 0 : NMEA streaming stop
- 1 : NMEA streaming start

<nmea_type>	integer	N/A	Set NMEA type mask to modem
-------------	---------	-----	-----------------------------

Values:

- 0 : Disable NMEA type
- 1÷134020607 : NMEA type mask

Additional info:

- ▶▶ the bit mask values of <nmea_type>:
 default with OEM PRI setting: 134020607
 default without OEM PRI setting: 0
 - 0x00000001 - Enable GPGLL type
 - 0x00000002 - Enable GPRMC type
 - 0x00000004 - Enable GPGSV type
 - 0x00000008 - Enable GPGSA type
 - 0x00000010 - Enable GPVTG type
 - 0x00000020 - Enable GPGLL type
 - 0x00000040 - Enable GLGSV type
 - 0x00000080 - Enable GNGSA type
 - 0x00000100 - Enable GNGNS type
 - 0x00000400 - Enable GARMC type
 - 0x00000800 - Enable GAGSV type
 - 0x00001000 - Enable GAGSA type
 - 0x00002000 - Enable GAVTG type
 - 0x00004000 - Enable GAGGA type
 - 0x00008000 - Enable BDGSV type

- 0x00040000 - Enable GPGNS type
- 0x00080000 - Enable GLGNS type
- 0x00100000 - Enable GNGSV type
- 0x00200000 - Enable GAGNS type
- 0x00400000 - Enable BDGSA type
- 0x00800000 - Enable BDRMC type
- 0x01000000 - Enable BDVTG type
- 0x02000000 - Enable BDGGA type
- 0x04000000 - Enable BDGNS type

- i** For `<nmea_mode_ind>` value, each value means the following description,
 - NMEA streaming start: GPS engine start location fix and start to stream out NMEA sentences.
 - NMEA streaming stop: GPS engine stop location fix and stop NMEA streaming.
- i** The current setting `<nmea_type>` is stored in NVM.
- i** The Default of `<nmea_type>` is value after applying OEM PRI setting.
- i** If `$GPSNMUN` or `$GPSNMUNEX` command is already used, the user should avoid using this command because this setting have an effect on `$GPSNMUN` and `$GPSNMUNEX` operation.



AT#LOCNMEATYPE?

Read command returns the current NMEA type configuration, in the format:

#LOCNMEATYPE: <nmea_type>



AT#LOCNMEATYPE=?

Test command reports the supported range of values for parameters `<nmea_mode_ind>` and `<nmea_type>`.

2.16.1.16. AT\$XTRAEN - GpsOneXTRA feature control

This command enables/disables the GpsOneXTRA Feature.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$XTRAEN=<mode>

Execution command set to control the GpsOneXTRA feature.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Control GpsOneXTRA feature.

Values:

- 0 : Disable GpsOneXTRA feature
- 1 : Enable GpsOneXTRA feature

Additional info:

- ▶▶ When GpsOneXTRA feature is enabled:
If standalone GNSS session is started and there is no XTRA assistance data file in device, The XTRA file downloading is triggered, and it always requires data service. An XTRA file contains orbit predictions for constellations, which are valid up to 7 days. With valid XTRA data present, a GNSS engine on modem can eliminate the need for GNSS navigation data demodulation over the air and reduce the time required for generating a position fix.



AT\$XTRAEN?

Read command returns the values of saved GpsOneXTRA feature <mode>.

\$XTRAEN: <mode>



AT\$XTRAEN=?

Test command returns the supported range of values of parameters <mode>

\$XTRAEN: (0,1)



- i** New setting is applicable across device power cycles.
- i** The current setting is stored in NVM.
- i** If gpsOneXTRA feature is enabled, the unintentional data usage can be occurred. Please set as disable if you want not to use this feature.
- i** If gpsOneXTRA feature is enabled, the following describes only the general behaviors of XTRA client.
An XTRA file contains orbit predictions for constellations, which are valid up to **7 days**. With valid XTRA data present, a GNSS engine on modem can eliminate the need for GNSS navigation data demodulation over the air and reduce the time required for generating a position fix.
 - 1) XTRA data download
 - XTRA data downloading **always requires data service**. The pending XTRA data download is resumed after data connection is available.
 - 2) XTRA data download Initiation
 - After power-up: XTRA client initiates XTRA data download after power-up and data service is connected.
 - On-demand: When the modem requests for XTRA data download, XTRA client initiates XTRA data download.
 - 3) Download throttle mechanism
 - The maximum number of downloads per UTC day are **three**. After this download limit is reached, no download request is accepted on that day.



- The following describes only the general gpsOneXTRA behaviors.

- Enable gpsOneXTRA Feature.

```
AT$XTRAEN?
$XTRAEN: 0
```

```
OK
```

```
AT$XTRAEN=1
```

```
OK
```

```
AT#REBOOT
```

```
OK
```

```
AT$XTRAEN?
```

```
$XTRAEN: 1
```

```
OK
```

- Enable Data connection (See #ICMCONNECT)

```
AT+CGDCONT?
```

```
+CGDCONT:
```

```
1,"IPV4V6","lte.sktelecom.com","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0,,,,,,,,,"",,0
```

```
OK
```

```
AT#ICMCONNECT="CON",1,4
```

```
OK
```

```
AT#ICMCONNECT="CON",1,6
```

```
OK
```

```
AT#ICMCONNECT?
```

```
#ICMCONNECT: 1,1,1,1,1
```

```
OK
```

- Check the standalone GNSS mode.

```
AT$GPSSLSR?
```

```
$GPSSLSR: 2,3,,,,,1,255
```

```
OK
```

- On-demand Trigger with cold start for example.

```
AT$GPSR=1
```

```
OK
```

```
AT$GPSP=1
```

```
OK
```

- After few seconds, the GNSS SVs information from XTRA Data download is displayed on NMEA stream and can get a fix soon.

```
AT$GPSNMUN?
```

```
$GPSNMUN: 2,1,1,1,1,1,1
```

```
OK
```

```
$GPGSA,A,1,,,,,,,,,,,,,*32
```

```
$GPVTG,,T,,M,,N,,K,N*2C
```

```
$GPRMC,,V,,,,,,,,,N,V*29
```

```
$GPGGA,,,,,0,,,,,*66
```

```
$GPGLL,,,,,V,N*64
```

```
$GPGSA,A,1,,,,,,,,,,,,,*32
```

```
$GPVTG,,T,,M,,N,,K,N*2C
```

```
$GPRMC,,V,,,,,,,,,N,V*29
```

```
$GPGGA,,,,,0,,,,,*66
```

```
$GPGLL,,,,,V,N*64
```

```
$GPGSV,3,1,12,16,58,274,34,31,56,085,38,03,08,261,,04,36,306,,1*64
```

```
$GPGSV,3,2,12,08,00,000,,09,07,322,,18,11,099,,22,02,237,,1*6E
```

```
$GPGSV,3,3,12,26,71,345,,27,27,194,,29,22,042,,32,08,160,,1*68
```

```
$GPGSA,A,1,,,,,,,,,,,,,*32
```

```
$GPVTG,,T,,M,,N,,K,N*2C
```

```
$GPRMC,,V,,,,,,,,,N,V*29
```

```
$GPGGA,,,,,0,,,,,*66
```

\$GPGLL,,,,,V,N*64
\$GPGSV,3,1,12,04,36,306,31,16,58,274,34,26,71,345,37,31,56,085,39,1*6D
\$GPGSV,3,2,12,03,08,261,,08,00,000,,09,07,322,,18,11,099,,1*64
\$GPGSV,3,3,12,22,02,237,,27,27,194,,29,22,042,,32,08,160,,1*6C
 \$GPGSA,A,1,,,,,,,,,,,,,32
 \$GPVTG,T,,M,,N,,K,N*2C
 \$GPRMC,,V,,,,,,,,,N,V*29
 \$GPGGA,,,,,0,,,,,,,,*66
 \$GPGLL,,,,,V,N*64
\$GPGSV,3,1,12,04,36,306,34,16,58,274,34,26,71,345,38,31,56,085,40,1*69
\$GPGSV,3,2,12,03,08,261,,08,00,000,,09,07,322,,18,11,099,,1*64
\$GPGSV,3,3,12,22,02,237,,27,27,194,,29,22,042,,32,08,160,,1*6C
 \$GPGSA,A,3,04,16,26,31,,,,,,,,,4.1,2.1,3.5,1*2A
 \$GPVTG,203.1,T,203.1,M,23.1,N,42.7,K,A*22
 \$GPRMC,013356.18,A,3731.301587,N,12655.781339,E,23.1,203.1,080421,6.0,W,A,V*63
\$GPGGA,013356.18,3731.301587,N,12655.781339,E,1,04,2.1,92.1,M,18.0,M,,*5F
 \$GPGLL,3731.301587,N,12655.781339,E,013356.18,A,A*6E

2.16.2. GNSS Receiver

2.16.2.1. AT\$GPRST - Restore Default GNSS Parameters

This command resets the GNSS parameters to "Factory Default" configuration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GPRST

Execution command resets the GNSS parameters to "Factory Default" configuration and stores them in the NVM of the device.



AT\$GPRST=?

Test command returns the **OK** result code.



The restored parameters are those of:

\$GPSP, \$GPR, \$GPSQOS, \$GPSSLSR and \$GPSSTOP commands (see their default value at each command description).



If the GPS controller is powered up (see **\$GPSP**), the GNSS controller is powered down because the GNSS parameters should be reset with "Factory Default".

2.16.2.2. AT\$GPSSAV - Save GNSS Parameters Configuration

This command stores the current GNSS parameters in the NVM of the device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSSAV

Execution command stores the current GNSS parameters in the NVM of the device.



AT\$GPSSAV=?

Test command returns the **OK** result code.



The saved parameters are those of:

\$GPSP, \$GPSR, \$GPSQOS, \$GPSSLSR and \$GPSSTOP commands.

2.16.2.3. AT\$GPSP - GNSS Positioning Session Control

This command controls the GNSS positioning session.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSP=<status>

The set command allows to control the GNSS positioning session.

Parameter:

Name	Type	Default	Description
<status>	integer	0	GNSS positioning session status

Values:

- 0 : Stop GNSS positioning session
- 1 : Start GNSS positioning session

- This command only controls the started GNSS positioning session from **\$GPSP** and **\$GPSSLSR**. The GNSS positioning sessions of other Service (IMS, MDT or UIM) cannot be controlled.
- The Start GNSS positioning session clears GNSS memory and then powers up the GNSS receiver if it powers down. The GNSS data cleaning is performed on the base of the current value of the **<reset_type>** parameter (see **\$GPSR**).
- The GNSS operation mode of Start GNSS positioning session is performed on the base of the current values of **\$GPSSLSR** configuration (see **\$GPSSLSR**).
- The **\$GPSP** and **\$GPSSLSR** cannot be used at same time.



AT\$GPSP?

The read command reports the current value of the **<status>** parameter, in the format:

\$GPSP: <status>

Where:

- <status> - GNSS positioning session status
- 0 - GNSS positioning session is not working
- 1 - GNSS positioning session is working



AT\$GPSP=?

The test command reports the supported values range for parameter **<status>**.

\$GPSP: (0,1)



The current **<status>** value is stored through **\$GPSSAV** command.



Start GNSS positioning session.

AT\$GPSP=1

OK

Stop GNSS positioning session.

AT\$GPSP=0

OK

2.16.3. GNSS General Management

2.16.3.1. AT\$GNSSCONF - Configuration of the GNSS receiver

This command is used to configure the capabilities of the GNSS receiver.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GNSSCONF=<combination>[,<worldwide>]

Set command configures the capabilities of the GNSS receiver.

Parameters:

Name	Type	Default	Description
<combination>	integer	9	GNSS configuration
Values:			
0	:	GPS Only	
1	:	GPS + GLONASS	
2	:	GPS + GALILEO	
3	:	GPS + GLONASS + GALILEO	
4	:	GPS + GLONASS + BEIDOU	
5	:	GPS + BEIDOU + GALILEO	
6	:	GPS + GLONASS + BEIDOU + GALILEO	
7	:	GPS + GLONASS + QZSS	
8	:	GPS + GLONASS + BEIDOU + QZSS	
9	:	GPS + GLONASS + BEIDOU + GALILEO + QZSS	
<worldwide>	integer	0	Applicable area The BEIDOU, GALILEO and QZSS are only applicable for this option.
Values:			
0	:	Outside of the United States	
1	:	Worldwide (For test/debug purposes)	

- New setting is applicable across device power cycles.
- The <worldwide> configuration is only meant for test/debug purposes.



AT\$GNSSCONF?

Read command returns the currently selected GNSS configuration in the format:

\$GNSSCONF: <combination>,<worldwide>

**AT\$GNSSCONF=?**

Test command reports the supported range of values for parameter(s) **<combination>** and **<worldwide>**.

\$GNSSCONF: (the supported range of <combination>),(the supported range of <worldwide>)

2.16.3.2. AT\$GPSR - Reset the GNSS Controller

This command resets the GNSS controller.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSR=<resetType>

Set command allows to reset the GNSS controller.

Parameter:

Name	Type	Default	Description
<resetType>	integer	3	set the type of GNSS controller reset.

Values:

- 0 : Factory Reset: this option clears all the GNSS memory including Clock Drift.
- 1 : Coldstart (No Almanac, No Ephemeris): this option clears all data that is currently stored in the internal memory of the GNSS receiver including Position, Almanac, Ephemeris and Time. The stored Clock Drift is retained.
- 2 : Warmstart (No ephemeris): this option clears all initialization data in the GNSS receiver and subsequently reloads the data that is currently displayed in the Receiver Initialization Setup screen. The Almanac is retained but the Ephemeris is cleared.
- 3 : Hotstart (with stored Almanac and Ephemeris): the GNSS receiver restarts by using all data that is currently stored in the internal memory of the GNSS receiver: validated Ephemeris and Almanac.

- Factory Reset** performs the same operation as **Coldstart**.
- <resetType>** sets the kind of start when GNSS is activated through **\$GPSP** command.



AT\$GPSR?

Read command returns the currently used reset type, in the format:

\$GPSR: <resetType>



AT\$GPSR=?

Test command reports the range of supported values for parameter **<resetType>**.



The current setting is stored through **\$GPSSAV** command.



```
Factory reset  
AT$GPSR=0  
OK
```


2.16.3.3. AT\$GPSLOCK - GNSS Lock Mode

This command is used to configure the GNSS lock mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GPSLOCK=<mode>

Set command sets the GNSS lock mode.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Lock Mode

Values:

- 0 : GNSS Unlock
- 1 : Mobile-Initiated (MI) session is locked
- 2 : Mobile-Terminated (MT) session is locked
- 3 : Except for an emergency call, all (MI and MT) is locked



The default value depends on operator.

For Fx980 series,

- SKT: 3 (Some GNSS commands return ERROR. If GNSS fix should be used, please set 0 value to work GNSS)

- Others: 0



AT\$GPSLOCK?

Read command returns the currently selected lock mode in the format:

\$GPSLOCK: <mode>



AT\$GPSLOCK=?

Test command reports the supported range of values for parameter(s) <mode>.

\$GPSLOCK: (the supported range of <mode>)



During an emergency call, an MT session will always be permitted irrespective of the setting.

2.16.3.4. AT\$GPSANTPORT - Configuration of GNSS Antenna Port Type

This command is used to configure the GNSS receiver antenna port between the dedicated GPS and cellular AUX port.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GPSANTPORT=<type>

Set command selects to configure GNSS antenna port.

Parameter:

Name	Type	Default	Description
<type>	integer	2	Enabled Port type

Values:

- 0 : Disable GNSS on AUX port and GNSS port. (GNSS off)
- 1 : Enable GNSS on AUX port and disable GNSS on GNSS port; Internal LNA On, DC-Bias Off. (passive antenna on Aux port)
- 2 : Enable GNSS on GNSS port and disable GNSS on AUX port; Internal LNA On, DC-Bias Off. (passive antenna on GNSS port)
- 3 : Enable GNSS on GNSS port and disable GNSS on AUX port; Internal LNA Off, DC-Bias On. (active antenna on GNSS port)
- 4 : Enable GNSS on GNSS port and disable GNSS on AUX port; Internal LNA On, DC-Bias On. (active antenna on GNSS port)

Additional info:

- ▶▶ When **AT\$GPSANTPORT** setting is **3**:
 1. The target GNSS antenna port (external active antenna gain – Cable loss) should be 22 ~ 26dB.
- ▶▶ When **AT\$GPSANTPORT** setting is **4**:
 1. The target GNSS antenna port (external active antenna gain – Cable loss) should be 1.5 ~ 7.5dB.
 2. This setting should be used only for very long GNSS antenna cable length.



AT\$GPSANTPORT?

Read command returns the currently selected port type in the format:

\$GPSANTPORT: <type>



AT\$GPSANTPORT=?

Test command reports the supported range of values for parameter(s) <type>.

\$GPSANTPORT: (the supported range of <type>)

2.16.4. GNSS Positioning Information

2.16.4.1. AT\$GPSNMUN - Unsolicited NMEA Data Configuration

Unsolicited NMEA data configuration



NMEA 0183 Standard

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSNMUN=<enable>[,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG>]

Set command allows to activate an unsolicited GNSS data stream built with NMEA sentences on the standard serial port and defines which NMEA sentences will be available. Refer to document [1] to have information on the NMEA sentences contents and formats.

Parameters:

Name	Type	Default	Description
<enable>	integer	0	Enables unsolicited GNSS data stream and selects one of the available GNSS data stream format display. <enable> parameter is also used to disable the GNSS data stream. Here is the list of the <enable> values. See Additional info section to have information on GNSS data stream formats.
Values:			
0 : disable GNSS data stream			
1 : enable the first GNSS data stream format			
2 : enable the second GNSS data stream format			
3 : enable the first GNSS data stream format, and reserve the AT interface port only for the GNSS data stream			
<GGA>	integer	0	enables/disables the presence of the Global Positioning System Fix Data NMEA sentence (GGA) in the GNSS data stream.
Values:			
0 : disable			
1 : enable			
<GLL>	integer	0	enable/disable the presence of the Geographic Position - Latitude/Longitude NMEA sentence (GLL) in the GNSS data stream.
Values:			
0 : disable			
1 : enable			
<GSA>	integer	0	enable/disable the presence of the GNSS DOP and Active Satellites NMEA sentence (GSA) in the GNSS data stream.
Values:			

	0	:	disable
	1	:	enable
<GSV>	integer	0	enable/disable the presence of the Satellites in View NMEA sentence (GSV) in the GNSS data stream.
Values:			
	0	:	disable
	1	:	enable
<RMC>	integer	0	enable/disable the presence of the Recommended Minimum Specific GNSS Data NMEA sentence (RMC) in the GNSS data stream.
Values:			
	0	:	disable
	1	:	enable
<VTG>	integer	0	enable/disable the presence of the GNSS Course Over Ground and Ground Speed NMEA sentence (VTG) in the GNSS data stream.
Values:			
	0	:	disable
	1	:	enable

Additional info:

- ▶▶ **<enable>=1**, GNSS data stream format:
\$GPSNMUN: <NMEA SENTENCE 1><CR><LF>
 ...
\$GPSNMUN: <NMEA SENTENCE N><CR><LF>
 ...

- ▶▶ **<enable>=2**, GNSS data stream format:
<NMEA SENTENCE 1><CR><LF>
 ...
<NMEA SENTENCE N><CR><LF>
 ...

- ▶▶ **<enable>=3**, in this case, the AT interface port is dedicated to NMEA sentences, it is not possible to send AT commands. Use the escape sequence "+++" to return in command mode. GNSS data stream format:
<NMEA SENTENCE 1><CR><LF>
 ...
<NMEA SENTENCE N><CR><LF>
 ...

- If the **<enable>** is 3, it can activate the NMEA unsolicited streaming both the current dedicated port and NMEA port. This **<enable>** option isn't stored in NVM.



AT\$GPSNMUN?

Read command returns whether the unsolicited GNSS data stream is currently enabled or not, along with the current NMEA mask configuration, in the format:

\$GPSNMUN: <enable>,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG>



AT\$GPSNMUN=?

Test command returns the supported range of values for parameters:

<enable>,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG>



- The storage of **\$GPSNMUN** setting value is following,

Setting saved
Auto

The current setting is stored in NVM.

- If **#LOCNMEATYPE** command is already used, the user should avoid using this command because this setting have an effect on **#LOCNMEATYPE** operation.



Set the GSA as available sentence in the unsolicited message

AT\$GPSNMUN=1,0,0,1,0,0,0
OK

Turn-off the unsolicited mode

AT\$GPSNMUN=0
OK

Read the current NMEA mask configuration:

AT\$GPSNMUN?
\$GPSNMUN: 1,0,0,1,0,0,0
OK

The unsolicited message will be:

\$GPSNMUN: \$GPGSA,A,3,23,20,24,07,13,04,02,,,,,2.4,1.6,1.8*3C

2.16.4.2. AT\$GPSNMUNEX - Unsolicited NMEA Extended Data Configuration

This command allows to activate streaming of GNSS data through unsolicited report codes.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSNMUNEX=<GNGNS>,<GNGSA>,<GLGSV>

Set command permits to activate a stream of unsolicited GNSS data code (in NMEA extended format) through the NMEA port and defines which NMEA extended sentences will be available.

Parameters:

Name	Type	Default	Description
<GNGNS>	integer	0	Fix data of GNSS receivers
Values:			
0 : disable			
1 : enable			
<GNGSA>	integer	0	DOP and active satellites of GNSS
Values:			
0 : disable			
1 : enable			
<GLGSV>	integer	0	GLONASS satellites in view
Values:			
0 : disable			
1 : enable			

i The storage of \$GPSNMUNEX setting value is following,

Setting saved
Auto

The current setting is stored in NVM.



AT\$GPSNMUNEX?

Read command returns the NMEA extended sentences availability status, in the format:

\$GPSNMUNEX: <GNGNS>,<GNGSA>,<GLGSV>



AT\$GPSNMUNEX=?

Test command returns the supported range of values for parameters:

<GNGNS>,<GNGSA>,<GLGSV>



- i** The NMEA extended data is displayed on NMEA port depending on **\$GPSNMUN** setting.
- i** If **#LOCNMEATYPE** command is already used, the user should avoid using this command because this setting have an effect on **#LOCNMEATYPE** operation.



```
AT$GPSNMUNEX=1,0,0
OK
```

These set the GNGNS as available sentence in the unsolicited message.

```
AT$GPSNMUNEX?
$GPSNMUNEX: 1,0,0
OK
```

Give the current frame selected (GNGNS)

The unsolicited message will be:

```
$GNGNS,010304.00,3731.304375,N,12655.784627,E,AAANA,17,0.8,67.6,18.0,,,V*57
```


2.16.4.3. AT\$GPSACP - Get Acquired GNSS Position

This command returns last GNSS position information.



NMEA 0183 Standard

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSACP

Execution command returns information about the last GNSS position in the format:

\$GPSACP: <UTC>,<latitude>,<longitude>,<hdop>,<altitude>,<fix>,<cog>,<spkm>,<spkn>,<date>,<nsat>

Additional info:

- ▶▶ Meanings of the parameters returned by the command.

Name	Type	Default	Description
<UTC>	string	-	UTC time (hhmmss.sss) referred to GGA sentence
<latitude>	string	-	latitude in the format ddmm.mmmmmm N/S (referred to GGA sentence) where: dd: 00..90, degrees mm.mmmmmm: 00.000000..59.999999, minutes N/S: North/South
<longitude>	string	-	longitude in the format dddmm.mmmmmm E/W (referred to GGA sentence) where: ddd: 000..180, degrees mm.mmmmmm: 00.000000..59.999999, minutes E/W: East/West
<hdop>	string	-	horizontal dilution of precision (referred to GGA sentence)
<altitude>	string	-	altitude - mean-sea-level (geoid) in meters (referred to GGA sentence)
<fix>	integer	N/A	fix type Values: 0 : invalid fix 1 : invalid fix 2 : 2D fix 3 : 3D fix
<cog>	string	-	course over ground (degrees, True) (referred to VTG sentence) in the format ddd.mm

			where: ddd: 000..360, degrees mm: 00..59, minutes
<spkm>	string	-	speed over ground (km/hr) (referred to VTG sentence)
<spkn>	string	-	speed over ground (knots) (referred to VTG sentence)
<date>	string	-	date of fix (referred to RMC sentence) in the format ddmmyy where: dd: 01..31, day mm: 01..12, month yy: 00..99, year 2000 to 2099
<nsat>	integer	N/A	total number of GNSS satellites in use (referred to GNS sentence)

Value:
0÷99 : total number of GNSS satellites in use



AT\$GPSACP?

Read command has the same behavior as the execution command.



AT\$GPSACP=?

Test command returns the **OK** result code.



AT\$GPSP? \$GPSP: 0

when module is down there no acquired position

```
AT$GPSACP
$GPSACP:
OK
AT$GPSP=1
OK
```

Until first fix is received, the command will display no fix GNSS position

```
AT$GPSACP
$GPSACP: ,,,,,,1,,,,,
OK
```

Once fix has been received the command will display actual GNSS position

```
AT$GPSACP
$GPSACP: 002518.000,3731.303660N,12655.781816E,0.8,73.1,3,0.0,0.0,0.0,290819,18
OK
```

2.17. PSM (Power Saving Mode)

2.17.1. AT#PSMWDISACFG - Power Saving mode configuration

The command allows configuration of Power Saving mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PSMWDISACFG=<mode>

Set command Power Saving mode

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Power Saving Mode

Values:

- 0 : Low Power Mode (both RX/TX disable) (factory default)
- 1 : power saving which watch W_DISABLE_N pin
- 2 : ignore on W_DISABLE_N pin
- 10 : enable dying gasp with W_DISABLE_N pin (activated when translates from high to low)

- After the command issued, the modem will reset
- The setting is maintained for both firmware updates and firmware switches.
- USB suspend mode is not supported (Qualcomm limitation)



AT#PSMWDISACFG?

Display current mode



AT#PSMWDISACFG=?

Test command reports the supported mode



- AT#PSMWDISACFG=1
OK
- AT#PSMWDISACFG?
#PSMWDISACFG: 1
OK
- AT#PSMWDISACFG=?
#PSMWDISACFG: (0-2,10)
OK

2.17.2. AT#PSMEVTCFG - Wake Up Event configuration

This command is used to set event for wake up from Power saving mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PSMEVTCFG=<SMS>,<NO_SERVICE>[,<VOICE>]

Set command enable/disable each wake up event

Parameters:

Name	Type	Default	Description
<SMS>	integer	0	SMS
Values:			
0 : disable			
1 : enable			
<NO_SERVICE>	integer	0	Network de-registration
Values:			
0 : disable			
1 : enable			
<VOICE>	integer	0	Voice CALL
Values:			
0 : disable			
1 : enable			



Voice call event is only available with VOICE call support models



AT#PSMEVTCFG?

Display current wake up event configurations mask



AT#PSMEVTCFG=?

Test command reports the supported wake up event



- AT#PSMEVTCFG = 1,1
OK
- AT#PSMEVTCFG?
#PSMEVTCFG = 1,1
OK
- AT#PSMEVTCFG=?
#PSMEVTCFG: (0,1),(0,1)
OK

2.17.3. AT#PSMWAKENCFG - WAKE_N pin configuration command

This command is used to set WAKE_N pin configuration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PSMWAKENCFG=<n>,<tring>,<tpause>

Set command WAKEN_N ping configuration

Parameters:

Name	Type	Default	Description
<n>	integer	3	number of waken_n
Value: 1÷5 : number of waken_n			
<tring>	integer	100	number of wake_n pin duration
Value: 0÷5000 : number of wake_n pin duration			
<tpause>	integer	100	time of pause of the wake_n pin duration
Value: 0÷5000 : time of pause of the waken_n pin duration			



Note 1: the time duration is in milliseconds

Note 2: if WAKE_N pin configuration changes, reboot of the modem required.



AT#PSMWAKENCFG?

display current wake up event configuration mask

2.17.4. AT#PSMEVT - Get Wake up events

This command is used to display the last wake-up event information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PSMEVT

Execution command which display wake up event.

This command display source mask, last event source, and last event source timestamp.



Note: Time stamp is based on epoch time and micro seconds.



AT#PSMEVT=?

Test command returns the OK result.



SMS event received at 1516708576002437 epoch time

(Tuesday, January 23, 2018 11:56:16.002 AM)

AT#PSMEVT

#PSMEVT: 0x00000001,0x00000001,1516708576002437

OK

2.18. Customization Feature AT Commands

2.18.1. AT#GETCUSTFEAT - Get the Setting of Customization Feature

This command used to read customization feature settings.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#GETCUSTFEAT=<cust_id>

Parameter:

Name	Type	Default	Description
<cust_id>	string	N/A	String of customization feature

Values:

"AUDIS"	:	Audio disable
"DGACTION"	:	Dying gasp Action
"DGENABLE"	:	Dying gasp Enable
"GPSSEL"	:	GPS Antenna Select
"IPV6ENABLE"	:	Support IPV6 Data Connection

Additional info:

- ▶▶ The setting of the specified <cust_id> will be returned in the format:
#GETCUSTFEAT: <cust_id>,<cust_value>,<cust_attr>

Name	Type	Default	Description
<cust_id>	string	-	String of customization feature
<cust_value>	integer	-	Customization setting value. "AUDIS" - Audio disable 0 - enable audio 1 - disable audio (default) "DGACTION" - Dying gasp Action (same with #DGENABLE) 0 - Disable sending both detach request and SMS 1 - Enable only the SMS option (default) 2 - Enable only sending detach request 3 - Enable sending both SMS and detach request 4 - Graceful shutdown 5 - SMS sending and graceful shutdown "DGENABLE" - Dying gasp Enable cust_value[0] - enable/disable dying gasp

			0: disable (default) 1: enable
			cust_value[1] - GPIO number used for dying gasp event monitoring.
			cust_value[2] - GPIO trigger used for event
			0: activate dying gasp when GPIO translates from high to low (default)
			1: activate dying gasp when GPIO translates from low to high
			"GPSSSEL" - GPS Antenna Select
			0 - Dedicated GPS Port
			1 - GPS Rx over AUX Port
			2 - GPS Rx over dedicated GPS port with no bias voltage applied.
			255 - Invalid data
			"IPV6ENABLE" - whether to support IPV6
			0 - disabled
			1 - enabled

<cust_attr>	integer	N/A	Customization setting attribute
--------------------------	---------	-----	---------------------------------

Values:

0	:	Customization setting attribute
1	:	read/write

<cust_id> only supports upper case.



AT#GETCUSTFEAT=?

Test command returns the supported customization features for parameter **<cust_id>**.



AT#GETCUSTFEAT=?

#GETCUSTFEAT: ("AUDIS","DGACTION","DGENABLE","GPSSSEL","IPV6ENABLE")

OK

AT#GETCUSTFEAT="IPV6ENABLE"

#GETCUSTFEAT: "IPV6ENABLE", 1, 1

OK

AT#GETCUSTFEAT="DGENABLE"

#GETCUSTFEAT="DGENABLE",000,1

OK

2.18.2. AT#SETCUSTFEAT - Set the Customization Feature

Set commands used to set the customization feature parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SETCUSTFEAT=<cust_id>,<cust_value>

Parameters:

Name	Type	Default	Description
<cust_id>	string	N/A	String of customization feature

Values:

- "AUDIS" : Audio Disable
- "DGACTION" : Dying Gasp Action
- "DGENABLE" : Dying Gasp Enable
- "GPSSEL" : GPS Antenna Select
- "IPV6ENABLE" : Support IPV6 Data Connection

<cust_value>	integer	-	<p>Customization setting value.</p> <p>"AUDIS" - Audio Disable 0 - enable audio 1 - disable audio (default)</p> <p>"DGACTION" - Dying Gasp Action (same with #DGENABLE) 0 - Disable sending both detach request and SMS 1 - Enable only the SMS option (default) 2 - Enable only sending detach request 3 - Enable sending both SMS and detach request 4 - Graceful shutdown 5 - SMS sending and graceful shutdown</p> <p>"DGENABLE" - Dying Gasp Enable cust_value[0] - enable/disable dying gasp 0: disable (default) 1: enable cust_value[1] - GPIO number used for dying gasp event monitoring. Available range is from '1'(GPIO_01) to '8'(GPIO_08). cust_value[2] - GPIO trigger used for event 0: activate dying gasp when GPIO translates from high to low (default) 1: activate dying gasp when GPIO translates from low to high</p> <p>"GPSSEL" - GPS Antenna Select 0 - Dedicated GPS Port 1 - GPS Rx over AUX Port</p>
--------------	---------	---	--

2 - GPS Rx over dedicated GPS port with no bias voltage applied.

"IPV6ENABLE" - whether to support IPV6

0 - disabled

1 - enabled

- i** **"GPSSEL"** configuration is stored in NVM.
- i** The **"AUDIS"** setting is saved in system and available on following reboot, therefore manual reboot is required after changing **<cust_value>** of **"AUDIS"**.
- i** The **"AUDIS"** setting is maintained even after power off.
If in case audio is disabled('1'), DVI pins are assigned as GPIO pins (GPIO_05~GPIO_08).
- i** **"DGACTION"** configuration is stored in NVM.
As default dying gasp do fast shutdown. If want a graceful shutdown instead, configure to '4' or '5'.
- i** **"DGENABLE"** configuration is stored automatically.
- i** **<cust_id>** only supports upper case.



AT#SETCUSTFEAT=?

Test command returns the supported customization features for parameter **<cust_id>**.



```
AT#SETCUSTFEAT=?
```

```
#SETCUSTFEAT: ("AUDIS","DGACTION","DGENABLE","GPSSEL","IPV6ENABLE")
```

```
OK
```

```
AT#SETCUSTFEAT="IPV6ENABLE",1
```

```
OK
```

```
AT#SETCUSTFEAT="DGENABLE",140
```

```
OK
```

2.19. Dying GASP AT Commands

2.19.1. AT#DGCFG - Dying GASP Configuration

Set command sets the Dying GASP configuration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#DGCFG=[<DestSMSNubmer>[,<DestSMSContent>]]

Parameters:

Name	Type	Default	Description
<DestSMSNubmer>	string	-	SMS Destination Number as string of 8bit ASCII; Characters with max 20 chars.
<DestSMSContent>	string	-	SMS Content as a string of 8bit ASCII text; Characters with max 160 chars.



The current setting is stored in NVM.



AT#DGCFG?

Read command returns the current Dying GASP setting, in the format:

#DGCFG: <DestSMSNumber>,<DestSMSContent>



AT#DGCFG=?

Test command reports the supported range of values for parameters

<DestSMSNumber>,<DestSMSContent>.

2.19.2. AT#DGSTAT - Dying GASP Statistics Management

Set command sets to read/clear the Dying GASP Statistics.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DGSTAT=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	Clear/read the Dying GASP Statistics

Values:

- 0 : Clear the Dying GASP Statistics
- 1 : Read the Dying GASP Statistics

Additional info:

- ▶▶ When <mode> is 1, returns information about the Dying GASP Statistics in the format:
#DGSTAT: <TimeStamp>,<SMSAttemptedFlag>

Name	Type	Default	Description
<TimeStamp>	string	-	Timestamp of the last time power loss was detected and Dying Gasp feature was triggered; UTC time in seconds since Jan 06, 1980 (GPS Epoch).
<SMSAttemptedFlag>	integer	N/A	Indicates whether device attempted to send SMS in the last power loss event; This only indicates device sent the SMS does not guarantee network delivery.

Values:

- 0 : SMS not attempted
- 1 : SMS attempted



AT#DGSTAT?

Read command returns the current Dying GASP Statistics, in the format:

#DGSTAT: <TimeStamp>,<SMSAttemptedFlag>



AT#DGSTAT=?

Test command reports the supported range of values for parameters <mode>

2.19.3. AT#DGENABLE - Dying GASP Enable/Disable SMS/Detach Request

Set command to enable/disable sending SMS detach request when Dying Gasp is activated.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#DGENABLE=[<Value>]

Parameter:

Name	Type	Default	Description
<Value>	integer	1	Enable/disable SMS/detach request

Values:

- 0 : Enable/disable SMS/detach request
- 1 : Enable only the SMS option
- 2 : Enable only sending detach request
- 3 : Enable sending both SMS and detach request
- 4 : Graceful shutdown
- 5 : SMS sending and graceful shutdown

As default dying gasp do fast shutdown. If want a graceful shutdown instead, configure to '4' or '5'.



AT#DGENABLE?

Read command returns the current setting, in the format:

#DGENABLE: <Value>



AT#DGENABLE=?

Test command reports the supported range of values for parameters <Value>.

3. LIST OF ACRONYMS

Acronym	Meaning
ARFCN	Absolute Radio Frequency Channel Number
AT	Attention command
BA	BCCH Allocation
BCCH	Broadcast Control Channel
CA	Cell Allocation
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CCM	Current Call Meter
CLIR	Calling Line Identification Restriction
CTS	Clear To Send
CUG	Closed User Group
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DGPS	Differential GPS, the use of GPS measurements, which are differentially corrected
DNS	Domain Name System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
GGA	GPS Fix data
GLL	Geographic Position – Latitude/Longitude
GLONASS	Global positioning system maintained by the Russian Space Forces
GMT	Greenwich Mean Time
GNSS	Any single or combined satellite navigation system (GPS, GLONASS and combined GPS/GLONASS)
GPRS	Global Packet Radio Service
GPS	Global Positioning System
GSA	GPS DOP and Active satellites
GSM	Global System Mobile
GSV	GPS satellites in view
HDLC	High Level Data Link Control
HDOP	Horizontal Dilution of Precision
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IRA	International Reference Alphabet
IWF	Interworking Function
ME	Mobile Equipment
MO	Mobile Originated
MT	<i>either</i> Mobile Terminated <i>or</i> Mobile Terminal
NMEA	National Marine Electronics Association
NVM	Non-Volatile Memory
PCS	Personal Communication Service
PDP	Packet Data Protocol
PDU	Packet Data Unit
PIN	Personal Identification Number
PPP	Point to Point Protocol
PUK	Pin Unblocking Code
RLP	Radio Link Protocol
RMC	Recommended minimum Specific data
RTS	Request To Send
SAP	SIM Access Profile
SCA	Service Center Address
SMS	Short Message Service
SMSC	Short Message Service Center
SMTP	Simple Mail Transport Protocol
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol
USSD	Unstructured Supplementary Service Data
UTC	Coordinated Universal Time
VDOP	Vertical dilution of precision
VTG	Course over ground and ground speed
WAAS	Wide Area Augmentation System

4. DOCUMENT HISTORY

Revision	Date	Changes
0	2021-07-30	Initial revision



SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

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