ME310M1

AT Commands Reference Guide

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Applicability Table

Table 1: Applicability Table - Products

Products
ME310M1

Table 2: Applicability Table - Software

Software
48.00.xx3

Introduction

Scope

This document is aimed to provide a detailed specification and a comprehensive listing for reference for the entire AT command set.

Audience

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

Contact Information, Support

For technical support and general questions please e-mail:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com
- TS-ONEEDGE@telit.com

Alternatively, use:

https://www.telit.com/contact-us/

Product information and technical documents are accessible 24/7 on our web site:

https://www.telit.com

Conventions

Note:

Provide advice and suggestions that may be useful when integrating the module.

Danger:

This information MUST be followed, or catastrophic equipment failure or personal injury may occur.

ESD Risk:

Notifies the user to take proper grounding precautions before handling the product.

Warning:

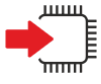
Alerts the user on important steps about the module integration.

Danger: This information MUST be followed or catastrophic equipment failure or personal injury may occur.

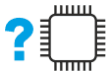
Warning: Alerts the user on important steps about the module integration. If these points are not followed, the module and end user equipment may fail or malfunction.

Note/Tip: This section provides all information related to the AT command involved. Each note can provide a different level of information: danger, caution/warning and tip/information

Note/Tip: Provides advice and suggestions that may be useful when integrating the module.



Set: This section provides all information related to SET functionality of the AT command involved. If there is strictly and relevant SET information, it can be found at the end of the section.

	Read: This section provides all information related to READ functionality of the AT command involved. If there is strictly and relevant READ information, it can be found at the end of the section.
	Test: This section provides all information related to TEST functionality of the AT command involved. If there is strictly and relevant TEST information, these can be found at the end of the section.
	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: This section provides useful references (standards or normative) related to the AT command involved.
	Example: This section provides useful examples related to the AT command involved.

All dates are in ISO 8601 format, that is YYYY-MM-DD

Terms and Conditions

Refer to

https://www.telit.com/terms-conditions/

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Commands

The Telit family of wireless modules can be controlled using standard AT commands, via either the Serial UART or USB interfaces, where available.

The AT Command interface complies with:

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

In addition to the standards-based commands, Telit wireless modules also support our own proprietary AT commands, used for special purposes and to provide additional useful information.

The following is a description of how to use the AT commands with the modules mentioned in the Applicability Table.

Note:

The AT is an ATTENTION command and is used as a prefix to other parameters in a string.

AT commands, combined with their parameters, can be sent from your Host Application, a Script, or when using a Terminal emulator typed in manually as a command line instruction.

Definitions

The following syntactic definitions apply:

<CR> ASCII Carriage return character - is the command line and terminator character of the result code. The decimal value is between 0 and 255 and is specified within parameter S3. The default value is 13.

<LF> ASCII Linefeed character - is the character recognized as line feed character. The decimal value is between 0 and 255 and is specified within parameter S4. The default value is 10. The line feed character is output after the carriage return character if detailed 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 syntactic element. They are not displayed on the command line.

[...] The optional sub parameter of a command or an optional part of the TA (Terminal adapter) information response is enclosed in square brackets. These brackets are not displayed on the command line. If the sub parameter is not provided in AT commands that have a Read command, the new value remains the same as its previous value. Action type commands do not store the values of any of their sub parameters and therefore do not have a Read command. These commands are executed to invoke a function of the equipment, which generally involves more than the simple storage of a value for later use. When using action type commands, an action should be performed according to the recommended default setting of the sub parameter.

AT Commands 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:

- 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 stored values), or "tested" (to determine ranges of values supported). Each of them has a test command (trailing =?) to provide information about the type of its sub parameters; they also have a Read command (trailing ?) to check the current values of sub parameters.
- Action type commands. This type of command may be "executed" or "tested".
  - "executed" to invoke a function of the equipment, which generally involves more than the simple storage of a value for later use
  - "tested" to determine:
    - if sub parameters are associated with the action, the ranges of sub parameter values that are supported. If the command has no sub parameters, issuing the corresponding Test command (trailing =?) raises the result code "ERROR".

      Note: issuing the Read command (trailing ?) causes the command to be executed.
    - whether the equipment implements the Action Command or not. In this case issuing the correspondent Test command (trailing =?) returns the OK result code). If sub parameters are associated with the action, the ranges of sub parameter values that are supported.

Action commands do not store the values of any of their possible sub parameters.

Moreover:

The response to the Test Command (trailing =?) may be modified in the future by Telit to allow for 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 result code to be returned to OK and the previous values of the omitted sub parameters to be retained.

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 must 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 always requires to write the input string parameters in quotes: this is explicitly reported in the specific descriptions.

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:

- ATCMD1<CR> where AT is the command line prefix, CMD1 is the body of a basic command (note: the name of the command never begins with the character "+") and <CR> is the command line terminator character
- ATCMD2=10<CR> where 10 is a sub parameter
- AT+CMD1;+CMD2=, ,10<CR> These are two examples of extended commands (note: the name of the command always begins with the character "+"2F2F). They are delimited by semicolon. In the second command the sub parameter is omitted.
- +CMD1?<CR> This is a Read command for checking current sub parameter values
- +CMD1=?<CR> This is a Test command for checking possible sub parameter values

Note:

The set of proprietary AT commands differs 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.

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

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

However, it is always preferable to separate basic and extended commands in different command lines. Furthermore, it is recommended 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 determine which one of them has failed the execution.

If command V1 is enabled (detailed responses codes) and all commands in a command line have been performed successfully, the 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 the command itself is invalid, or the command cannot be executed 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 have been executed successfully, the 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 the command itself is invalid, or command cannot be executed for some reason, result code 4<CR> and no subsequent commands in the command line are processed.

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

Note:

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.

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 detailed (see +CMEE). The possible values of <err> are reported in the table:

Note:

"Numeric Format" Not all modules support the error codes shown in the table.

Note:

"Verbose Format" There could be small variations in the message depending on the module in use.

Table 3: ME Error Result Code

Numeric Format	Verbose Format
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
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
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
1007	SSL cannot activate
1008	SSL not connected
1009	SSL already connected
1010	SSL error enc/dec data
1011	SSL disconnected
1012	SSL version mismatch

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
1150	GTP error timeout
1151	PDP is not active
1152	GTP is Disabled
1153	operation not supported
1154	Reboot failed. Reboot manually

ME Error Result Code for MQTT - +CME ERROR: <err>

If MQTT commands are used detailed error codes for possible values of <err> are reported in the following table:

Table 3.1: ME Error Result Code

Numeric Format	Verbose Format
1100	MQTT Initialization Fail
1101	MQTT De-initialization Fail
1102	MQTT Configuration Fail
1103	MQTT Connect Fail
1104	MQTT Disconnect Fail
1105	MQTT Publish Fail
1106	MQTT Subscribe Fail
1107	MQTT Unsubscribe Fail
1108	MQTT SSL Configuration Fail
1109	MQTT Command Timeout Fail
1110	MQTT PUBSEXT Fail
1111	MQTT Protocol Unsupported
1112	MQTT Identifier Rejected
1113	MQTT Server Unavailable
1114	MQTT Bad Username or Password
1115	MQTT Not Authorised

1200	MQTT-SN Initialization Fail
1201	MQTT-SN De-initialization Fail
1202	MQTT-SN Configuration Fail
1203	MQTT-SN Socket Fail
1204	MQTT-SN Connect Fail
1205	MQTT-SN Disconnect Fail
1206	MQTT-SN Register Fail
1207	MQTT-SN Publish Fail
1208	MQTT-SN Subscribe Fail
1209	MQTT-SN Unsubscribe Fail
1210	MQTT-SN Will Topic Update Fail
1211	MQTT-SN Will Message Update Fail
1212	MQTT-SN State Change Fail
1213	MQTT-SN Invalid Client Status

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:

Table 4: Message Service Failure Result Code

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
514	LL error
515	No response from network

Carriage Returns, Line Feeds and Log

Generally, the number of carriage returns (<CR>) and line feeds (<LF>) at the end of command responses may vary. This scenario may also vary from software version to software version. We do not have evidence of this behavior in URC lines.

Command responses examples:

AT#LWM2MMON?<CR>

<CR><LF>

#LWM2MMON: "4"<LF>#LWM2MMON: "3"

Warning:

missing <CR>

<CR><LF>

<CR><LF>

OK

<CR><LF>

AT#LWM2MFYACKURI=0,2<CR>

<CR><LF>

#LWM2MNFYACKURI: "/3/0/9"<LF>#LWM2MNFYACKURI: "/3/0/8"

Warning:

missing <CR>

<CR><LF>

<CR><LF>

OK

<CR><LF>

The user must be aware of this aspect before writing a script to parse the command lines and the relative response lines to generate a log.

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:

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

Moreover, there are two other types of result codes:

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

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

Table 5: Basic result codes

Numeric form	Verbose form
0	OK

1	CONNECT or CONNECT <text>
2	RING
3	NO CARRIER
4	ERROR
6	NO DIALTONE
7	BUSY
8	NO ANSWER
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
15	CONNECT 14400
23	CONNECT 1200/75

Note:

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

Command Response Time-Out

Every command issued to the Telit modules returns a result response if response codes are enabled (default). The time required 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 may take several seconds to send a response, depending on the SIM configuration (for example, the number of contacts stored in the phonebook, the number of stored SMS), or on the network the command may interact with.

Command Issuing Timing

The chain Command -> Response must always be respected, and a new command must not be issued before the module has finished all the ending of the response result code (whatever it is).

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.

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

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 must be respected.

Command Response after Module Boot

Please note that all LWM2M commands reply with ERROR if sent just after module boot.

There is a short delay between the completion of AT interface initialization (when the module starts to respond to AT commands) and the completion of LWM2M task initialization (when the module starts to respond to LWM2M commands).

Module Reboot

Reboot of the module can be triggered by AT command. Specific AT commands, to apply the changes requested, do include an implicit reboot. These AT commands are identified by the "This AT command causes a reboot" or "This AT command could cause a reboot" warning box statements in this Guide.

Warning:

The boot-up time of the module, after issuing any of the AT commands that implicitly trigger a Reboot procedure, could be considerably longer than expected.

Please allow up to 20 seconds for boot-up before executing an HW_SHUTDOWN

Storage

The Telit wireless modules store the values set by several commands in the internal non-volatile memory (NVM), allowing them to remember these settings even after power off.

Some of them are always stored automatically, while others are stored by issuing specific commands (#SLEDSAV, $GPSSAV); all these values are read at power-up.

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

Table 6: AT Command short overview table

SIM Presence	Setting saved	Can be aborted
/	see below	/

This chapter focuses on the values that the Saved Setting field can have and their meaning. The meaning of the other fields will be described in the next chapter. The Saved Setting field can have one of the values listed below:

Auto: The parameter values set by the command are automatically stored in NVM, without issuing any storing AT command, and regardless of the profile (unique values). The values are automatically restored at startup.

Examples of AT commands: #SCFG, #PORTCFG, etc.

Other: The parameter values set by the command are stored in NVM by issuing a specific command and regardless of the profile.

Examples of AT commands:

#SLED setting is saved by #SLEDSAV

$GPSP setting is saved by $GPSSAV

etc.

Note:

AT Commands listed in the Examples may not be available on some modules.

AT Command Short Overview Table

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

Table 7: AT Command short overview table

SIM Presence	Setting saved	Can be aborted
Not required	/	No

Here are the table fields meanings:

SIM Presence: indicates if the AT command to be executed requires the presence of a SIM card.

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

AT COMMANDS

General Control and Config

Generic Modem Control

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
Not required	No	No

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 resets application NVM parameters

1 : resets both modem and application NVM parameters

ATZ - Soft Reset

Soft Reset

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

ATZ

Execution command sets all parameters to their defaults as specified by a user memory profile or by the manufacturer and resets device

Reset device but doesn't return values to factory default.

AT+GCAP - Capabilities List

This command returns the equipment supported command set list.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+GCAP

Execution command returns the equipment supported command set list:

+GCAP: +CGSM

Additional info:

Supported Command Set:

+CGSM: GSM ETSI command set

AT+GCAP=?

Test command returns ERROR result code.

AT+GMI - Manufacturer Identification

This command returns the manufacturer identification.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+GMI

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

AT+GMI=?

Test command returns OK result code.

AT+GMM - Model Identification

The command returns the model identification.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+GMM

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

AT+GMM=?

Test command returns OK result code.

AT+GMR - Revision Identification

The command returns the software revision identification.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+GMR

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

AT+GMR=?

Test command returns OK result code.

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
Not required	No	No

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.

AT+CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CGMI

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

AT+CGMI=?

Test command returns OK result code.

AT+CGMM - Request Model Identification

This command returns the device model identification.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+CGMM

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

AT+CGMM=?

Test command returns OK result code.

AT+CGMR - Request Revision Identification

The command returns device software revision number.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CGMR

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

AT+CGMR=?

Test command returns OK result code.

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
Not required	No	No

AT+CGSN

Execution command returns the product serial number in form of IMEI of the mobile followed by an OK at newline.

Additional info:

The IMEI is composed of the following elements (each element shall consist of decimal digits only):

1. Type Allocation Code (TAC). Its length is 8 digits
2. Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC. Its length is 6 digits
3. Luhn Check Digit. Its length is 1 digit

AT+CGSN=?

Test command returns OK result code.

AT#CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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.

AT#CGMR - Request Revision Identification

The command returns device software revision number.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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.

AT#SWPKGV - Request Software Package Version

This command shows the software, modem, production, application packages versions. It provides two syntax formats: set and execution.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SWPKGV=<version>

Here is the set format.

Parameter:

Name	Type	Default	Description
<version>	string	N/A	selects the type of version to be shown; it must be entered between double quotes

Values:

M	:	shows modem version
A	:	shows App version
P	:	shows Production version
PK	:	shows the full package version

Additional info:

The execution format returns the packages versions without #SWPKGV: command echo. The response is as follows:

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

<Production Parameters Version>
<Application Software Version>

OK

AT#SWPKGV=?

Test command returns OK result code.

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
Not required	No	No

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 : NON-CYCLIC SLEEP mode, see Additional info section

1 : mobile full functionality with power saving disabled

4 : disable both TX and RX

5 : push the module in power saving, see Additional info section

9 : NON-CYCLIC SLEEP mode, see Additional info section

10 : NON-CYCLIC SLEEP mode, see Additional info section

11 : NON-CYCLIC SLEEP mode, see Additional info section

<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> functionality level, this option works only with <fun> =1, with other it will return an error

Additional info:

▶▶ <fun>=0

NON-CYCLIC SLEEP mode, minimum functionality: the AT interface is not accessible by UART. Consequently, once you have set <fun>=0, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or toggling RTS line, stops power saving and takes the ME back to full functionality level <fun>=1.

▶▶ <fun>=5

To place the module in power saving mode set <fun>= 5 and the DTR line to OFF. Once in power saving, the CTS line switch to the OFF status to signal that the module is really in power saving condition.

During the power saving condition, before sending any AT command on the serial line, the DTR line must be set to ON to exit from power saving and it must be waited for the CTS line to go in ON status.

Until the DTR line is ON, the module will not return in the power saving condition.

▶▶ <fun>=9

NON-CYCLIC SLEEP mode, minimum functionality: the AT interface is not accessible by UART. Consequently, once you have set <fun>=9, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or the rising edge of the WAKE0 signal, stops power saving and takes the ME back to full functionality level <fun>=1.

<fun>=9 allows for higher power reduction respect <fun>=0 if both SIM Suspend and eDRX features are enabled, otherwise <fun>=0 power reduction is applied.

▶▶ <fun>=10

NON-CYCLIC SLEEP mode, minimum functionality: the AT interface is not accessible by UART. Consequently, once you have set <fun>=10, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or toggling RTS line, stops power saving and takes the ME back to the last functionality level before setting <fun>=10.

<fun>=10 allows the power saving even if the current level is <fun>=4 .

<fun>=11

NON-CYCLIC SLEEP mode, minimum functionality: the AT interface is not accessible by UART. Consequently, once you have set <fun>=11, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or the rising edge of the WAKE0 signal, stops power saving and takes the ME back to the last functionality level before setting <fun>=11.

<fun>=11 allows for higher power reduction respect <fun>=0 if both SIM Suspend and eDRX features are enabled, otherwise <fun>=0 power reduction is applied.

<fun>=11 allows the power saving even if the current level is <fun>=4 .

- Issuing AT+CFUN=4[,0] causes the module to perform either a network deregistration and a SIM deactivation.
- If power saving is enabled, it reduces the power consumption during the idle time, thus allowing a longer standby time with a given battery capacity.
- The power saving function does not affect the network behavior of the module, even during the power save condition the module remains registered on the network and reachable for incoming calls or SMS. If a call incomes during the power save, then the module will wake up and proceed normally with the unsolicited incoming call code.
- WAKE0 signal must be tied low to enable power saving.
- The OK response to the AT+CFUN=4 command does not mean that all RX and TX disabling operations are complete.

These may take longer than the actual execution of the command, so if the AT+CFUN=4 command is immediately followed by AT+CFUN=1, the modem may experience an inconsistent and unexpected state.

A correct procedure should be:

AT+CFUN=4

check sim and registration state, when the unit completed the deregistration then

AT+CFUN=1

AT+CFUN?

Read command reports the current setting of <fun> in the format:

+CFUN: <fun>

AT+CFUN=?

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

AT+CLAC - Available AT Commands

This command shows the available AT commands list.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

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.

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
Not required	No	No

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	enables/disables +CME ERROR: <err> result code and selects the format

Values:

0 : disable

1 : enable and use numeric<err> values

2 : enable and use verbose <err> values

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

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
Not required	Auto	No

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:

the failure in the last unsuccessful call setup (originating or answering)

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.

AT#HWREV - Hardware Identification

This command returns the device Hardware revision identification code.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#HWREV

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

AT#HWREV?

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

AT#HWREV=?

Test command returns the OK result code.

AT+CSCS - Select TE Character Set

The command purpose is to set different character sets that are used by the device.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CSCS=[<chset>]

Set command sets the current character set used by the device.

Parameter:

Name	Type	Default	Description
<chset>	string	8859-1	character set to be used by the device.

Values:

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).
HEX	:	Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters

	with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done. If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS style packing of 7 bit alphabet).

AT+CSCS?

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

AT+CSCS=?

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

AT+CMUX - Multiplexing Mode

This command is used to enable/disable the multiplexing protocol control channel.

3GPP TS 27.007
3GPP TS 27.010

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]

Set command is used to enable/disable the multiplexing protocol control channel.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	basic option is currently the only supported mode. Value: 0 : basic option mode.
<subset>	integer	0	the way in which the multiplexer control channel is set up Value: 0 : UIH frame

<port_speed>	integer	N/A	transmission rate. The default value is implementation specific.

Values:

1	:	9600 bps
2	:	19200 bps
3	:	38400 bps
4	:	57600 bps
5	:	115200 bps
6	:	230400 bps

<N1>	integer	122	maximum frame size

Value:

1÷1500	:	expressed in bytes

<T1>	integer	10	acknowledgement timer in units of ten milliseconds

Value:

1÷255	:	in units of ten milliseconds

<N2>	integer	3	maximum number of re-transmissions

Value:

0÷100 : range of re-transmissions number

<T2> integer 30 response timer for the multiplexer control channel. T2 must be longer than T1

Value:

2÷255 : in units of ten milliseconds

<T3> integer 10 wake up response timer

Value:

1÷255 : in seconds

<k> integer 2 window size, for Advanced option with Error-Recovery Mode

Value:

1÷7 : window size range

AT+CMUX?

Read command returns the current value of the parameters, in the format:

+CMUX: <mode>,<subset>,<port_speed>,<N1>,<T1>, <N2>,<T2>,<T3>,<k>

AT+CMUX=?

Test command returns the range of supported values for all parameters.

AT#PORTCFG - Connect Physical Ports to Service Access Points

This command allows to connect Service Access Points (software anchorage points) to the external physical ports.

[1] Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#PORTCFG=<Variant>

Set command allows to connect Service Access Points to the external physical ports giving a great flexibility. Examples of Service Access Points: AT Parser Instance #1, #2, #3, etc..

Parameter:

Name	Type	Default	Description
<Variant>	integer	0	set port configuration. A short description, for each <Variant> value, is reported in test command section.

Value:

0÷max : see test command section

To enable the set port configuration, the module must be rebooted.

AT#PORTCFG?

Read command returns the requested and the active port configuration in the format:

#PORTCFG: <requested>,<active>

Additional info:

▶▶ Parameters returned by the read command

Name	Type	Default	Description
<requested>	integer	-	value showing the requested configuration that will be activated at the next power ON.
<active>	integer	-	value showing the current configuration.

AT#PORTCFG=?

Test command returns a brief description of the supported ports arrangement solutions.

For each <Variant> are reported, on one row, the logical connections between a physical port (USIF0, USIF1, etc.) and a Service Access Point (AT#1, AT#2, etc.). To have information about the physical ports, refer to document [1].

The test command returns, for example, the following message:

AT#PORTCFG=?
#PORTCFG: Variant=0: AT= USIF0; Trace= NONE
#PORTCFG: Variant=3: AT= USIF0; Trace= AUX

OK

AT#CGMM - Request Model Identification

This command returns the device model identification.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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.

AT#FWSWITCH - Set Active Firmware Image

Set command allows enabling a specific firmware image on products embedding 2 or more different firmware images.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#FWSWITCH=<imageNumber>[,<reboot>]

Parameters:

Name	Type	Default	Description
<imageNumber>	integer	2	To know the <imageNumber> values range refer to the test command. For the relation between <imageNumber> value and the relative customization refer to the table in Additional info section where are also described the default values.

Value:

2 : Default value

<reboot>	integer	0	Reboot mode

Values:

0 : Reboot the module after the network selection

1 : Do not reboot the module

Additional info:

<imageNumber> identifies the image (customization) as shown in the following table.

Product	Customization	<imageNumber> default value
ME310M1-W1	0 = AT&T, 1 = Verizon, 2 =ROW	2

AT#FWSWITCH?

Read command reports the current active firmware image:

#FWSWITCH: <imageNumber>

AT#FWSWITCH=?

Test command reports the range of supported values for parameters <imageNumber>, <reboot>

Switch to image 1:

```
AT#FWSWITCH =1
OK
```

AT#SECMODE - Set security mode

Set command sets the security mode of the module

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#SECMODE=<mode>,<signature>

Set command allows changing the security mode of the module.

Parameters:

Name	Type	Default	Description
<mode>	integer	-	Specifies the security mode to be set

Values:

- 0 : user or operational mode allows access only to user AT commands of operational mode
- 1 : diag mode allows access to normal operational AT commands, log and crash dump
- 2 : extended mode allows full access: diagnostic + extended AT commands + debug tools

Name	Type	Default	Description
<signature>	string	N/A	Signature string representing hexadecimal values (format without quotation marks) or 0

Additional info:

- When provided <signature> is 0, depending on the <mode> set, the response could be nothing or a number, that could be the IMEI or a random number.

  The meaning of the 0 provided as second parameter is the desire to change into the mode provided by first parameter. If a number is provided, it means that in order to enter that desired state, the sign of the value has to be provided instead of 0 as second parameter.

  To enter operative mode, only 0 is sufficient and must be provided:

  (0:requested mode, 0;desire to change in requested mode)

  AT#SECMODE=0,0

  OK

  no number is provided as response, only OK since the mode is changed accordingly

  AT#SECMODE?

  #SECMODE: 0

  (1:requested mode, 0;desire to change in requested mode)

  AT#SECMODE=1,0

  <imei>

  OK

  An hex string is provided, meaning that in order to enter in "diag" mode a signature of the value (IMEI) must be provided:

  AT#SECMODE=1,<signature(imei)>

  OK

  AT#SECMODE=2,0

  <random>

OK

It means that in order to enter in extended mode a signature of the random string must be provided:

AT#SECMODE=2,<signature(random)>

OK

- When an incorrect signature is entered, it is not possible to change the security mode for 5 seconds.

  If another incorrect signature is entered after that, the lockout duration increases to 10 seconds, and so on.

  The lockout times follow this sequence: 5s, 10s, 20s, 40s, 80s, up to a maximum of 160 seconds. Each consecutive incorrect attempt doubles the lockout time until it reaches the maximum limit.

  The command just returns ERROR in case of wrong password or when it is not allowed to provide a new one due to lockout timeout.

  To recognize the real reason of error, use the AT+CMEE=2 option to see the verbose error.

  A single correct signature entry is sufficient to reset the lockout time. However, the lockout time remains active even after a module reboot.

- It is not possible to switch from extended security mode (2) to diag mode (1).

- If you attempt to enter the security mode you are already in, the command will respond with 'OK' even if an incorrect signature is provided, no lockout timeout is set.

- Changing the security mode requires a reboot to take effect.

For modules produced with SW version 48.00.003 onwards default value for parameter <mode> is 0.

For modules produced with a SW version prior to 48.00.003 default value and behavior for parameter <mode> is 2, even after a SW update procedure.

AT#SECMODE?

Read the current security mode. The report has the following format:

#SECMODE: <mode>

Additional info:

Parameter meaning:

Name	Type	Default	Description
<mode>	integer	-	security mode

Values:

0 : user or operational security mode

1 : diag security mode

2 : extended security mode

AT#SECMODE=?

Test command responds in the following format:

#SECMODE: (0-2),(0,128)

Example section

AT#SECMODE=2,0

<random>

OK

AT#SECMODE=2,sign(random)

OK

AT#SECMODE?

#SECMODE: 2

OK

AT#SECMODE=0,0

OK

(no numbers here, mode is changed to 0)

AT#SECMODE?

#SECMODE: 0

OK

AT#PSMRI - Power Saving Mode Ring Indicator

The command enables or disables the Ring Indicator pin response to an URC message while modem is in power saving mode.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#PSMRI=<n>

Set command enables/disables the Ring Indicator pin response to an URC message while modem is in power saving mode. If enabled, a negative going pulse is generated, when URC message for specific event is invoked. The duration of this pulse is determined by the value of <n>.

Parameter:

Name	Type	Default	Description
<n>	integer	0	disables, enables/sets duration of the generated pulse.

Values:

0	:	disables RI pin response for URC message
50÷1150	:	enables RI pin response for URC messages with a duration specified in ms

- When RING signal from incoming call/SMS/socket listen is enabled, the behavior for #PSMRI will be ignored.
- The behavior for #PSMRI is invoked only when modem is in sleep mode AT+CFUN=5.
- RING signal will not be enabled when receiving incoming data in online mode.

AT#PSMRI?

Read command reports the duration in ms of the pulse generated, in the format:

#PSMRI: <n>

AT#PSMRI=?

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

S Parameters

ATS2 - Escape Character

The command manages the ASCII character used as escape character.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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:

0÷255	:	factory default value is '+'

The escape sequence consists of three escape characters preceded and followed by n ms of idle.

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.

ATS2=?

Test command returns OK result code.

DTE - Modem Interface Control

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
Not required	No	No

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

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
Not required	No	No

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.

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

ATV - Response Format

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]).

[1] ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

ATV[<n>]

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

ATI - Identification Information

This command returns identification information.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

ATI[<n>]

Execution command returns one or more lines of information text followed by a result code.

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 ATI0

AT&C - Data Carrier Detect (DCD) Control

This set command controls the DCD output behavior of the AT commands serial port.

ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT&C[<n>]

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

AT&D - Data Terminal Ready (DTR) Control

This set command configures the behavior of the module according to the DTR control line transitions (RS232).

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT&D[<n>]

Parameter:

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

Values:

0 : module ignores DTR control line transitions

1 : when the module is connected, the high to low transition of DTR line sets the module in command mode, the current connection is not closed

2 : when the module is connected, the high to low transition of DTR line sets the module in command mode and the current connection is closed

3 : C108/1 operation is enabled

4 : C108/1 operation is disabled

If parameter is omitted, the command has the same behavior of AT&D0.

AT&K - Flow Control

Flow Control settings.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT&K[<n>]

Set command controls the serial port flow control behavior.

Parameter:

Name	Type	Default	Description
<n>	integer	0	flow control behavior

Values:

0 : no flow control

3 : hardware bi-directional flow control (both RTS/CTS active)

If parameter is omitted, the command has the same behavior as AT&K0

AT+IPR - UART DCE Interface Data Rate Speed

The command sets the speed of the USIF0 serial port, see document [1].

[1] Hardware Design Guide of the used module

[2] ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+IPR=<rate>

The command sets the UART speed of the USIF0 port during command mode operations.

Parameter:

Name	Type	Default	Description
<rate>	integer	115200	speed of the serial USIF0 port expressed in bit per second.

Values:

300 : bps

600 : bps

1200 : bps

4800 : bps

9600 : bps

19200 : bps

38400	:	bps
57600	:	bps
115200	:	bps
230400	:	bps
460800	:	bps
921600	:	bps

AT+IPR?

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

AT+IPR=?

Test command returns the list of <rate> values in the format:

+IPR: (list of <rate> values)

This command has no effect if it is sent on USB interface or CMUX instances: the DCE sends the OK result but the settings are ignored.

Test command example

AT+IPR=?

+IPR: (300,600,1200,2400,4800,9600,19200,38400,
57600,115200,230400,460800,921600)

OK

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
Not required	No	No

AT+IFC=<byDTE>,<byDCE>

Parameters:

Name	Type	Default	Description
<byDTE>	integer	0	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)

Name	Type	Default	Description
<byDCE>	integer	0	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+IFC=?

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

AT#CFLO - Command Flow Control

This set command enables/disables the hardware flow control in command mode. If enabled, the flow control is applied to both data mode and command mode.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CFLO=<enable>

Parameter:

Name	Type	Default	Description
<enable>	integer	1	enable/disable hardware flow control

Values:

0 : disable flow control in command mode

1 : enable flow control in command mode

The flow control in online mode is not affected by this command. See AT&K command for the flow control in online mode.

AT#CFLO?

Read command returns current setting value in the format:

#CFLO: <enable>

AT#CFLO=?

Test command returns the range of supported values for parameter <enable>

AT#SKIPESC - Skip Escape Sequence

This command enables/disables skipping the escape sequence.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SKIPESC=[<mode>]

Set command enables/disables skipping the escape sequence (+++) while transmitting during a data connection.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable skipping the escape sequence (+++)

Values:

0 : does not skip the escape sequence; its transmission is enabled.

1 : skips the escape sequence; its transmission is not enabled.

In FTP connection the escape sequence is not transmitted, regardless of the command setting.

AT#SKIPESC?

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

#SKIPESC: <mode>

AT#SKIPESC=?

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

Call (Voice and Data) Control

ATD - Dialup Connection

This command establishes a dialup connection between the TE and the external PDN.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	Yes

ATD

The ATD execution command assumes the format shown in Additional info section. It causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

Additional info:

ATD*<gprs_sc>[*[*[*[<cid>]]]]#

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

ATH - Hang Up/Disconnect the Current Call

This execution command disconnects the current dial-up.

ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted
Not required	No	No

ATH

When 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, tying Low the DTR pin.

ATO - Return to ON-Line Mode

This execution command is used, during a suspended data conversation, to return in on-line mode from command mode. If there is no suspended conversation, it returns NO CARRIER.

ITU-T Recommendation V. 25 ter

SIM Presence	Setting saved	Can be aborted
Required	No	No

ATO

After issuing ATO command, the device returns in on-line mode. To enter again command-mode you must issue the escape sequence, see register S2.

Network

AT+CNUM - Subscriber Number

Execution 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
Required	No	No

AT+CNUM

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

AT+COPN - Read Operator Names

This command read operator names.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+COPN

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

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

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

The parameters are described in the Additional info section.

Additional info:

Parameters meaning:

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

Each operator code <numericn> that has an alphanumeric equivalent <alphan> in the ME memory is returned.

AT+COPN=?

Test command returns the OK result code.

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
Not required	No	No

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>]]

extended format: +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>] [,<cause_type>, <reject_cause>]]

The parameter meanings are shown in Unsolicited code value section.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code and selects one of the formats: short, long or extended. 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)

3 : enable the network registration unsolicited result code, and selects the extended format

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 : out of coverage / suspended SIM in PSM/eDRXs 5 : registered, roaming
<lac>	string	the parameter reports: Local Area Code when <AcT>=0 Tracking Area Code when <AcT>=8 or 9
<ci>	string	Cell Id for the currently registered on cell
<AcT>	integer	access technology of the registered network Values: 7 : CAT-M 9 : NB IoT
<cause_type>	integer	indicates the type of <reject_cause>. Values: 0 : <reject_cause> contains an EMM cause value 1 : <reject_cause> contains a manufacturer-specific cause
<reject_cause>	integer	contains the cause of the failed registration. The value is of type as defined by <cause_type>

<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

AT+COPS - Operator Selection

The command selects a network operator and registers the module.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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

<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
<act>	integer	N/A	selects access technology.

Values:

7	:	CAT-M
9	:	NB-IoT

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.

The output of this command is given after the scan/attach/detach procedure is completed. So, the command may require some seconds for each enabled band before the output is given.

The enabled bands can be set using AT#BND.

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.

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.

For NB-IoT only:

AT+COPS=? returns ERROR if the number of the enabled Earcfns is more than 3500.

This number depends on the enabled bands, that can be set using AT#BND.

AT+CLCK - Facility Lock/Unlock

This command is used to lock or unlock a ME on a network facility.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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

Set command is used to lock, unlock or interrogate a modem or a network lock facility. Password is normally needed to do such actions

Parameters:

Name	Type	Default	Description
<fac>	string	N/A	facility to lock, unlock or interrogate
	Values:		
	"SC" : SIM (PIN request) (device asks SIM password at power-up and when this lock command issued)		
	"PN" : Network Personalization		
	"PU" : network sUbset Personalization		
	"PS" : PS lock		
<mode>	integer	N/A	defines the operation to be done on the facility
	Values:		

0	:	unlock facility
1	:	lock facility
2	:	query status

<password>	string	-	shall be the same as password specified for the facility from the DTE user interface or with command Change Password +CPWD
<class>	integer	N/A	is a sum of integers, each representing an information class of which the command refers to; default is 7 (voice + data + fax).

Values:

1	:	voice (telephony)
2	:	data (refers to all bearer services)
4	:	fax (facsimile services) (not supported by LTE)
8	:	short message service
16	:	data circuit sync
32	:	data circuit async
64	:	dedicated packet access
128	:	dedicated PAD access

Additional info:

When <mode>=2 and command is successful, it returns:

+CLCK: <status>

Name	Type	Default	Description
<status>	integer	N/A	the current status of the facility
	Values:		
	0 : not active		
	1 : active		

AT+CLCK=?

Test command reports all the facilities supported by the device.

AT+CPWD - Change Facility Password

This command changes the password for the facility lock function defined by command Facility Lock +CLCK command.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	
Required	Other	Yes	180 s

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

Execution command changes the password for the facility lock function defined by command Facility Lock +CLCK command.

Parameters:

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

Values:

"SC" : SIM (PIN request)

"P2" : SIM PIN2

"PN" : Network Personalization

"PU" : network sUbset Personalization

"PS" : PS lock

<oldpwd>	string	it shall be the same as password specified for the facility from the ME user interface or with command +CPWD.	
<newpwd>	string	-	new password.

Parameter <oldpwd> is the old password while <newpwd> is the new one.

The password can be changed only if PIN request is enabled (see +CLCK command).

AT+CPWD=?

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

AT+CPOL - Preferred Operator List

The command is used to edit or update the UICC preferred list of networks. The list is read in the UICC file selected by the command +CPLS.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

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

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

Parameters:

Name	Type	Default	Description
<index>	integer	N/A	the order number of operator in the UICC preferred operator list. Value: 1÷n : order number in the list
<format>	integer	2	format for <oper> parameter. Value: 2 : numeric. Only 2 is allowed up to now

<oper>	string	-	Operator Identifier.
<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. Currently the parameter is not supported but set value is accepted. Values: 0 : access technology not selected 1 : access technology selected
<UTRAN_AcT>	integer	N/A	UTRAN access technology. Currently the parameter is not supported but set value is accepted. 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

- If <index> is used, and <oper> is not entered, the entry is deleted from the list of preferred operators.
- If <oper> is used, and <index> is not used, <oper> is put in the next free location.
- If only <format> is entered, the format of the <oper> in the read command is changed.

AT+CPOL?

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

AT+CPOL=?

Test command returns the <index> range supported by the UICC and the range for the <format> parameter.

Entry 3 in the preferred list of the operators is deleted.

```
AT+CPOL=3
OK
```

Operator identifier 22603 is inserted in the next free location of the list.

```
AT+CPOL=,2,22603
OK
```

Format of <oper> in the read command is changed (only 2 is allowed up to now).

```
AT+CPOL=,2
OK
```

Operator Identifier 22603 is inserted in the 4th position of the list.
AT+CPOL=4,2,22603
OK

Available range for <index> is 1 to 20, for <format>= 2.
AT+CPOL=?
+CPOL: (1-20),(2)

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
Required	Auto	No

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.

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.

AT+CSQ - Signal Quality

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

[1] 3GPP TS 27.007
[2] 3GPP TS 07.07
[3] 3GPP TS 25.133

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CSQ

See Additional info sections.

Additional info:

2G Networks

The execution command returns the following message:

+CSQ: <rssi>,<ber>

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

<ber>	integer	N/A	measurements of the channel bit error rate, expressed in %, are mapped to <ber> as shown below

Values:

0	:	less than 0.2%
1	:	0.2% to 0.4%
2	:	0.4% to 0.8%
3	:	0.8% to 1.6%
4	:	1.6% to 3.2%
5	:	3.2% to 6.4%
6	:	6.4% to 12.8%
7	:	more than 12.8%
99	:	not known or not detectable

▶▶ 4G Networks

The execution command returns the following message:

+CSQ: <rssi>,<ber>

Name	Type	Default	Description
<rssi>	integer	N/A	Received Signal Strength Indication. For <rssi> 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

Name	Type	Default	Description
<ber>	integer	N/A	measurements of the channel bit error rate, expressed in %, are mapped to <ber> as shown below

Values:

0	:	less than 0.2%
1	:	0.2% to 0.4%

2 : 0.4% to 0.8%

3 : 0.8% to 1.6%

4 : 1.6% to 3.2%

5 : 3.2% to 6.4%

6 : 6.4% to 12.8%

7 : more than 12.8%

99 : not known or not detectable

AT+CSQ=?

Test command returns values supported as compound values.

AT+CEINFO - Retrieve Coverage Enhancement (CE) Mode Information

This command is used to retrieve Coverage Enhancement (CE) Mode Information.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+CEINFO=<reporting>

Set command enables/disables retrieving of Coverage Enhancement (CE) Mode Information.

Parameter:

Name	Type	Default	Description
<reporting>	integer	1	enable/disable unsolicited report for CE Mode

Values:

0	:	disable
1	:	enable

Only AT+CEINFO=0 (disable) is supported.

AT+CEINFO?

Read command returns the current CE Mode Information, in the format:

+CEINFO: <reporting>,<CE_Enabled>,<UE_State>,<Downlink_Rep_Fact>,<Uplink_Rep_Fact>,<RSRP>,<CINR>

Additional info:

Parameters meaning:

Name	Type	Default	Description
<CE_Enabled>	integer	0	indicates whether the serving cell supports CE mode A/B Values: 0 : disabled 1 : enabled
<UE_State>	string	N/A	UE state at the time of the report Values: I : idle R : RACH C : connected
<Downlink_Rep_Fact>	integer	-	downlink repetition factor; value is the integer representation

			of the ASN.1 enumeration
<Uplink_Rep_Fact>	integer	-	uplink repetition factor; value is set to the integer representation of the ASN.1 enumeration
<RSRP>	integer	-	Current RSRP Level in dBm at time of report Range: For CAT-M: from -140 dBm to -44 dBm For NB-IoT: from -156 dBm to -44 dBm
<CINR>	integer	N/A	Current RS SNR (reference signal signal-to-noise ratio) in tenth of dB Value: - : RS SNR in tenth of dB 120÷400

If command fails, +CME ERROR: <err> is returned.

If device is not in RRCE_IdleCampedOnCellor RRC_Connected states, the +CME ERROR: operation not allowed is reported.

AT+CEINFO=?

Test command returns the list of supported values for <reporting>.

When receiving From SIB2 the following parameters:

For CE level 0:

mpdcch-NumRepetition-RA-r13: r1
vnumRepetitionPerPreambleAttempt-r13: n1

For CE level 1:

mpdcch-NumRepetition-RA-r13: r16

numRepetitionPerPreambleAttempt-r13: n1

When CE Level is 0, the UE returns:

+CEINFO: 0,1,I,1,1,-90,317

1 - corresponds to mpdcch-NumRepetition-RA-r13: r1

1 - corresponds to numRepetitionPerPreambleAttempt-r13: n1

When CE level is 1, the UE returns:

+CEINFO: 0,1,I,16,1,-100,265

16 - corresponds to mpdcch-NumRepetition-RA-r13: r16

1 - corresponds to numRepetitionPerPreambleAttempt-r13: n1.

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
Required	Auto	No

AT+CPNER=<reporting>

Set command enables and disables reporting of primary notification events when received from the network with unsolicited result code.

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

Primary notification events are 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

Unsolicited fields:

Name	Type	Description

<message_identifier>	string	in hexadecimal character format. The parameter contains the message identifier (2 bytes) of the primary notification.
<serial_number>	string	in hexadecimal character format. The parameter contains the serial number (2 bytes) of the primary notification.
<warning_type>	string	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 range of values of parameter.

AT+CPNER?

+CPNER: 1

OK

AT#BND - Select Band

This command selects RF bands

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#BND=<GSM_band>[,<UMTS_band>[,<LTE_band>[,<TDSCDMA_band>[,<LTE_band_over_64>]]]]

Set command selects the current CAT-M1 bands. If some of these bands are supported by NB-Iot then set them also for this technology.

Parameters:

Name	Type	Default	Description
<GSM_band>	integer	0	this parameter is used for backward compatibility Value: 0 : default value
<UMTS_band>	integer	0	this parameter is used for backward compatibility. Value: 0 : default value

<LTE_band>	integer	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 32 bits):

Band number	Band i
1	B1
2	B2
4	B3
8	B4
...	...
(2exp(i-1))	Bi
...	...
2147483648	B32

Values:

0	:	no low band selected
1÷4294967295	:	range of the sum of Band number (1+2+8 ..)

<TDSCDMA_band>	integer	0	this parameter is used for backward compatibility

Value:

0	:	default value

<LTE_band_over_64>	integer	N/A	indicates the LTE high supported bands expressed as the sum of Band number (1+2+8 ...) calculated as shown in the table (mask of 32 bits):

Band number	Band i
1	B65
2	B66
4	B67
8	B68
...	...
(2exp(i-64-1))	Bi
...	...

Values:

0	:	no high band selected
1÷4294967295	:	range of the sum of Band number (1+2+8 ...)

The command needs a reboot to be effective.

For actual range value please refer to test command.

AT#BND?

Read command returns the current selected bands in the format:

#BND: <GSM_band>,<UMTS_band>,<LTE_band>,< TDSCDMA_band>,< LTE_band_over_64>

<LTE_band> and <LTE_band_over_64> refer to CAT-M1 currently selected bands.

AT#BND=?

Test command returns the supported range of values of parameters:

<GSM_band>, <UMTS_band>,<LTE_band>,< TDSCDMA_band> ,< LTE_band_over_64>.

<LTE_band> and <LTE_band_over_64> refer to CAT-M1 supported range of values.

Test command
AT#BND=?

#BND: (0),(0),(0,1-252655775),(0),(0,1-1048675)

OK

Read command
AT#BND?

#BND: 0,0,252655775,0, 1048675

OK

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
Not required	Auto	No

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 (MMGMM/EMM) or session management (SM/ESM) procedure not accepted by the network.

Additional info:

The following error codes are valid for mobility management (MM/GMM) or session management (SM), i.e. for 2G and 3G networks.

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 SNDCP 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

Telit recommends that the host controlling the modem defines the proper retry/reboot scheme for reject causes 2, 7, 11, 14, 30, 33, 34, 38.

AT#CEERNET=?

Test command returns OK result code.

AT#CEERNETEXT - Extended Error Report for Network Reject Cause

This command is both a set and an execution command.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CEERNETEXT[=[<func>]]

Set command enables/disables the URC presentation or delates the last network information. The execution command (AT#CEERNETEXT<CR><LF>) gets the last reject error information from the network and returns the following message:

#CEERNETEXT: <code>,<AcT>,<MCC>,<MNC>

If no error information is present, the execution command returns OK

When URC is enabled, it will occur every time a mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure is not accepted by the network.

The URC message is equal to the message returned by the execution command.

Parameter:

Name	Type	Default	Description
<func>	integer	0	enable/disable the URC or delete the last network info

Values:

0 : disable the #CEERNETEXT URC

1 : enable the #CEERNETEXT URC

2 : delete last info of <code>, <AcT>, <MCC> and <MNC>

Unsolicited fields:

Name	Type	Description
<code>	integer	last numeric Network Reject Cause from network, see <code> in #CEERNET
<AcT>	integer	access technology of the registered network Values: 0 : GSM 8 : CAT-M 9 : NB-IoT
<MCC>	string	Mobile Country Code of the used network when last numeric code was received
<MNC>	string	Mobile Network Code of the used network when last numeric code was received

AT#CEERNETEXT?

The read command returns the current value of parameter <func> in the format:

#CEERNETEXT: <func>

Additional info:

▶▶ Parameters returned by the read command.

Name	Type	Default	Description
<func>	integer	N/A	can assume the following values:

Values:

0	:	#CEERNETEXT URC is disabled
1	:	#CEERNETEXT URC is enabled

AT#CEERNETEXT=?

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

AT+CEMODE - Set Mode of Operation for EPS

This set command configures the mode of operation for EPS.

[1] 3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+CEMODE=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	2	mode of operation. The default value depends on product and the support of VoLTE. UE modes of operation can be found in standard [1]. 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>

AT+CEMODE=?

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

AT+CESQ - Extended Signal Quality

Execution command returns received signal quality parameters according to the network on which the module is registered.

[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
Required	No	No

AT+CESQ

See Additional info section for networks on which the module can be registered.

Additional info:

The execution command returns the following message. Its format depends on the network on which the module is registered.

2G Networks

+CESQ: <rxlev>,<ber>,255,255,255,255

LTE Networks

+CESQ: 99,99,255,255,<rsrq>,<rsrp>

Name	Type	Default	Description
<rxlev>	integer	N/A	received signal strength level, see 3GPP TS 45.008 subclause 8.1.4. Values:

0	:	rssi < -110 dBm
1	:	-110 dBm ≤ rssi < -109 dBm
2	:	-109 dBm ≤ rssi < -108 dBm
...	:	...
61	:	- 50 dBm ≤ rssi < - 49 dBm
62	:	- 49 dBm ≤ rssi < -48 dBm
63	:	- 48 dBm ≤ rssi
99	:	not known or not detectable or if the current serving cell is not a GERAN cell

<ber> integer N/A channel bit error rate.

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

<rsrq> integer N/A reference signal received quality, see 3GPP TS 36.133 subclause 9.1.7.

Values:

0	:	rsrq < -19.5 dB
1	:	-19.5 dB ≤ rsrq < -19.0 dB
2	:	-19.0 dB ≤ rsrq < -18.5 dB
...	:	...
32	:	-4 dB ≤ rsrq < -3.5 dB
33	:	-3.5 dB ≤ rsrq < -3 dB
34	:	-3 dB ≤ rsrq
255	:	not known or not detectable or if the current serving cell is not a E-UTRA cell

<rsrp>	integer	N/A	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 dBm ≤ rsrp < -45 dBm

96 : -45 dBm ≤ rsrp < -44 dBm

97 : -44 dBm ≤ rsrp

255 : not known or not detectable or if the current serving cell is not a E-UTRA cell

AT+CESQ=?

Test command returns values supported as compound values.

AT+WS46 - PCCA STD-101 Select Wireless Network

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

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

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	28	WDS-Side Stack to be used by the TA. Value: 28 : E-UTRAN only

<n> parameter setting is stored in NVM, and available at next reboot.

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>.

AT+CEDRXS - eDRX Setting

This command controls the setting of the UEs eDRX parameters.

3GPP TS 27.007
3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+CEDRXS=[<mode>[,<AcTtype>[,<Req_eDRX>]]]

Set command controls the setting of the UEs eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcTtype>.

Values:

0 : disable the use of eDRX

1 : enable the use of eDRX

2 : enable the use of eDRX and enable the unsolicited result code, see Additional info.

3 : disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values

<AcTtype>	integer	N/A	type of access technology. Values: 0 : Access technology is not using eDRX. This parameter value is only used in the unsolicited result code, it cannot be used in the set command. 4 : E-UTRAN (CAT-M mode) 5 : E-UTRAN (NB1 mode)
<Req_eDRX>	string	-	half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008, Table 10.5.5.32/3GPP TS 24.008.

Additional info:

▶▶ If <mode>=2 and there is a change in the eDRX parameters provided by the network, the unsolicited result code reports:

+CEDRXS: <AcTtype>[,<Req_eDRX>[,<NW_prove_DRX>[,<PagTimeWindow>]]]

Name	Type	Default	Description
<NW_prove_DRX>	string	-	half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.

<PagTimeWindow>	string	-	half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.

AT+CEDRXS?

Read command returns the current settings for each defined value of <AcTtype>, in format:

+CEDRXS: <AcTtype>,<Req_eDRX>[<CR><LF>
+CEDRXS: <AcTtype>,<Req_eDRX>[...]]

AT+CEDRXS=?

Test command returns the supported <mode>s and the value ranges for the access technology and the requested eDRX value as compound values.

AT+CEDRXS=?

+CEDRXS: (0-3),(5),("0001"-"1111")

OK

AT+CEDRXRDP - eDRX Read Dynamic Parameters

This command returns a message related to Extended Discontinuous Reception (eDRX).

3GPP TS 27.007
3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CEDRXRDP

Execution command returns the following message if eDRX is used for the cell that the MS is currently registered to, in the format:

+CEDRXP:<AcTtype>[,<Req_eDRX>[,<NW_prov_eDRX>[,<PagTimeWindow>]]]

If the cell that the MS is currently registered to is not using eDRX, <AcTtype>=0 is returned.

Additional info:

Here is the list of the meanings of the parameter returned by the +CEDRXRDP command.

Name	Type	Default	Description
<AcTtype>	integer	0	type of access technology. Values: 0 : access technology is not using eDRX 2 : see +CEDRXS.

4 : see +CEDRXS.

5 : see +CEDRXS.

<Req_eDRX>	string	-	see +CEDRXS.
<NW_prov_eDRX>	string	-	see +CEDRXS.
<PagTimeWindow>	string	-	see +CEDRXS.

AT+CEDRXRDP=?

Test command returns OK result code.

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
[4] 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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>]]

extended format: +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>, <reject_cause>]]

PSM format: +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>], [<Periodic-TAU>]]]]

extended PSM format: +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>], [<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]

<tac>, <ci>, <AcT>, <cause_type>, <reject_cause>, <Active-Time>, <Periodic-TAU> 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 triggers 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 URC PSM format will provide additional information for the Active Time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN URC Extended PSM format further enhances the unsolicited result code with <cause_type> and <reject_cause> when the value of <stat> changes

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)
3	:	enable the network registration unsolicited result code, and selects the extended format

4 : enable the network registration unsolicited result code, and selects the PSM format

5 : enable the network registration unsolicited result code, and selects the extended PSM format

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 : out of coverage / suspended SIM in PSM/eDRX 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. 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: 7 : CAT-M 9 : NB IoT
<cause_type>	integer	indicates the type of reject_cause>. Values: 0 : <reject_cause> contains an EMM cause value

1 : <reject_cause> contains a manufacturer-specific cause

<reject_cause>	integer	contains the cause of the failed registration. The value is of type as defined by <cause_type>.
<Active-Time>	string	Active Time value (one byte) in bit format
<Periodic-Tau>	string	Indicates the extended periodic TAU value allocated to the UE in LTE (one byte) in bit format

AT+CEREG?

Read command returns the current value of <mode>, the registration status <stat>, and the information <tac>, <ci>, <AcT>, <cause_type>, <reject_cause>, <Active-Time>, <Periodic-TAU> according to the current <mode> parameter value.

When <mode>=0,1,2 or 3:

+CEREG: <mode>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>, <reject_cause>]]]

When <mode>=4 or 5:

+CEREG: <mode>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>, <reject_cause>] [,[<Active-Time>],[<Periodic-TAU>]]]]

AT+CEREG=?

Test command returns supported values for parameter <mode>.

AT#RFSTS - Read Current Network Status

Command reads current network status.

SIM Presence	Setting saved	Can be aborted
Required	No	No

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>,<TXPWR>,<MM>,<RR>,<NOM>,<CID>,<IMSI>,<NetNameAsc>,<SD>,<ABND>

Parameters	Description
<PLMN>	Country code and operator code(MCC, MNC)
<ARFCN>	Assigned Radio Channel
<RSSI>	Received Signal Strength Indication
<LAC>	Location Area Code
<RAC>	Routing Area Code (dummy)
<TXPWR>	Tx Power (In traffic only) (dummy)
<MM>	Mobility Management state (dummy)

Parameters	Description
<RR>	Radio Resource state (dummy)

<NOM>	Network Operator Mode (dummy)
<CID>	Cell ID

Parameters	Description
<IMSI>	International Mobile Station ID
<NetNameAsc>	Operator name, quoted string type

Parameters	Description
<SD>	Service Domain
0	No Service
1	CS only
2	PS only
3	CS + PS

Parameters	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 (dummy)
<TXPWR>	Tx Power (In traffic only) (dummy)
<DRX>	Discontinuous reception cycle Length (cycle length in ms) (dummy)

Parameter/values	Description
<MM>	Mobility Management state (dummy)

Parameters	Description
<RRC>	Radio Resource state
<CID>	Cell ID

Parameter/values	Description
<IMSI>	International Mobile Station ID
<NetNameAsc>	Operator name, quoted string type
<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 (dummy)
<T3412>	Timer T3412 in seconds (dummy)
<SINR>	Signal-to-Interface plus Noise Ratio

AT#RFSTS=?

Test command tests for command existence.

AT#CEDRXS - Extended eDRX Setting

This command controls the setting of the UEs eDRX parameters.

3GPP TS 27.007
3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#CEDRXS=[<mode>[,<AcTtype>[,<Req_eDRX>[,<ReqPagTimeWindow>]]]]

Set command controls the setting of the UEs eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcT>.

Values:

0 : disable the use of eDRX

1 : enable the use of eDRX

	2 : enable the use of eDRX and enable the unsolicited result code, see Additional info. 3 : disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values		
<AcTtype>	integer	N/A	type of access technology. Values: 0 : Access technology is not using eDRX. This parameter value is only used in the unsolicited result code, it cannot be used in the set command. 2 : GSM (A/Gb mode) 4 : E-UTRAN (CAT M1 mode) 5 : E-UTRAN (NB1 mode)
<Req_eDRX>	string	-	half a byte in a 4 bit format. The eDRX value refers to bit-4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information

			element in 3GPP TS 24.008, Table 10.5.5.32/3GPP TS 24.008.
<ReqPagTimeWindow>	string	-	half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. Default value is "0000"

Additional info:

▶▶ If <mode>=2 and there is a change in the eDRX parameters provided by the network, the unsolicited result code reports:

#CEDRXP:<AcTtype>[,<Req_eDRX>[,<NW_prov_eDRX>[,<ReqPagTimeWindow>[,<NW_prov_PagTimeWindow>]]]]

Name	Type	Default	Description

<NW_prov_eDRX>	string	-	half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.

<NW_prov_PagTimeWindow>	string	-	half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008

AT#CEDRXS?

Read command returns the current settings for each defined value of <AcTtype> in the format:

#CEDRXS:<AcTtype>,<eDRX_act_state>,<Req_eDRX>,<ReqPagTimeWindow>,<mode>[<CR><LF>

#CEDRXS:<AcTtype>,<eDRX_act_state>,<Req_eDRX>,<ReqPagTimeWindow>,<mode>[...]]]

If <AcTtype> is the same the device is registered to, the format is

#CEDRXS:<AcTtype>,<eDRX_act_state>,<Req_eDRX>,<ReqPagTimeWindow>,
<eDRX_nw_state>,<NW_prov_eDRX>,<NW_prov_PagTimeWindow>,<mode>

Additional info:

- Meaning of the <eDRX_act_state> parameter.

Name	Type	Default	Description
<eDRX_act_state>	integer	0	eDRX status
	Values:		
	0 : eDRX disabled		
	1 : eDRX enabled		

- Meaning of the <eDRX_nw_state> parameter.

Name	Type	Default	Description
<eDRX_nw_state>	integer	0	eDRX status in the network

Values:

0	:	eDRX disabled
1	:	eDRX enabled

AT#CEDRXS=?

Test command returns the supported <mode>s and the value ranges for the access technology, requested eDRX value and requested Paging Time Window as compound values.

```
AT#CEDRXS?
#CEDRXS: 2,0,"0101","0000"
#CEDRXS: 4,0,"0101","0000"
#CEDRXS: 5,0,"0101","0000"

OK
```

AT#MONI - Cell Monitor

This command is both a set and an execution command.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MONI[=[<number>]]

Set command sets the cells from which extract LTE related information.

After entering the set command, enter the execution command AT#MONI<CR> to get the LTE related information for the selected cell or cells in the format shown 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:

LTE network

Name	Type	Default	Description
<number>	integer	0	LTE network

Value:

0	:	it is the serving cell

Execution command AT#MONI<CR> reports LTE related information for selected cell and dedicated channel (if exists) in the following format:

a) When extracting data for the serving cell and the network name is known the format is:

LTE network

#MONI: <netmame> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac> Id:<id> EARFCN:<earfcn> PWR:<dBm> DRX:<drx> PCI:<physicalCellId>

Name	Type	Default	Description
<netname>	string	-	name of network operator
<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<tac>	integer	-	Tracking Area Code
<id>	integer	-	cell identifier
<earfcn>	integer	-	E-UTRA Assigned Radio Channel

<dBm>	integer	-	received signal strength in dBm.
<drx>	string	-	Discontinuous reception cycle length (dummy)
<physicalCellId>	integer	-	physical cell identifier

AT#MONI=?

Test command reports the maximum number of cells from which we can extract 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
<CellSet>	integer	-	last setting done with command #MONI.

Set command selects the cell 0 in the network

AT#MONI=0

OK

AT+CRCES - Reading Coverage Enhancement Status

This execution command returns the coverage enhancement status of the MT. The terminal can consider the coverage enhancement status prior to deciding to transmit. Depending on the coverage enhancement status the terminal can refrain from transmitting data.

The coverage enhancement status is only provided by the MT if the access technology of the serving cell is Cat-M or NB-IoT. If the access technology of the serving cell is different, <Act>=0 is indicated.

[1] 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CRCES

Additional info:

The execution command returns the following message.

+CRCES: <AcT>,<CE_level>,<CC>

Name	Type	Default	Description
<AcT>	integer	N/A	access technology of the serving cell
	Values:		

0 : Serving cell has no coverage enhancement

1 : Cat-M

3 : NB-IoT

<CE_level>	integer	N/A	Coverage Enhancement (CE) level of the MT in the serving cell.

Values:

0 : No Coverage Enhancement in the serving cell

1 : Coverage Enhancement level 0

2 : Coverage Enhancement level 1

3 : Coverage Enhancement level 2

4 : Coverage Enhancement level 3

<CC>	integer	N/A	Coverage Class (CC) of the MT in the serving cell. Currently not supported.

Value:

0 : No Coverage Class in the serving cell

AT+CRCES=?

Test command returns OK result code.

AT#IOTBND - CAT-M1 & NB-IoT Band Setting

Set command configures the CAT-M1 and NB-IoT bands.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#IOTBND=[<lte_m1_band_pref.bits_1_64>] [,[<lte_m1_band_pref.bits_65_128>] [,<lte_nb1_band_pref.bits_1_64> [,<lte_nb1_band_pref.bits_65_128>]]]

Parameters:

Name	Type	Default	Description
<lte_m1_band_pref.bits_1_64>	integer	-	indicates the lower (1-64) CAT-M1 supported bands, expressed as the sum of Band number (0 meaning "no low band selected"); see #BND command
<lte_m1_band_pref.bits_65_128>	integer	-	indicates the higher (65-128) CAT-M1 supported bands, expressed as the sum of Band number (0 meaning "no high band selected"); see #BND command
<lte_nb1_band_pref.bits_1_64>	integer	-	indicates the lower (1-64) NB-IoT supported

			bands, expressed as the sum of Band number (0 meaning "no low band selected"); see #BND command
<lte_nb1_band_pref.bits_65_128>	integer	-	indicates the higher (65-128) NB-IoT supported bands, expressed as the sum of Band number (0 meaning "no high band selected"); see #BND command

The command needs a reboot to be effective.

AT#IOTBND?

Read command returns the current parameters setting for #IOTBND command in the format:

#IOTBND:
<lte_m1_band_pref.bits_1_64>,<lte_m1_band_pref.bits_65_128>,
<lte_nb1_band_pref.bits_1_64>,<lte_nb1_band_pref.bits_65_128>

AT#IOTBND=?

Test command reports the supported range of values for parameters:

<lte_m1_band_pref.bits_1_64>,<lte_m1_band_pref.bits_65_128>,
<lte_nb1_band_pref.bits_1_64>,<lte_nb1_band_pref.bits_65_128>

AT#WS46 - Select IoT Technology

This command selects the IoT technology.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#WS46=[<n>[,<GSM_P>]]

Set command selects the IoT technology to operate with.

Parameters:

Name	Type	Default	Description
<n>	integer	0	selects the technology to be used. Values: 0 : CAT-M1 1 : NB-IoT
<GSM_P>	integer	0	selects the technology priority. Value: 0 : 4G (LTE) priority

The command takes effect after the module reboot.

AT#WS46?

Read command reports the currently selected technology and priority, in the format:

#WS46: <n>,<GSM_P>

AT#WS46=?

Test command reports the range for the parameters <n> and <GSM_P>.

Phonebook

AT+CPBS - Select Phonebook Memory Storage

This set command selects phonebook memory storage, which will be used by other phonebook commands.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CPBS=<storage>[,<password>]

Parameters:

Name	Type	Default	Description
<storage>	string	"SM"	specify 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 (+CPBF is not applicable for this storage)
"SD"	:	SIM Service Dialing Numbers (SDN) phonebook (+CPBW is not applicable for this storage)

<password>	string	-	string type value representing the PIN2-code required when selecting PIN2-code locked <storage> 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 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 the actual values of the parameter <storage>, the number of occupied records <used> and the maximum index number <total>, in the format:

+CPBS: <storage>,<used>,<total>

For <storage>="MC": if there are more than one missed calls 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>

AT+CPBR - Read Phonebook Entries

The command reads phonebook entries.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

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 omitted, only location <index1> is returned.

The intermediate 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 storage (see +CPBS).
<index2>	integer	-	value in the range of location numbers of the currently selected phonebook memory storage (see +CPBS).

Additional info:

▶▶ Intermediate response parameters

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 phone number octet Values: 129 : national numbering scheme 145 : international numbering scheme (contains the character "+")
<test>	string	-	the alphanumeric text associated to 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	-	the group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	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 address; character set as specified by command Select TE Character Set +CSCS

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.

If all queried locations are empty (but available), no information text lines will be returned, while if listing fails in an ME error, +CME ERROR: <err> is returned.

AT+CPBR=?

Test command returns the supported range of values for parameters <indexn> and the maximum lengths of <number>, <text>, <group>, <secondtext> and <email> string parameters, in the format:

+CPBR: (<minIndex> - <maxIndex>),<nlength>,<tlength>,<glength>,<slength>,<elength>

Additional info:

Test command response parameters

Name	Type	Default	Description
<minIndex>	integer	-	the minimum <index> number
<maxIndex>	integer	-	the maximum <index> number
<nlength>	integer	-	maximum <number> field length
<tlength>	integer	-	maximum <name> field length
<glength>	integer	-	maximum <group> field length
<slength>	integer	-	maximum <secondtext> field length
<elength>	integer	-	maximum <email> field length

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+CPBF - Find Phonebook Entries

This command returns phonebook entries.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	Other	No

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; used character set should be the one selected with command +CSCS.

Additional info:

The command returns a report in the form:

[+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 phone number octet

Values:

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

<text>	string	-	The alphanumeric text associated to the number; the character set used should be the one selected with command +CSCS
<group>	string	-	Field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	additional number; phone number of format <adtype>

<adtype>	integer	-	type of address octet
<secondtext>	string	-	Field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
<email>	string	-	field of maximum length <elength> indicating an email address; 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

+CPBF is not applicable if the current selected storage (see +CPBS) is either "MC", "RC" or "LD".

If <findtext>="" the command returns all the phonebook records.

If no PB records satisfy the search criteria then an ERROR message is reported.

AT+CPBF=?

Test command reports the maximum lengths of <number> and <text> fields, in the format:

+CPBF: <nlength>,<tlength>,<glength>,<slength>,<elength>

Additional info:

Test command 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.

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
Required	Other	No

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	-	value in the range of location numbers of the currently selected phonebook memory storage (see +CPBS)
<number>	string	-	phone number in the format <type>
<type>	integer	129	type of number

Values:

129 : national numbering scheme

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

<text>	string	-	text associated to the number; used character set should be the one selected with command +CSCS
<group>	string	-	string type field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	additional number; string type phone number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	string type field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
<email>	string	-	field of maximum length <elength> indicating an email address; 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.

AT+CPBW=?

Test command returns location range supported by the current storage as a compound value, the maximum length of <number> field, supported number format of the storage and maximum length of <text> field. The format is:

+CPBW: (list of supported <index>s),<nlength>,(list of supported <type>s),<tlength>, <glength>,<slength>,<elength>

Additional info:

▶▶ Test command 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"

SIM

AT+CCID - 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.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT+CCID

The command returns the following message:

+CCID: <ICCID>
OK

AT+CCID?

Read command returns the following message:

+CCID: <ICCID>
OK

AT+CCID=?

Test command returns the OK result code.

AT+CCID
+CCID: 89861109091740011006
OK

AT+CIMI - International Mobile Subscriber Identity (IMSI)

This command returns the International Mobile Subscriber Identity (IMSI number).

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CIMI

Execution command returns the value of the International Mobile Subscriber Identity stored in the SIM, the returned message has the following format (with command no echoed):

<IMSI value>
OK

If the SIM is not inserted, the command returns ERROR.

AT+CIMI=?

Test command returns OK result code

AT+CIMI
22201701202507
OK

AT#CCID - 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.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#CCID

The command returns the following message:

#CCID: <ICCID>
OK

AT#CCID=?

Test command returns the OK result code.

```
AT#CCID
#CCID: 89861109091740011006
OK
```

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
Required	No	No

AT+CSIM=<length>,<command>

Set command transmits to the MT the <command>, it then shall send as it is to the UICC. 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 standard [1] or [2] (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 standard [1] or [2] (hexadecimal character format)
<err>	string	-	error values (numeric format followed by verbose format)

AT+CSIM=?

Test command returns the OK result code.

AT+CSIM=<lock>

This special form of the command has no effect and is kept only for backward compatibility.

Parameters:

<lock>=1 locking of the interface
<lock>=0 unlocking of the interface

- 2G SIM, see standard [1]:

  STATUS
  AT+CSIM=10,A0F2000016
  +CSIM:48,"000002A87F2002000000000009930022080083 8A838A9000"
  OK

  SELECT EF 6F07
  AT+CSIM=14,A0A40000026F07
  +CSIM: 4,"9F0F"
  OK

  GET RESPONSE
  AT+CSIM=10,A0C000000F
  +CSIM: 34,"000000096F0704001A001A010200009000"
  OK

  SELECT EF 6F30
  AT+CSIM=14,A0A40000026F30
  +CSIM: 4,"9F0F"
  OK

  READ BINARY
  AT+CSIM=10,A0B00000FC
  +CSIM:508,"FFFFFF1300831300901300541300301300651300381300801301801
  3000113110913013013009813007713005913004313008113009513014013002313
  0016330420130041FFFFFFFFFFFF21436542F41922F28822F201FFFFFFFFFFF
  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
  FFFFFFFFFFFFFFFF9000"
  OK

AT+CCHO - Open Logical Channel

Open Logical Channel

3GPP TS 31.101

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CCHO=<dfname>

Execution of the 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 (hexadecimal character format; refer +CSCS).

Additional info:

<sessionId> returned by the +CCHO command.

Name	Type	Default	Description
<sessionId>	integer	-	session Id to be used to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism.

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. Refer to 3GPP TS 31.101.

AT+CCHO=?

Returns the OK result code.

AT+CCHC - Close Logical Channel

Close a communication session.

3GPP TS 31.101

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CCHC=<sessionId>

Set 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 to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism. \<sessionId\> is returned by the +CCHO command.

AT+CCHC=?

Test command returns the OK result code.

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.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+ICCID

The command returns the following message:

+ICCID: <ICCID>

AT+ICCID=?

Test command returns the OK result code.

```
AT#CCID
#CCID: 89861109091740011006
OK
```

AT+CPIN - Enter the PIN

The command sends to the device a password which is necessary before it can be operated.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT+CPIN=<pin>[,<newpin>]

Set command sends to the device a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.).
If the PIN required is SIM PUK or SIM PUK2, the <newpin> is required. This <newpin>, will replace the old pin in the SIM.
The command may be used to change the SIM PIN by sending it with both parameters <pin> and <newpin>.

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

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+CMEE=1
OK

AT+CPIN?
+CME ERROR: 10
error: you have to insert the SIM

AT+CPIN?
+CPIN: READY
OK
you inserted the SIM and module is not waiting for PIN
```

AT+CPINR - Remaining PIN Retries

This command returns the number of remaining PIN retries for the MT passwords.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CPINR[=[<sel_code>]]

Execution command cause the MT to return the number of remaining PIN retries for the MT passwords.

The intermediate response format is:

+CPINR: <code>,<retries>,<default_retries>

Parameter:

Name	Type	Default	Description
<sel_code>	string	-	These values are strings and shall be indicated within double quotes. It is optional to support wildcard match by '*', meaning match any (sub-)string.

Additional info:

- One line with one intermediate result code is returned for every <code> selected by <sel_code>.

Name	Type	Default	Description
<code>	string	-	type of PIN
<retries>	integer	-	number of remaining retries per PIN
<default_retries>	integer	-	number of default/ initial retries per PIN

AT+CPINR=?

Test command returns the OK result code.

```
AT+CPINR="SIM*"
+CPINR: SIM PIN,3,3
+CPINR: SIM PUK,10,10
+CPINR: SIM PIN2,0,3
+CPINR: SIM PUK2,2,10

OK
AT+CPINR="*SIM*"
+CPINR: SIM PIN,3,3
+CPINR: SIM PUK,10,10
+CPINR: SIM PIN2,0,3
+CPINR: SIM PUK2,2,10
+CPINR: PH-FSIM PIN,10,10
+CPINR: PH-FSIM PUK,0,0

OK
```

AT+CRSM - Restricted SIM access

The command transmits to the UICC some specific commands and their required parameters.

3GPP TS 11.11/51.011

3GPP TS 27.007

ETSI TS 102 221

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CRSM=<command>[,<fileId>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]

Set command transmits to the MT the SIM <command> and its required parameters. The MT handles internally all SIM-MT interface locking and file selection routines. As response to the command, MT sends the actual SIM information parameters and response data. The response of the command is 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 by the MT to the SIM
	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 SIM. Mandatory for every command except STATUS.

<P1> integer N/A parameter passed on by the MT to the SIM. It is mandatory for every command except GET RESPONSE and STATUS.

Value:

0÷255	:	parameter passed on by the MT to the SIM

<P2> integer N/A parameter passed on by the MT to the SIM. It is mandatory for every command except GET RESPONSE and STATUS.

Value:

0÷255	:	parameter passed on by the MT to the SIM

<P3>	integer	N/A	parameter passed on by the MT to the SIM. It is mandatory for every command except GET RESPONSE and STATUS.

Value:

0÷255	:	parameter passed on by the MT to the SIM

<data>	string	-	information which shall be written to the SIM (hexadecimal character format).
<pathid>	string	-	contains the path of an elementary file on the SIM/ UICC in hexadecimal format. This shall only be used in the mode "select by path from MF" (e.g. "7F205F70").

Additional info:

▶▶ Response data fields:

Name	Type	Default	Description
<sw1>	integer	-	information from the SIM about the execution of the actual command (successful or failed)

<sw2>	integer	-	information from the SIM about the execution of the actual command (successful or failed)
<response>	hex	-	response of a successful completion of the command previously issued (hexadecimal character format). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. This information includes the type of file and its size. After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY, UPDATE RECORD or SET DATA command.

Use only decimal numbers for parameters <command>, <fileid>, <P1>, <P2> and <P3>.

AT+CRSM=?

Test command returns the OK result code.

Read binary, ICCID(2FE2)

AT+CRSM=176,12258,0,0,10
+CRSM: 144,0,98285070200110768 6F4
OK

Read record, ADN(6F3A)

AT+CRSM=178,28474,1,4,40
+CRSM: 144,0,42434A554EFFFFFFFFFFFFFFFFFFFFFF06811056789282FFFFFFFFFFFFFF
OK

Update Binary, KcGPRS(6F52)

AT+CRSM=214,28539,0,0,8,C69018C7958C87
+CRSM: 144,0
OK

Update Record, ADN(6F3A)

AT+CRSM=220,28474,9,4,30,657469FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
+CRSM: 144,0
OK

Status, FPLMN(6F7B)

AT+CRSM=242,28539
+CRSM:144,0,623C820238218410A0000000871002FFFFFFFF89040300FFA51180013181030
10A3282011E8304000030E08A01058B032F0609C6099001C0830101830181
OK

Get Response, MSISDN(6F40)
AT+CRSM=192,28480
+CRSM:
144,0,621E820542210026028 3026F40A5039201008A01058B036F06058002004C8800
OK

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
Required	No	No

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).

<err>	string	-	error values (numeric format followed by verbose format)

AT+CGLA=?

Test command returns the OK result code.

AT+CUSATE - USAT envelope command

This command allows the TE to send a USAT envelope command to the MT.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CUSATE=<envelope_command>

If the UICC provides response data to the command or indicates that USAT is busy, the following information response is returned:

+CUSATE: <envelope_response>[,<busy>]

A second line of information response:

[<CR><LF>+CUSATE2: <sw1>,<sw2>]

may be provided if the MT presents the status words provided by the UICC. See Additional info.

Parameter:

Name	Type	Default	Description
<envelope_command>	string HEX	-	Envelope command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object

Additional info:

▶▶ Response parameters:

Name	Type	Default	Description
<envelope_response>	string HEX	-	Response to the envelope command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object. An empty string is provided if the UICC does not have any response data to provide
<busy>	integer	-	busy indicator Values: 0 : UICC indicated normal ending of the command 1 : UICC responded with USAT is busy, no retry by the MT 2 : UICC responded with USAT is busy even after one or more retries by the MT
<sw1>	integer	-	Status word information from the envelope response returned by the UICC as

			defined in ETSI TS 102 221 [60], subclause 10.2. The parameter can be delivered to the TE both in the case of successful and failed execution of the envelope command
<sw2>	integer	-	For description see <sw1>

If the UICC provides response data to the command or indicates that USAT is busy, the information response +CUSATE: [,] is returned.

A second line of information response +CUSATE2: , may be provided if the MT presents the status words provided by the UICC .

AT+CUSATE=?

Test command returns OK.

AT+CUSATT - USAT terminal response

This command sends a USAT terminal response to the MT .

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CUSATT

Execution command sends a USAT terminal response to the MT as an answer to a preceding USAT proactive command sent from the UICC with unsolicited result code +CUSATP.

The command returns OK or ERROR or +CME: ERROR response.

Extended error responses are enabled by the +CMEE command.

Unsolicited Result Code:

Name	Type	Default	Description
<terminal_response>	string HEX	-	Terminal response to a proactive command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object

AT+CUSATT=?

Test command returns OK.

SMS & CB

AT+CSMS - Select Message Service

Set command selects messaging service <service>

3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.041

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

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	0	mobile terminated messages support: Values: 0 : type not supported 1 : type supported
<mo>	integer	0	mobile originated messages support Values: 0 : type not supported 1 : type supported
<bm>	integer	0	broadcast type messages support Values: 0 : type not supported 1 : type supported

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>

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
Required	Auto	No

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	ME	memory from which messages are read and deleted
	Values:		
	ME : SMS memory storage in Flash		
	SM : SIM SMS memory storage		
<memw>	string	ME	memory to which writing and sending operations are made
	Values:		

ME	:	SMS memory storage in Flash
SM	:	SIM SMS memory storage

<mems>	string	ME	memory to which received SMs are preferred to be stored

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

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

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
Required	No	No

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>.

AT+CSCA - Service Center Address

This command allows to set the Service Center Address for SMS transmissions.

3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted
Required	Other	No

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	145	The type of number

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
```

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 27.005
3GPP TS 03.40/23.040
3GPP TS 03.38/23.038

SIM Presence	Setting saved	Can be aborted
Required	Other	No

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	-	depending on the command or result code: first octet of 3GPP TS 03.40/23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format.
<vp>	mixed	-	depending on SMS-SUBMIT <fo> setting: 3GPP TS 03.40/23.040 TP-Validity-Period either in integer format (default 167) or in quoted time-string format.
<pid>	integer	-	3GPP TS 03.40/23.040 TP-Protocol-Identifier in integer format.
<dcs>	integer	-	depending on the command or result code:

3GPP TS 03.38/23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme.

AT+CSMP?

Read command returns the current setting in the format:

+CSMP: <fo>,<vp>,<pid>,<dcs>

AT+CSMP=?

Test command returns the OK result code.

The current settings are stored through +CSAS

Set the parameters for an outgoing message with 24 hours of validity period and default properties:

AT+CSMP=17,167,0,0
OK

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
Required	No	No

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 : 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>.

AT+CSAS - Save Settings

Execution command saves settings which have been made by the +CSCA, and +CSMP commands in local non-volatile memory.

3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted
Required	No	No

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 (AT+CSAS<CR> is given) the settings are saved in the non-volatile memory.

AT+CSAS=?

Test command returns the possible range of values for the parameter <profile>.

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
Not required	No	No

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>.

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
Required	No	No

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>

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
Not required	Auto	No

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	1	unsolicited result codes buffering option.
	Value:		
	1 :		Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved, otherwise forward them directly to the TE.
<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.

<bm> integer 0 broadcast reporting option

Value:

0 : Cell Broadcast Messages are not sent to the DTE

<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 1 buffered result codes handling method

Value:

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'.

<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
<dcs>	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

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
Not required	No	No

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.

It has been necessary to take the following decision to get over any incoherence problem, due to the possibility to have contemporaneous different settings of parameter <mt> and <ds> of the +CNMI command in different sessions (see #PORTCFG and +CMUX): only the <mt> and <ds> setting for session "0" are considered as valid to decide if +CNMA acknowledgment is expected or not.

</>

* 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 acknowledgment (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

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
Required	No	No

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>[,<tooa/toda>,<length>]<CR><LF> <data>[<CR><LF>
+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>[,<tooa/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.

<tooa/ toda>	integer	N/A	type of number <oa/da> 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

If parameter is omitted the command returns the list of SMS with "REC UNREAD" status.

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

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
Required	No	No

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>

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>

If there is a Message Delivery Confirm message in location <index> the output format is:

+CMGR: <stat>,<fo>,<mr>,,,<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

<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): 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>

Values:

129	:	number in national format
145	:	number in international format (contains the "+")

<toda>	integer	N/A	type of number of <da>

Values:

129	:	number in national format
145	:	number in international format (contains the "+")

<tosca>	integer	N/A	type of number of <sca>

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 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)

In both cases (in PDU or Text mode) if status of the message is 'received unread', status in the storage changes to 'received read'.

AT+CMGR=?

Test command returns the OK result code

AT+CMGF=0
OK

AT+CMGR=1
+CMGR:2,,21

```
07912801929190301164 0A8110516529700000A709027A794E77B95C2E
OK

AT+CMGF=1
OK

AT+CMGR=3
+CMGR:"REC READ","+821020955219",,"07/07/19,10:06:34+36" test
message/.....
OK
```

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
Required	Auto	No

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 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.

- 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: 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.

- To ensure that during the command execution, which may take several seconds, no other SIM interacting commands issued, care must taken.
- It is not possible to send concatenated SMS.

  The standard AT+CMGS command returns single message reference index and assumes that concatenation is handled by the host.
- 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

AT+CMGS=18
> 088128010099010259115507811020905512F90000A704F4F29C0E

+CMGS: 124

OK

Set text mode
AT+CMGF=1

AT+CSMP=17,167,0,0

AT+CMGS="01090255219",129

>TEST MESSAGE

+CMGS:125

OK

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
Required	No	No

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

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>

where:

<mr> - message reference number.

If message sending fails for some reason, an error code is reported:

+CMS ERROR:<err>

To store a message in the <memw> storage see command +CMGW.

Care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.

AT+CMSS=?

Test command returns the OK result code.

To avoid malfunctions it is suggested to wait for the +CMSS: <mr> or +CMS ERROR: <err> response before issuing further commands.

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
Required	Auto	No

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
	Values:		

129	:	number in national format
145	:	number in international format (contains the character "+")

<stat> string N/A message status

Values:

"REC UNREAD"	:	new received message unread
"REC READ"	:	received message read
"STO UNSENT"	:	message stored not yet sent (default)
"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 10 SMs; the maximum number of chars depends on <dcs>:

  2448 chars

  2144 chars if 8-bit is used

  1072 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.

```
AT+CMGF=0           set PDU mode
OK

AT+CMGW=18

> 088128010099010259115507811020905512F90000A704F4F29C0E

+CMGW: 29

OK

AT+CMGF=1           set text mode
OK

AT+CSMP=17,167,0,0
OK

AT+CSCA="821029190903",145
OK

AT+CMGW="0165872928"

> test message...

+CMGW: 28
```

AT+CMGD - Delete Message

This command allows to delete from memory messages.

3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted
Required	No	No

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 form 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.

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.

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
```

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
Required	Auto	No

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.

AT+CMGC - Send SMS Command

The command is related to sending SMS command.

3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CMGC

Execution command sends command message from a TE to the network (SMS-COMMAND). It can have two syntax formats according to the SMS format: PDU or Text mode (see +CMGF command). If SMS command is successfully sent to the network, the result is shown with the following URC:

in PDU mode:

+CMGC: <mr>[,<ackpdu>]

in text mode:

+CMGC: <mr>[,<scts>]

Additional info:

In PDU mode, the +CMGC command has the following syntax:

AT+CMGC=<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	-	length of the actual TP data unit in octets. (Excluding the SMSC address octets).

▶▶ Message header and contents in PDU mode format. See description in Table:

Reference	Description	Length
<SCA>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<FO>	First Octet.	1 BYTE

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 1 0 SMS-COMMAND (in the direction MS to SC)
5	TP-Status-Report-Request	Parameter indicating if a status report is requested by the MS. 0 A status report is not requested 1 A status report is requested

6	TP-User-Data-Header-Indicator	Parameter indicating whether the beginning of the User Data field contains a Header in addition to the short message or contains only the short message. 0 The TP-UD field contains only the short message 1 The beginning of the TP-UD field contains a Header in addition to the short message

<TP-MR>	Message Reference. An integer representation of a reference number of the SM submitted to the SC by the MS. Values between 0-255.	1 BYTE
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-CT>	Command Type	1 BYTE

<TP-MN>	Message Number	1 BYTE
<TP-DA>	Destination address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-CDL>	Command data length	1 BYTE
<TP-CD>	Command data	0-156 BYTES

▶▶ In Text mode, the +CMGC command has the following syntax:

AT+CMGC=<fo>,<ct>[, <pid>[,<mn>[, <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)

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
<fo>	integer	-	First octet of 3GPP TS 23.040 SMS-COMMAND in integer format.

<ct>	integer	-	TP-Command-Type in integer format specified in 3GPP TS 23.040. Default value is 0.
<pid>	integer	0	TP-Protocol-Identifier in integer format.

Value:

0÷255 : TP-Protocol-Identifier in integer format

<mn>	integer	-	TP-Message-Number in integer format.
<da>	string	-	TP-Destination-Address-Value field in string format represented in the currently selected character set (see +CSCS).
<toda>	integer	129	TP-Destination-Address Type-of-Address octet:

Values:

129 : number in national format

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

Unsolicited fields:

Name	Type	Description
<mr>	integer	TP-Message-Reference in integer format
<ackpdu>	string	RP-User-Data element of RP-ACK PDU (When +CSMS <service> value is 1 and network supports).
<scts>	string	TP-Service Centre Time Stamp in Time String Format. (When +CSMS <service> value is 1 and network supports).

- 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: 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.
- To ensure that during the command execution, which may take several seconds, no other SIM interacting commands issued, care must take.
- If message sending fails for some reason, then an error code is reported.

AT+CMGC=?

Test command returns the OK result code.

To avoid malfunctions it is suggested to wait for the +CMGC: <mr> or +CMS ERROR: <err> response before issuing further commands.

Set PDU mode

```
AT+CMGF=0
OK

AT+CMGC=15
> 07917952140230f202440002340C917952446585600100
+CMGC: 124

OK
```

Set text mode

```
AT+CMGF=1
OK

AT+CSMP=17,167,0,0
OK

AT+CMGS="01090255219",129
> Text Message is entered <CTRL-Z>
+CMGS:125

OK

AT+CMGC=2,1,0,125
> Text Message is entered <CTRL-Z>
OK
```

AT#E2SMSRI - SMS Ring Indicator

This set command enables/disables the Ring Indicator pin response to an incoming SMS message. If enabled, a negative going pulse is generated when receiving an incoming SMS message.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#E2SMSRI=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	RI enabling

Values:

0	:	disables RI pin response for incoming SMS messages
50÷1150	:	enables RI pin response for incoming SMS. The value of <n> is the duration in ms of the pulse generated on receipt of an incoming SMS.

If the second parameter +CNMI is equal to zero, no ring pulse will be generated, regardless of #E2SMSRI value

AT#E2SMSRI?

Read command reports the duration in ms of the pulse generated on receipt of an SMS, in the format:

#E2SMSRI: <n>

<n>=0 means that the RI pin response to an incoming SMS is disabled

AT#E2SMSRI=?

Reports the range of supported values for parameter <n>

Time & Alarm

AT+CCLK - Clock Management

The command is related to real time clock management.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

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

Warning: any real-time clock settings will be lost if the set command is sent between a power on and a reboot/shutdown command and if the reboot occurs within 60 seconds from the power on.

AT+CCLK?

Read command returns the current setting <time> of the real-time clock, in the format:

+CCLK: <time>

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

AT+CTZR - Time Zone Reporting

This command enables and disables the time zone change event reporting.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CTZR=<onoff>

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:

+CTZV: <tz>

Parameter:

Name	Type	Default	Description
<onoff>	string	0	enable/disable the time zone change event reporting.

Values:

0 : Disable time zone change event reporting

1 : Enable time zone change event reporting

Unsolicited field:

Name	Type	Description

<tz>	string	New time zone.

AT+CTZR?

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

+CTZR: <onoff>

AT+CTZR=?

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

AT+CTZU - Automatic Time Zone Update

Set command enables/disables the automatic time zone update.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CTZU=<onoff>

Parameter:

Name	Type	Default	Description
<onoff>	integer	1	enables/disables the automatic time zone update

Values:

0	:	disable
1	:	enable

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>.

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
Not required	No	No

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

The <time> format of +CCLK and +CALA is:

"yy/MM/dd,hh:mm:ss+zz" when <auxmode>=1

"yyyy/MM/dd,hh:mm:ss+zz" when <auxmode>=2

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

AT#NITZ - Network Identity and Time Zone

This command handles Network Identity and Time Zone.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#NITZ=[<val>[,<mode>]]

Set command enables/disables the automatic date/time updating and the Full Network Name applying.

Parameters:

Name	Type	Default	Description
<val>	integer	7	enables NITZ
	Values:		
	0 : disable NITZ		
	1÷15 : enable NITZ		
<mode>	integer	0	enables/disables the #NITZ URC
	Values:		
	0 : disable the URC		
	1 : enable the URC		

- <val> parameter allows to enable/disable NITZ; other functionalities are not implemented.

  All <val> from 1 to 15 are equivalent.

- <mode> parameter is ignored, it does not enable/disable URC. It can be omitted.

AT#NITZ?

Read command returns:

#NITZ: <val>,<mode>

AT#NITZ=?

Test command returns supported values of parameters <val> and <mode>.

#NITZ: (0-15),(0,1)

HW and Radio Control

AT#GPIO - General Purpose Input/Output Pin Control

Configure the general-purpose input/output GPIO pins.

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

AT#GPIO=[<pin>,<mode>[,<dir>[,<save>]]]

Execution command allows to configure the general purpose GPIO pin.

Parameters:

Name	Type	Default	Description
<pin>	integer	N/A	GPIO pin number. The supported range goes from 1 to Max value that is hardware dependent. Use AT#GPIO=? test command to know Max value. Value: 1÷Max : GPIO pin identifier
<mode>	integer	0	sets GPIO pin configuration, its action depends on <dir> value. Refer to Additional info sections. Value: 0÷4 : mode identifier
<dir>	integer	0	sets the GPIO pin in input, output, or alternate functions. Refer to Additional info sections.

Values:

0	:	pin set as input
1	:	pin set as output
2÷17	:	pin set in alternate functions.

<save> integer 0 GPIO pin save configuration. If <save> is omitted, the configuration is stored in NVM only if user set ALTx function.

Values:

0	:	GPIO pin configuration is not saved
1	:	GPIO pin configuration is saved

Additional info:

▶▶ This table shows the GPIOs configurations set by <dir>=0 and <mode> values ranging from 0 to 4.

AT#GPIO=<pin>,<mode>,0

<mode>	Description
0	Set INPUT, any internal pull up/pull down removed.
1	Set INPUT, any internal pull up/pull down removed (same behavior as <mode>=0).
2	Read mode, <dir> can be omitted, see Additional info section below

3	Set INPUT, and internal pull up.
4	Set INPUT, and internal pull down.

- This table shows the GPIOs configurations set by <dir>=1 and <mode> values ranging from 0 to 4.

  AT#GPIO=<pin>,<mode>,1

<mode>	Description
0	Set OUTPUT, and GPIO logical value to zero (Low).
1	Set OUTPUT, and GPIO logical value to one (High).
2	Read mode, <dir> can be omitted, see Additional info section below
3	<mode> has no meaning.
4	<mode> has no meaning.

- <mode>=2 selects the read mode. In read mode, <dir> can be omitted.

  AT#GPIO=<pin>,2

Name	Type	Default	Description
<stat>	integer	-	the parameter can be: logic value read from pin GPIO<pin> in the case the pin <dir> is set to input. logic value present in output of the pin 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 or tristate pull down.

<dir> values from 9 to 17 select an alternate function ranging respectively from ALT1 to ALT16. <mode> must be set to 0 or 1 when an alternate function is selected. The table shows the relationship between ALTx, <dir> and the name of the associated function.

AT#GPIO=<pin>,0,<dir>

ALTx	Functions names (between quotes) associated to ALTx
ALT8 (<dir>=9)	#GPIO maps "DTR" on GPIO_01 or GPIO_05
ALT9 (<dir>=10)	#GPIO maps "RING" on GPIO_02 or GPIO_06
ALT15 (<dir>=16)	#GPIO maps "DCD" on one of the available GPIOs
ALT16 (<dir>=17)	#GPIO maps "DSR" on one of the available GPIOs

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, for any GPIO pin, a row showing the current parameters values. Row one shows GPIO pin one, row two shows GPIO pin two, and so on.

#GPIO: <dir>,<stat><CR><LF>
#GPIO: <dir>,<stat><CR><LF>
...

If GPIO was previously set to <mode>= 3 or 4, the format of the returned message is:

#GPIO:<dir>,<stat>,<mode><CR><LF>
#GPIO:<dir>,<stat>,<mode><CR><LF>
...

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: (1-6),(0-4),(0-16),(0,1)
OK

Set GPIO_3 in output, and set logical value HIGH
AT#GPIO=3,1,1
OK

Set GPIO_4 as output, value HIGH a save setting
AT#GPIO=4,1,1,1
#GPIO: 1,0
OK

Report GPIO_3 state
AT#GPIO=3,2
#GPIO: 1,1
OK

Read command
AT#GPIO?
#GPIO: 1,1 GPIO_1 is output, value is HIGH
#GPIO: 0,0
#GPIO: 1,1
#GPIO: 0,0
#GPIO: 0,1 GPIO_5 is input, value is HIGH
#GPIO: 1,0
OK

AT#SLED - STAT_LED GPIO Setting

The command configures the behavior of the STAT_LED status.

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

AT#SLED=<mode>[,<onDuration>[,<offDuration>]]

STAT_LED is on a dedicated pin for ME310M1 family.

Parameters:

Name	Type	Default	Description
<mode>	integer	5	defines the STAT_LED pin behavior. "pin" indicates the dedicated pin according to the family of modules used.

Family	<mode> default value
ME310M1	5

Values:

0 : pin tied low

1 : pin tied high

2 : pin is handled with specific timings. See Additional info section

3 : pin is turned ON/OFF alternatively, with period defined by the sum <onDuration> + <offDuration>

4 : pin is handled with specific timings. See Additional info section

5 : status led disabled

<onDuration>	integer	10	duration of period in which STAT_LED pin is tied high while <mode>=3

Value:

1÷40 : in tenth of seconds

<offDuration>	integer	10	duration of period in which STAT_LED pin is tied low while <mode>=3

Value:

1÷40 : in tenth of seconds

Additional info:

- <mode>=2, the timings of STAT_LED pin are:

  not registered: always ON

  registered in idle: blinking 1 s ON and 2 s OFF

  registered in idle with power saving: blinking time depends on network condition to minimize power consumption

- <mode>=4, the timings of STAT_LED pin are:

  not registered: blinking 0,5 s ON and 0,5 s OFF

  registered in idle: blinking 300 ms ON and 2,7 s OFF

registered in idle with power saving: blinking time depends on network condition to minimize power consumption

AT#SLED?

Read command returns the STAT_LED pin current setting, in the format:

#SLED: <mode>,<onDuration>,<offDuration>

AT#SLED=?

Test command returns the range of available values for parameters <mode>, <onDuration> and <offDuration>.

The setting is saved using the #SLEDSAV command.

AT#SLEDSAV - Save STAT_LED GPIO Setting

This command allows to save the current STAT_LED GPIO setting.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SLEDSAV

Execution command saves the STAT_LED GPIO setting in NVM.

AT#SLEDSAV=?

Test command returns OK result code.

AT#ADC - Read Analog/Digital Converter Input

This command returns the current voltage value of the specified ADC inputs, expressed in mV.

[1] Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#ADC=[<adc>,<mode>[,<dir>]]

Execution command reads selected <adc> pin voltage, converts it by baseband internal ADC and prints outs the result as shown in Additional info section.

Parameters:

Name	Type	Default	Description
<adc>	integer	1	index of input pin Value: 1÷n : input pin index. For the number of available ADCs see document [1]
<mode>	integer	2	required action Value: 2 : query ADC value
<dir>	integer	0	direction. Its interpretation is currently not implemented.

Value:

0	:	no effect

Additional info:

Format of the message printed out by the execution command:

#ADC:<value>

Name	Type	Default	Description
<adc>	integer	-	pin voltage expressed in mV.

The command returns the last valid measure.

AT#ADC?

Read command reports all pins input voltage in the format:

#ADC:<value>[<CR><LF>#ADC:<value>[...]]

AT#ADC=?

Test command reports the supported range of values of the command parameters <adc>, <mode> and <dir>.

AT#I2CWR - Write to I2C

This command is used to send data to an I2C peripheral connected to module.

[1] Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#I2CWR=<sdaPin>,<sclPin>,<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.
<sclPin>	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, but in this #I2CWR implementation, it doesn't matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x. 10 bit address is also supported.

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 <sdaPin>, <sclPin>, <deviceId>, <registerId>, <len>.

Set GPIO_2 as SDA, and GPIO_3 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=2,3,20,10,14
> 00112233445566778899AABBCCDD<ctrl-z>
OK

AT#I2CRD - Read from I2C

This command is used to read data from an I2C peripheral connected to module.

[1] Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#I2CRD=<sdaPin>,<sclPin>,<deviceId>,<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.
<sclPin>	integer	-	GPIO number for SCL. To know the range use #I2CRD test command.
<deviceId>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/ write command, but in this #I2CRD implementation, it does not matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x. 10 bit address is also supported

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 - Data Read from I2C will be dumped in hexadecimal format - 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>, <sclPin>, <deviceId>, <registerId>, <len>.

Read 12 bytes from I2C device with address 0x20, starting from register address 0x10. SDA is mapped on GPIO_02, SCL is mapped on GPIO_03.

```
AT#I2CRD=2,3,20,10,12
#I2CRD: 001122334455667788 99AABBCC
OK
```

AT#TESTMODE - Test Mode Configuration

Set module in Test Mode for configuring and testing the POWER level (not signaling mode).

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#TESTMODE=<cmd>

The Test Mode is entered using the following commands according to the network technology:

AT#TESTMODE="TM" followed by AT#TESTMODE="INIT4G" for 4G networks

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, enter the following commands according to the network technology:

AT#TESTMODE="DEINIT4G" followed by AT#TESTMODE="OM" for 4G

Parameter:

Name	Type	Default	Description
<cmd>	string	N/A	Identifies one of the commands listed in the Values: section. The command is a quoted string. PL4G command must be followed by the value of the <pwr> power transmission in tenths of dBm: AT#TESTMODE="PL4G -100" CH4G command must be followed by the <earfcn> channel and <bw> bandwidth: AT#TESTMODE="CHG4 20000 0"

Values:

"TM"	:	forces the module in Test Mode
"OM"	:	forces the module in Operative Mode and reboots module
"INIT4G"	:	4G command: initialize Radio for 4G transmission; reboots the module
"CH4G earfcn bw"	:	4G command: set the earfcn UL or DL channel for transmitting and receiving and set the bandwidth
"PL4G pwr"	:	4G command: change the transmission power. Range is: -400 ÷ 230 in tenths of dBm
“TX4G"	:	4G command: starts the non-stop module transmission
"RL4G"	:	4G command: reads Rx power level in dBm
"DEINIT4G"	:	4G command: de-initialize Radio for 4G transmission and reception
“ESC"	:	stop the transmission or reception.

Additional info:

▶▶

<earfcn> UL	Band

18000 - 18599	1
18600 - 19199	2
19200 - 19949	3
19950 - 20399	4
20400 - 20649	5
21450 - 21799	8
23010 - 23179	12
23180 - 23279	13
23280 - 23379	14
23850 - 23999	18
24000 - 24149	19
24150 - 24449	20
26040 - 26689	25

26690 - 27039	26
27040 - 27209	27
27210 - 27659	28
131972 - 132671	66
133122 - 133471	71
134002 - 134181	85

<earfcn> DL	Band
0 - 599	1
600 - 1199	2
1200 - 1949	3
1950 - 2399	4
2400 - 2649	5
3450 - 3799	8

5010 - 5179	12
5180 - 5279	13
5280 - 5379	14
5850 - 5999	18
6000 - 6149	19
6150 - 6449	20
8040 - 8689	25
8690 - 9039	26
9040 - 9209	27
9210 - 9659	28
66436 - 67335	66
68586 - 68935	71
70366 - 70545	85

<bw>	Bandwidth (kHz)
0	180

Bands support varies depending on the product

When testing 4G transmission and reception, the minimum and maximum channels that can be used for a specific band have to be included in the following range:

(the lowest channel + 2) - (the highest channel - 1)

E.g. if we consider B4 UL, the usable channels start from 19952 up to 20398.

If we consider B4 DL, the usable channels start from 1952 up to 2398

For RL4G power level test, use a CW (continuous wave) signal with a frequency offset of 500 kHz.

AT#TESTMODE is intended for RF functional verification or connection testing.

The reported output power level (dBm) is not calibrated and therefore should not be used as a reference for accurate power measurement.

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

Set Test Mode

AT#TESTMODE="TM"

OK

Initialize Test Mode for 4G operations

AT#TESTMODE="INIT4G"

OK

Module reboot

Set B2 with 180 kHz bandwidth, download

AT#TESTMODE="CH4G 900 0"

OK

Read power level

AT#TESTMODE="RL4G"

TESTMODE: -96

OK

Stop reception

AT#TESTMODE="ESC"

OK

Set B4 with 180 kHz bandwidth, upload

AT#TESTMODE="CH4G 20000 0"

OK

Set power level

AT#TESTMODE="PL4G 200"

OK

Start transmission

AT#TESTMODE="TX4G"

OK

Stop transmission

AT#TESTMODE="ESC"

OK

De-initialize Test Mode for 4G operations

AT#TESTMODE="DEINIT4G"

OK

Exit from Test Mode

AT#TESTMODE="OM"

OK

Module reboot

Power Down

AT#REBOOT - Module Reboot

Immediate module reboot.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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.

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.

AT#REBOOT=?

Test command returns OK result code.

- Reboot the module
  AT#REBOOT
  OK
  (the module reboots)

AT#SHDN - Software Shutdown

This command turns the module OFF.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SHDN

Execution command causes device to detach from the network and shut down. Before definitive shut down an OK response is returned.

When issuing the command any previous activity terminated and the device will not respond to any further command.

To turn it on again hardware pin ON/OFF must be tied low.

AT#SHDN=?

Test command returns OK result code.

AT#FASTSHDN - Fast Shutdown Configuration

This command can be used as a set command to configure a GPIO pin performing a fast shutdown when on it is forced a High to Low level transition. Or can be used as an execute command to force immediately a fast shutdown.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#FASTSHDN[=<enable>,[<GPIO>]]

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	-	selects the GPIO to execute the fast shutdown. When the selected <GPIO> pin goes from High to Low level and the <enable> is set to 1, the module execute immediately the fast shutdown.

Additional info:

▶▶ The execution command #FASTSHDN<CR><LF> forces the module to execute immediately the fast shutdown.

- The GPIO pin selected by the #FASTSHDN command must be used for this purpose only. If you need to use the selected GPIO pin for different activities, it must be free with the following command:

  #FASTSHDN=0,<GPIO>

- To turn it on again hardware pin ON/OFF must be tied low.

AT#FASTSHDN?

Read command reports the currently selected configuration in the format:

AT#FASTSHDN: <enable>,<GPIO>

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

Easy Scan

AT#CSURV - Network Survey

The command performs a survey on the selected band channels.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CSURV[=[<s>,<e>]]

Execution command performs a quick survey on channels belonging to the band selected by last #BND command issue, starting from channel <s> to channel <e>. Network registration is required.
Issuing AT#CSURV<CR>, a full band scan is performed. The command responds with the following string:

Network survey started...

After a while, a list of network survey information text lines, one for each received carrier, is reported.

The #CSURV output ends in two ways, depending on the last #CSURVF setting.
If AT#CSURVF=0 or AT#CSURVF=1 the output will end with the string:

Network survey ended

If AT#CSURVF=2 the output will end with the string:

Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

The network survey information text lines are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel, see note section.
<e>	integer	-	ending channel, see note section.

Additional info:

- Network survey information text lines for CAT-M1:
  earfcn: <earfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> cellid: <cellId> tac: <tac> cellIdentity: <cellIdentity>

  Network survey information text lines for NBIoT:
  earfcn: <earfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> cellid: <cellId> tac: <tac> cellIdentity: <cellIdentity>

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-digits number; it is the mobile network code
<cellId>	integer	-	Physical cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a hexadecimal number

<tac>	integer	-	Tracking Area Code; If #CSURVF last setting is 0, <tac> is a decimal number, else it is a 4-digits hexadecimal number
<cellIdentity>	integer	-	Cell identifier; if #CSURVF last setting is 0, <cellIdentity> is a decimal number, else it is a hexadecimal number

▶▶ #CSURV end output parameters if AT#CSURVF=2:

Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

Name	Type	Default	Description
<NoARCFN>	integer	-	number of scanned frequencies
<NoBCCH>	integer	-	number of found BCCH

<s> and <e> parameters can assume the values shown in the Channels Ranges column, according to the module in use.

Channels Ranges	LTE Bands
0,599	1
600,1199	2
1200,1949	3
1950,2399	4
2400,2649	5
3450,3799	8
5010,5179	12
5180,5279	13
5850,5999	18
6000,6149	19
6150,6449	20
8690,9039	26
9210,9659	28

AT#CSURV

Network survey started ...

earfcn: 5110 rxLev: -73 mcc: 136 mnc: 19A cellId: 10D tac: 2700 cellIdentity: BBA7211

earfcn: 5110 rxLev: -73 mcc: 139 mnc: 064 cellId: 10D tac: 2700 cellIdentity: BBA7211

earfcn: 5110 rxLev: -70 cellId: 009B

Network survey ended (Carrier: 2 BCCh: 2)

OK

AT#CSURVC - Network Survey (Numeric Format)

This command performs a survey on the selected band channels. The return message uses only the numeric format.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CSURVC[=[<s>,<e>]]

Execution command performs a quick survey on channels belonging to the band selected by last #BND command issue, starting from channel <s> to channel <e>. The information provided by this command is the same as that provided by #CSURV command. The difference is that the output of #CSURV is in numeric format only, the parameters names are not reported.

Issuing AT#CSURC<CR>, a full band scan is performed. The command responds with the following string:

Network survey started...

After a while, a list of network survey information text lines in numeric format, one for each received carrier, is reported.

The #CSURVC output ends in two ways, depending on the last #CSURVF setting.

If AT#CSURVF=0 or AT#CSURVF=1 the output will end with the string:

Network survey ended

If AT#CSURVF=2 the output will end with the string:

Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

The network survey information text lines are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel, see #CSURV command.
<e>	integer	-	ending channel, see #CSURV command.

Additional info:

Network survey information text lines:

<earfcn>,<rxLev>,<mcc>,<mnc>,<cellId>,<tac>,<cellIdentity><rsrp>,<rsrq>

Name	Type	Default	Description
<earfcn>	integer	-	E-UTRA Assigned Radio Channel.
<tac>	integer	-	Tracking Area Code. If #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 4-digits hexadecimal number.
<cellId>	integer	-	Physical cell identifier, if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a hexadecimal number
<cellIdentity>	integer	-	Cell identifier, if #CSURVF last setting is 0, <cellIdentity> is a decimal number, else it is a hexadecimal number. If value cannot be retrieved then value is reported as 0.
<rsrp>	integer	-	Reference Signal Received Power. If value cannot be retrieved then value is reported as 0.
<rsrq>	integer	-	Reference Signal Received Quality. If value cannot be retrieved then value is reported as 0.

#CSURVC end output parameters if AT#CSURVF=2:

Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

Name	Type	Default	Description
<NoARCFN>	integer	-	number of scanned frequencies
<NoBCCH>	integer	-	number of found BCCH

AT#CSURVC

Network survey started ...

2500,-99,64,4,-122,-13

1350,-85,64,0,-110,-15

...

Network survey ended

OK

AT#CSURVF - Network Survey Format

The command configures the numbers format used in the messages related to the surveying of the network bands channels.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CSURVF=[<format>]

Set command configures the numbers format in each information text line of the network survey message (Easy Scan (R)).

Parameter:

Name	Type	Default	Description
<format>	integer	0	format of some numbers (see #CSURV and #CSURVC) in each network survey information text line

Values:

0 : Decimal

1 : Hexadecimal

2 : Hexadecimal and extended network survey end message format

AT#CSURVF?

Read command reports the current format of the numbers in each network survey information text line, as follows:

#CSURVF: <format>

AT#CSURVF=?

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

AT#CSURVNLF - Network Survey CR LF Removing

This command enables/disables the automatic <CR><LF> removing from each network survey information text line.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CSURVNLF=[<value>]

Parameter:

Name	Type	Default	Description
<value>	integer	0	enables/disables the automatic <CR><LF> removing from each network survey information text line

Values:

0 : disables <CR><LF> removing; they will be present in the information text line

1 : enables <CR><LF> removing from information text line

AT#CSURVNLF?

Read command reports whether the automatic <CR><LF> removing from each network survey information text line is currently enabled or not, in the format:

#CSURVNLF: <value>

AT#CSURVNLF=?

Test command reports the range of values for parameter <value>, in the format:

#CSURVNLF: (<value range>)

AT#CSURVEXT - Extended Network Survey

The command is present only for backward compatibility.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#CSURVEXT=[<value>]

Parameter:

Name	Type	Default	Description
<value>	integer	0	dummy parameter

Values:

0	:	dummy value
1	:	dummy value
2	:	dummy value

AT#CSURVEXT?

Read command reports current dummy value.

#CSURVEXT: <value>

AT#CSURVEXT=?

Test command reports the range of values for dummy parameter <value>.

Packet Domain

AT+CGDCONT - Define PDP Context

Define PDP Context.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<emergencyIndication>]]]]]]]]

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	-	(PDP Context Identifier) numeric parameter which specifies a particular PDP context definition. 1..max - where the value of max is returned by the Test command.
<PDP_type>	string	N/A	(Packet Data Protocol type) a string parameter which specifies the type of packet data protocol. Values:

	"IP" : Internet Protocol "IPV6" : Internet Protocol version 6 "IPV4V6" : Virtual introduced to handle dual IP stack UE capability. Non-IP : Transfer of Non-IP data to external packet data network		
<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.
<d_comp>	integer	0	Numeric parameter that controls PDP data compression. Compression is not supported, parameter can be set for backward compatibility reasons but it is ignored. Values:

0 : PDP data compression off (default if value is omitted)

1 : PDP data compression on

2 : V.42bis (applicable only for products supporting GSM)

<h_comp>	integer	0	Numeric parameter that controls PDP header compression. Compression is not supported, parameter can be set for backward compatibility reasons but it is ignored.

Values:

0 : PDP header compression off (default if value is omitted)

1 : PDP header compression on

2 : RFC1144 (applicable only for products supporting GSM; applicable for SNDCP only)

3 : RFC2507 (applicable only for products supporting GSM)

4 : RFC3095 (applicable only for products supporting GSM; applicable for PDCP only)

<IPv4AddrAlloc>	integer	0	a numeric parameter that controls how the MT/TA

			requests to get the IPv4 address information. Value: 0 : IPv4 Address Allocation through NAS Signaling (default)
<emergencyIndication>	integer	0	a numeric parameter used to indicate whether the PDP context is for emergency bearer services or not. Value: 0 : PDP context is not for emergency bearer services (default)

To erase all params for a <cid> give as follows:

AT+CGDCONT=<cid>,<pdp_type>,""

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>,0,0<CR><LF>

+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>,0,0[...]

AT+CGDCONT=?

Test command returns values supported as a compound value.

```
AT+CGDCONT=1,"IP","APN","10.10.10.10",0,0
OK

AT+CGDCONT?
+CGDCONT: 1,"IP","APN","10.10.10.10",0,0,0,0
OK

AT+CGDCONT=?
+CGDCONT: (1-6),"IP",,,(0-2),(0-4),0,0
+CGDCONT: (1-6),"IPV6",,,(0-2),(0-4),0,0
+CGDCONT: (1-6),"IPV4V6",,,(0-2),(0-4),0,0
OK
```

AT+CGSCONTRDP - Secondary PDP Context Read Dynamic Parameters

This command returns parameters for a given <cid>.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

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
<cid>	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

<p_cid>	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.
<bearer_id>	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.

AT+CNMPSD - No more PS data

This command indicates that no application is expected to exchange data.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+CNMPSD

Execution command indicates that no application is expected to exchange data.

AT+CNMPSD=?

Test command returns OK result code.

AT+CGAPNRC - APN rate control

This command returns the APN rate control parameters.

3GPP TS 27.007

3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+CGAPNRC[=<cid>]

This execution command returns the APN rate control parameters (see 3GPP TS 24.008) associated to the provided context identifier <cid>.

If the parameter <cid> is omitted, the APN rate control parameters for all active PDP contexts are returned.

Parameter:

Name	Type	Default	Description
<cid>	integer	N/A	(PDP Context Identifier) numeric parameter which specifies a particular PDP context definition

Value:

1÷max : the value of max is returned by the Test command

Additional info:

Possible Responses

[+CGAPNRC:
<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]]

[<CR><LF>+CGAPNRC:
<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]]
[...]]]

Name	Type	Default	Description
<Additional_exception_reports>	integer	N/A	indicates whether or not additional exception reports are allowed to be sent when the maximum uplink rate is reached. This refers to bit 4 of octet 1 of the APN rate control parameters IE as specified in 3GPP TS 24.008. Values: 0 : Additional_exception_reports at maximum rate reached are not allowed to be sent 1 : Additional_exception_reports at maximum rate reached are allowed to be sent
<Uplink_time_unit>	integer	N/A	specifies the time unit to be used for the maximum uplink rate.

			This refers to bits 1 to 3 of octet 1 of the APN rate control parameters IE as specified in 3GPP TS 24.008.
			Values: 0 : unrestricted 1 : minute 2 : hour 3 : day 4 : week
<Maximum_uplink_rate>	integer	-	specifies the maximum number of messages the UE is restricted to send per uplink time unit. This refers to octet 2 to 4 of the APN rate control parameters IE as specified in 3GPP TS 24.008.

AT+CGAPNRC=?

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

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
Required	No	No

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: for a static address, it will be the one set by the +CGDCONT command when the context was defined for a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>; <PDP_addr> is omitted if none is available

AT+CGPADDR=?

Test command returns a list of defined <cid>.

Only PDP contexts 1 and 2 can be defined

AT+CGPADDR=?

+CGPADDR: (1)

OK

AT+CGAUTH - Define PDP Context Authentication Parameters

This command allows the TE to specify authentication parameters for a PDP context.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT+CGAUTH=<cid>,<auth_type>,<username>,<password>

Set command allows the TE to specify authentication parameters for a PDP context identified by the (local) context identification parameter <cid>, used during the PDP context activation and the PDP context modification procedures.

Parameters:

Name	Type	Default	Description
<cid>	integer	-	specifies a particular PDP context definition, see the +CGDCONT command.
<auth_type>	string	NONE	selects the authentication protocol used for this PDP context.

Values:

NONE	:	no authentication
PAP	:	PAP authentication

CHAP : CHAP authentication

<username>	string	-	User name for access to the IP network
<password>	string	-	Password for access to the IP network

AT+CGAUTH?

Read command returns the PDP authentication parameters, excluding <password>, for every defined PDP context.

AT+CGAUTH=?

Test command reports the supported range of values for parameters <cid>, <auth_type> and the strings <username> and <password>.

AT+CIPCA - Initial PDP context activation

Attach with or without a PDN connection

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+CIPCA=[<n>[,<AttachWithoutPDN>]]

The set command controls whether an initial PDP context shall be established automatically following an attach procedure when the UE is attached to GERAN or UTRAN RATs and whether the UE is attached to E-UTRAN with or without a PDN connection.

Parameters:

Name	Type	Default	Description
<n>	integer	3	Activation of PDP context upon attach
	Value:		
	3 : No change in current setting		
<AttachWithoutPDN>	integer	0	EPS Attach with or without PDN connection
	Values:		
	0 : EPS Attach with PDN connection		

1 : EPS Attach without PDN connection

AT+CIPCA?

Read command returns the current setting in the format:

+CIPCA: <n>[,<AttachWithoutPDN>]

AT+CIPCA=?

Test command returns supported values of all parameters in the format:

+CIPCA: (list of supported <n>s),(list of supported <AttachWithoutPDN>s)

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
Not required	Auto	No

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.

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
<bearerId>	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.

- 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.
- 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+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
Required	Auto	No

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)

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
Not required	Auto	No

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>.

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>] [...]]

See +CGEQOS command to have information on the meaning of the returned parameters.

Parameter:

Name	Type	Default	Description
<cid>	integer	-	It specifies a particular Traffic Flows definition in EPS and a PDN connection definition in UMTS/GPRS.

If the parameter <cid> is omitted, the Quality of Service parameters for all established PDN connections are returned.

AT+CGEQOSRDP=?

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

Parameters of both network and MT/TA initiated PDN connections will be returned.

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
Not required	No	No

AT+CGPIAF=[<IPv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_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.

<IPv6_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#SGACT=1,1
#SGACT: 252.1.171.171.205.205.239.224.0.0.0.0.0.0.0.1
OK
AT+CGPIAF=1,0,0,0
OK
AT#SGACT=1,1
#SGACT: FC01:ABAB:CDCD:EFE0:0:0:0:1
OK
```

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
Required	No	No

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)

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.

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
Required	No	No

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
```

AT+CSODCP - Sending of Originating Data Via the Control Plane

The set command is used by the TE to transmit data over control plane to network via MT. Context identifier <cid> is used to link the data to particular context.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CSODCP=<cid>,<cpdataLength>,<cpdata>,<RAI>[,<typeOfUserData>]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	specifies a particular PDP context or EPS bearer context definition. The <cid> parameter is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been setup via AT command (see +CGDCONT command)
<cpdataLength>	integer	-	indicates the number of octets of the <cpdata> information element. When there is no data to transmit, the value shall be set to zero.

<cpdata>	string	-	is a string of octets. Contains the user data container contents. When there is no data to transmit, the <cpdata> shall be an empty string (""). This parameter shall not be subject to conventional character conversion as per +CSCS. The coding format of the user data container and the maximum length of <cpdata> are implementation specific.
<RAI>	integer	0	indicates the value of the release assistance indication

Values:

0	:	no information available
1	:	the MT expects that exchange of data will be completed with the transmission of the ESM DATA TRANSPORT message
2	:	the MT expects that exchange of data will be completed with the receipt of an ESM DATA TRANSPORT Message

<typeOfUserData>	integer	0	indicates whether the user data that is transmitted is regular or exceptional

Values:

0	:	regular data

1 : exception data

AT+CSODCP=?

Test command reports the supported range of values for parameters: <cid>,<cpdataLength>, <RAI> and <typeOfUserData>.

AT+CRTDCP - Reporting of Terminating Data Via the Control Plane

The set command is used to enable and disable reporting of data from the network to the MT that is transmitted via the control plane in downlink direction.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CRTDCP=[<reporting>]

If reporting is enabled, the MT returns the following unsolicited result code when data is received from the network.

+CRTDCP: <cid>,<cpdataLength>,<cpdata>

Parameter:

Name	Type	Default	Description
<reporting>	integer	0	controlling reporting of mobile terminated control plane data events

Values:

0 : disable reporting of MT control plane data

1 : enable reporting of MT control plane data by the unsolicited result code +CRTDCP

Unsolicited fields:

Name	Type	Description
<cid>	integer	specifies a particular PDP context or EPS bearer context definition. The <cid> parameter is local to the TE-MT interface and identifies the PDP or EPS bearer

		contexts which have been setup via AT command (see +CGDCONT command)
<cpdataLength>	integer	indicates the number of octets of the <cpdata> information element
<cpdata>	string	is a string of octets. Contains the user data container contents. This parameter shall not be subject to conventional character conversion as per +CSCS. The coding format of the user data container and the maximum length of <cpdata> are implementation specific

AT+CRTDCP?

Read command returns the current parameter setting for +CRTDCP command in the format:

+CRTDCP: <reporting>

AT+CRTDCP=?

Test command reports the supported range of values for parameter <reporting>, and range of supported <cid> and <cpdataLength>.

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
Required	Auto	No

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

AT+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 Responses are OK or 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].

  Limitation: filtering of <source address and subnet mask> is not supported.

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)>
[<CR><LF>+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (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 used.

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].

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
Required	No	No

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 index>	integer	N/A	evaluation precedence index Value: 0÷255 : supported range
<source address and	string	-	source address and subnet mask

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÷FFFFFFFF : 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)

AT+CGACT - PDP Context Activate or Deactivate

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

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT+CGACT=[<state>[,<cid>[,<cid>][,...]]]

Parameters:

Name	Type	Default	Description
<state>	integer	N/A	activate/deactivate the PDP context

Values:

0	:	deactivate
1	:	activate

Name	Type	Default	Description
<cid>	integer	-	specifies a PDP context definition (see +CGDCONT command)

if no <cid>s are specified, the activation form of the command activates the first three defined contexts. The deactivation form deactivates all the active contexts.

AT+CGACT?

Read command returns the current activation state for all the defined PDP contexts in the format:

+CGACT: <cid>,<state>[<CR><LF>
+CGACT: <cid>,<state>[...]]

AT+CGACT=?

Test command reports information on the supported PDP context activation states <state>.

AT+CGACT=1,1
OK

AT+CGACT?
+CGACT: 1,1

OK

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
Required	No	No

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)

AT#PPPCID - Select PDP context for dialup connection

This command selects the PDP context for dialup connection.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#PPPCID=<cid>

Set command selects the PDP context for dialup connection.

It sets the selected context and unset all the others.

Parameter:

Name	Type	Default	Description
<cid>	integer	N/A	Selects the PDP context to be used for dialup. Default values: see additional info section

Values:

1÷6 : cid for dialup connection

Additional info:

▶▶

Operator	Default cid for dialup
ROW	1
ATT	1
VERIZON	3

A module reboot is required for the command to take effect.

AT#PPPCID?

Read command reports the currently selected PDP context for dialup connection:

#PPPCID: <cid>

AT#PPPCID=?

Test command returns the selectable PDP contexts for the dial-up connection:

#PPPCID: (1-6)

IPEasy

AT#SGACT - Context Activation

This command enables/disables the PDP context activation.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SGACT=<cid>,<stat>[,<userId>[,<pwd>]]

Execution command is used to activate the specified PDP context, followed by binding data application to the PS network. Also, it is used to deactivate the PDP context and unbind data application from PS network.

Execution command returns a list of IP addresses for the specified context identifiers in the format:

for IP or IPV6 PDP context: #SGACT: <ipAddr>

for DUAL STACK IPV4V6 PDP context: #SGACT: [<ipAddrV4>],[<ipAddrV6>]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	specifies a particular PDP context definition. To know the range see +CGDCONT command.
<stat>	integer	0	activates/disactivates the PDP context specified
			Values:
			0 : deactivate the context
			1 : activate the context
<userId>	string	-	user identifier, used only if the context requires it

<pwd>	string	-	password, used only if the context requires it

Additional info:

Meaning of the parameters returned by the command.

Name	Type	Default	Description
<ipAddr>	string	-	ip address ipv4 or ipv6
<ipAddrV4>	string	-	ip address ipv4 (if v4 PDP context activated)
<ipAddrV6>	string	-	ip address ipv6 (if v6 PDP context activated)

- Context activation/deactivation returns ERROR if there is not any socket associated to it, see #SCFG.
- In LTE network, default PDP context (<cid>=1) is activated by piggybacking on LTE attach procedure and maintained until detached from network. This command with <cid>=1 is just binding or unbinding application to the default PDP context.
- If the unsolicited result code for obtaining IP address was enabled (urcmode value) using #SGACTCFG command, on start up and due to USB enumeration timing the unsolicited may not appear, user should manually use +CGPADDR command to see the IP address.
- #SCFG=x,0 will close all unclosed AT#SD sockets on <cid>=x.

AT#SGACT?

Read command returns the state of all the contexts that have been defined in the format:

#SGACT: <cid$_1$>,<stat$_1$><CR><LF>

...

#SGACT: <cid$_n$>,<stat$_n$>

Each row in the read command's answer is optional.

AT#SGACT=?

Test command reports the range for the parameters <cid> and <stat>.

AT#SCFG - Socket Configuration

The command sets the configuration for the socket.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SCFG=<connId>,<cid>,<pktSz>,<maxTo>,<connTo>,<txTo>

Set command sets the socket configuration parameters.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	Socket connection identifier. Value: 1÷conMax : Socket connection identifier value; conMax value is returned by test command
<cid>	integer	-	PDP context identifier. To know the range see +CGDCONT command.
<pktSz>	integer	300	Packet size in bytes to be used by the TCP/UDP/IP stack for data sending. Values: 0 : select automatically default value

1÷1500	: packet size in bytes

<maxTo> integer 90 Exchange timeout in seconds (or socket inactivity timeout); if there's no data exchange within this timeout period the connection is closed.

Values:

0	: no timeout
1÷65535	: timeout

<connTo> integer 600 Connection timeout in tenths of seconds. If we cannot establish a connection to the remote within this timeout period, an error is raised.

Value:

10÷1200	: timeout value in hundreds of milliseconds

<txTo> integer 50 data sending timeout; data are sent even if they are less than max packet size, after this period. Used for online data mode only.

Values:

0	: no timeout
1÷255	: timeout in tenths of seconds

256	:	timeout value of 10 ms
257	:	timeout value of 20 ms
258	:	timeout value of 30 ms
259	:	timeout value of 40 ms
260	:	timeout value of 50 ms
261	:	timeout value of 60 ms
262	:	timeout value of 70 ms
263	:	timeout value of 80 ms
264	:	timeout value of 90 ms

AT#SCFG?

Read command returns the current socket configuration parameters values for all the six sockets, in the format:

#SCFG: <connId1>,<cid1>,<pktsz1>,<maxTo1>,<connTo1>,<txTo1><CR><LF>
#SCFG: <connId2>,<cid2>,<pktsz2>,<maxTo2>,<connTo2>,<txTo2><CR><LF>
...
#SCFG: <connId6>,<cid6>,<pktsz6>,<maxTo6>,<connTo6>,<txTo6>

AT#SCFG=?

Test command returns the range of supported values for all the parameters.

Example of test command:

AT#SCFG?

#SCFG: 1,1,300,90,600,50

```
#SCFG: 2,2,300,90,600,50
#SCFG: 3,2,250,90,600,50
#SCFG: 4,1,300,90,600,50
#SCFG: 5,1,300,90,600,50
#SCFG: 6,1,300,90,600,50
OK
```

AT#SCFGEXT - Socket Configuration Extended

This command sets the socket configuration extended parameters.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SCFGEXT=<connId>,<srMode>,<recvDataMode>,<keepalive>[,<ListenAutoRsp>[,<sendDataMode>]]

Set command sets the socket configuration extended parameters.

Parameters:

Name	Type	Default	Description
<connId>	integer	1	socket connection identifier

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

Name	Type	Default	Description
<srMode>	integer	0	SRING unsolicited mode, see Additional info section.

Values:

0 : Normal

1 : Data amount

2 : Data view

			3 : Data view with UDP datagram information
<recvDataMode>	integer	0	Data view mode for received data in command mode (#SRECV or <srMode> = 2) Values: 0 : Text mode 1 : Hexadecimal mode
<keepalive>	integer	0	Set the TCP Keepalive value in minutes Values: 0 : deactivated 1÷240 : keepalive time in minutes
<ListenAutoRsp>	integer	-	dummy
<sendDataMode>	integer	0	Data mode for sending data in command mode (#SSEND) Values: 0 : data represented as text 1 : 0ata represented as sequence of hexadecimal numbers (from 00 to FF).

Each octet of the data is given as two IRA character long.

Additional info:

- These are the SRING formats, depending on <srMode> setting:

  if <srMode> = 0 (Normal):

  SRING: <connId>

  if <srMode> = 1 (Data amount):

  SRING: <connId>,<recData>

  if <srMode> = 2 (Data view):

  SRING: <connId>,<recData>,<data>

  if <srMode> = 3 (Data view with UDP datagram information):

  SRING: <sourceIP>,<sourcePort>,<connId>,<recData>,<dataLeft>,<data>

Name	Type	Default	Description
<recData>	integer	-	amount of data received on the socket connection number <connId>
<data>	mixed	-	data received displayed following <recvDataMode> value
<sourceIP>	string	-	IP address of the source of data
<sourcePort>	string	-	IP port of the source of data

<dataLeft>	integer	-	number of bytes left in the UDP datagram

Keepalive is available only on TCP connections.

For the behavior of #SL and #SLUDP in case of auto response mode or in case of no auto response mode, see the description of the two commands.

AT#SCFGEXT?

Read command returns the current socket extended configuration parameters values for all the six sockets, in the format:

#SCFGEXT: <connId$_1$>,
<srMode>,<dataMode>,<keepalive>,<ListenAutoRsp>,0<CR><LF>

. . .

#SCFGEXT:<connId$_{conMax}$>,<srMode>,<dataMode>,<keepalive>,
<ListenAutoRsp>,0<CR><LF>

AT#SCFGEXT=?

Test command returns the range of supported values for all the sub parameters.

- Socket 1 set with data view sring, text data mode, a keepalive time of 30 minutes and listen auto-response set.

  Socket 3 set with data amount sring, hex recv data mode, no keepalive and listen auto-response not set.

  Socket 4 set with hex recv and send data mode.

  AT#SCFGEXT?
  #SCFGEXT: 1,2,0,30,1,0
  #SCFGEXT: 2,0,0,0,0,0
  #SCFGEXT: 3,1,1,0,0,0

#SCFGEXT: 4,0,1,0,0,1
...
...
OK

AT#SCFGEXT2 - Socket Configuration Extended 2

Socket Configuration Extended.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#SCFGEXT2=<connId>,<bufferStart>[,<abortConnAttempt>[,<unused_B>[,<unused_C>[,<noCarrierMode>]]]]

Set command sets the socket configuration extended parameters for features not included in #SCFGEXT command.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier Value: 1÷max : socket connection identifier value (max value is returned by the Test command)
<bufferStart>	integer	0	select one of the two data sending timeout methods, the first one defined "old" the second one "new". The "old" data sending timeout method is set - by default - by #SCFG command, which sets also the <txTo> data sending timeout value. With #SCFGETXT2 command, you can set either the "old" or the "new" data sending timeout method. If the "new"

method is selected, the "old" one is automatically disabled.

The checking if new data have been received from serial port is done with a granularity that is directly related to #SCFG <txTo> setting with a maximum period of 1 sec.

Values:

0	:	select "old" method: start transmission timer only first time if new data are received from the serial port
1	:	select "new" method: restart transmission timer when new data is received from serial port

<abortConnAttempt>	integer	0	enable the abort of an ongoing connection attempt started by #SD command and before the reception of the CONNECT message (in online mode) or OK message (in command mode). Values automatically saved in NVM.

Values:

0	:	not possible to interrupt connection attempt

1 : it is possible to interrupt the connection attempt (<connTo> set by #SCFG or DNS resolution running if required) and give back control to AT interface by reception of a character. As soon as the control given to the AT interface, the ERROR message will be received on the interface itself.

<unused_B>	integer	-	reserved for future use
<unused_C>	integer	-	reserved for future use
<noCarrierMode>	integer	0	select the NO CARRIER message format received when the socket is closed.

Values:

0 : no additional information is attached to NO CARRIER message

1 : NO CARRIER: <connId> message

2 : NO CARRIER: <connId>, <cause> message. Refer to Additional info section

Additional info:

▶▶ <noCarrierMode>=2 selects the following NO CARRIER message format:

NO CARRIER: <connId>, <cause>

Name	Type	Default	Description

<cause>	integer	-	is the socket disconnection cause. Refer to #SLASTCLOSURE command to know its values and meanings.

- Is necessary to avoid overlapping of the two methods. Enabling new method, the old method for transmission timer (#SCFG) is automatically disabled to avoid overlapping.
- Check if new data have been received from serial port is done with a granularity directly related to <txTo> parameter which is set by #SCFG command. The maximum period is 1 sec.
- Like #SLASTCLOSURE, in case of subsequent consecutive closure causes received, the original disconnection cause indicated.
- In the case of command mode connection and remote closure with subsequent inactivity timeout closure without retrieval of all available data (#SRECV or SRING mode 2), it is indicated cause 1 for both possible FIN and RST from remote.

AT#SCFGEXT2?

Read command returns the current socket extended configuration of the six sockets.
The format is:

#SCFGEXT2:<connId$_1$>,<bufferStart$_1$>,<abortConnAttempt$_1$>,0,0,<noCarrierMode$_1$><CR><LF>
. . .
#SCFGEXT2:<connId$_6$>,<bufferStart$_6$>,<abortConnAttempt$_6$>0,0,<noCarrierMode$_6$><CR><LF>

AT#SCFGEXT2=?

Test command returns the range of supported values for all parameters.

- Set the new transmission timer behavior for <connId>=1 and <connId>=2 sockets.

  AT#SCFGEXT2=1,1
  OK

  AT#SCFGEXT2=2,1
  OK

  Check the current extended configuration of the six sockets

  AT#SCFGEXT2?
  #SCFGEXT2: 1,1,0,0,0,0
  #SCFGEXT2: 2,1,0,0,0,0
  #SCFGEXT2: 3,0,0,0,0,0
  #SCFGEXT2: 4,0,0,0,0,0
  #SCFGEXT2: 5,0,0,0,0,0
  #SCFGEXT2: 6,0,0,0,0,0
  OK

  Check the current configuration of the six sockets

  AT#SCFG?
  #SCFG: 1,1,300,90,600,50
  #SCFG: 2,1,300,90,600,50
  #SCFG: 3,1,300,90,600,50
  #SCFG: 4,2,300,90,600,50
  #SCFG: 5,2,300,90,600,50
  #SCFG: 6,2,300,90,600,50
  OK

  Change the <txTo> data sending timeout of the <connId>=1 socket.

  AT#SCFG=1,1,300,90,600,30
  OK

AT#SCFGEXT3 - Socket Configuration Extended 3

This command sets the socket configuration extended parameters for features not included in #SCFGEXT command nor in #SCFGEXT2 command.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SCFGEXT3=<connId>,<immRsp>[,<closureTypeCmdModeEnabling>[,<fastSRING>[,<ssendTimeout>[,<unusedD>]]]]

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷max	:	socket connection identifier value (max value is returned by the test command)

Name	Type	Default	Description
<immRsp>	integer	0	enables #SD command mode immediate response

Values:

			0 : #SD in command mode (see #SD) returns after the socket is connected 1 : #SD in command mode returns immediately; then the state of the connection can be read by the AT command #SS
<closureTypeCmdModeEnabling>	integer	0	it has no effect and is included only for backward compatibility
			Value:
			0 : factory default
<fastSRING>	integer	0	enables the fast SRING (active only when #SCFGEXT parameter <srmode>=2) in TCP and UDP sockets
			Values:

	0 : SRING unsolicited is received periodically if data are available every 200 ms 1 : if data are available SRING unsolicited is received asynchronous as fast as possible		
<ssendTimeout>	integer	0	timeout for #SSEND (dummy)
	Values: 0 : no timeout 1 : immediate exit(error) in case of stack temporary suspended internally 100÷600 : timeout in 100 msec units		
<unusedD>	mixed	0	unused parameter
	Value: 0 : factory default		

Parameter <ssendTimeout> is dummy.

The set value is only tested against range error according to range reported in AT#SCGFEXT=? test command.

AT#SCFGEXT3?

Read command returns the current socket extended configuration parameters values for all the max sockets, in the format:

#SCFGEXT3:<connId$_1$>,<immRsp$_1$>,<closureTypeCmdModeEnabling>,<fastsring>,<ssendTimeout>,0<CR><LF>

. . .

#SCFGEXT3:<connId$_{max}$>,<immRsp$_{max}$>,<closureTypeCmdModeEnabling>,<fastsring>,<ssendTimeout>,0<CR><LF>

AT#SCFGEXT3=?

Test command returns the range of supported values for all the parameters.

AT#SKTRST - Socket Parameters Reset

Socket Parameters Reset

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#SKTRST

Execution command resets the #SCFG socket parameters to the "factory default" configuration and stores them in the NVM of the device.

AT#SKTRST=?

Test command returns the OK result code.

Reset of the socket parameters

```
AT#SKTRST
OK
```

AT#SD - Socket Dial

Execution command opens a remote connection via socket.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SD=<connId>,<txProt>,<rPort>,<IPaddr>[,<closureType>[,<lPort>[,<connMode>[,<txTime>[,<userIpType>]]]]]

Execution command opens a remote connection via socket.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	Socket connection identifier. Value: 1÷max : socket connection identifier value (max value is returned by the Test command)
<txProt>	integer	N/A	Transmission protocol. Values: 0 : TCP 1 : UDP
<rPort>	integer	N/A	Remote host port to contact.

Value:

1÷65535	:	remote host port number

<lPaddr>	string	-	IP address of the remote host: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query - any valid IPv6 address in the format: xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx or xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx. xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx
<closureType>	integer	0	Socket closure behavior only for TCP when remote host has closed. The parameter has no effects for UDP connections.

Values:

0	:	local host closes immediately when remote host has closed
255	:	local host closes after an escape sequence (+++)

<lPort>	integer	N/A	UDP connections local port only for UDP connections. The parameter has no effects for TCP connections.

Value:

			1÷65535 : UDP local port number
<connMode>	integer	0	Connection mode. Values: 0 : online mode connection 1 : command mode connection
<txTime>	integer	0	dummy Value: 0 : default value
<userIpType>	integer	0	ip type for socket to open Values: 0 : no ip type chosen 1 : ipv4 2 : ipv6

<userIpType> parameter is only valid when <IPaddr> is domain name and dual stack connection is open by #SGACT.

When <userIpType> is "no ip type chosen" ipv6 will be requested firstly. When ipv6 DNS server does not support so ipv4 will be requested.

- <closureType> parameter is valid for TCP connections only and has no effect (if used) for UDP connections.
- <lPort> parameter is valid for UDP connections only and has no effect (if used) for TCP connections
- If we set <connMode> to online mode connection and the command is successful we enter in online data mode and we see the intermediate result code CONNECT. After the CONNECT we can suspend the direct interface to the socket connection (N.B. the socket stays open) using the escape sequence (+++): the module moves back to command mode and we receive the final result code OK after the suspension.

  After such a suspension, it is possible to resume it in every moment (unless the socket inactivity timer timeouts, see #SCFG) by using the #SO command with the corresponding <connId>.
- If we set <connMode> to command mode connection and the command is successful, the socket is opened, and we remain in command mode and we see the result code OK.
- If there are input data arrived through a connected socket and not yet read because the module entered command mode before reading them (after an escape sequence or after #SD has been issued with <connMode> set to command mode connection), these data are buffered and we receive the SRING URC (SRING presentation format depends on the last #SCFGEXT setting); it is possible to read these data afterwards issuing #SRECV. Under the same hypotheses it is possible to send data while in command mode issuing #SSEND.
- <txTime> parameter is valid for UDP connections only and has no effect (if used) for TCP connections. For slow servers it is recommended to adjust the time interval for uploading series of data packets in order to do not lose data. The following data

packet will be sent after the previous data packet's time interval has been expired.

AT#SD=?

Test command reports the range of values for all the parameters.

Examples of socket dial in online and command mode.

- Open socket 1 in online mode
  AT#SD=1,0,80,"www.google.com",0,0,0

  CONNECT
  ...

  ...
  Open socket 1 in command mode
  AT#SD=1,0,80,"www.google.com",0,0,1
  OK

AT#SO - Socket Restore

Execution command resumes the direct interface to a socket connection which has been suspended by the escape sequence.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SO=<connId>

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax	:	socket connection identifier. conMax value is returned by test command

AT#SO=?

Test command reports the range of values for <connId> parameter

AT#SH - Socket Shutdown

The set command closes a socket.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SH=<connId>

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier to be closed

Value:

1÷conMax	:	socket connection identifier. conMax value is returned by test command

Socket cannot be closed in states "listening", "resolving DNS" and "connecting". See #SS command.

If this command is issued while in "accept waiting" state, the socket will be closed. See #SL and #SLUDP commands.

AT#SH=?

Test command reports the range for parameter <connId>

AT#SL - Socket Listen

The command opens/closes socket listening.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SL=<connId>,<listenState>,<listenPort>[,<lingerT>]

Set command opens/closes a socket listening for an incoming TCP connection on a specified port.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax	:	Socket connection identifier value; conMax value is returned by test command

Name	Type	Default	Description
<listenState>	integer	N/A	listening action

Values:

0	:	close socket listening
1	:	start socket listening

Name	Type	Default	Description
<listenPort>	integer	N/A	local listening port

Value:

1÷65535	:	local listening port value

<lingerT>	integer	N/A	linger time

Values:

0	:	immediate closure after remote closure
255	:	local host closes only after an escape sequence (+++)

If successful, command returns a final result code OK. If the ListenAutoRsp flag has not been set through the command #SCFGEXT (for the specific <connId>), then, when a TCP connection request comes on the input port, if the sender is not filtered by internal firewall, an URC is received:

+SRING : <connId>

Afterwards we can use #SA to accept the connection or #SH to refuse it.

If the ListenAutoRsp flag has been set, then, when a TCP connection request comes on the input port, if the sender is not filtered by the internal firewall, the connection is automatically accepted: the CONNECT indication is given and the modem goes into online data mode.

If the socket is closed by the network the following URC is received:

#SL: ABORTED

AT#SL?

Read command returns all the actual listening TCP sockets.

AT#SL=?

Test command returns the range of supported values of the parameters.

Open a socket listening for TCP on port 3500.

```
AT#SL=1,1,3500
OK
```

AT#SLUDP - Socket Listen UDP

This command opens/closes a socket listening for an incoming UDP connection on a specified port.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT#SLUDP=<connId>,<listenState>,<listenPort>

Execution command opens/closes a socket listening for an incoming UDP connection on a specified port.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier Value: 1÷conMax : socket connection identifier. conMax value is returned by test command
<listenState>	integer	0	indicates the action that will be performed Values: 0 : closes socket listening 1 : starts socket listening
<listenPort>	integer	1	local listening port

Value:

1÷65535	:	available port numbers

If the ListenAutoRsp flag has not been set through the command #SCFGEXT (for the specific connId), then, when an UDP connection request comes on the input port, if the sender is not filtered by internal firewall, an URC is received:

+SRING : <connId>

Afterwards we can use #SA to accept the connection or #SH to refuse it.

If the ListenAutoRsp flag has been set, then, when an UDP connection request comes on the input port, if the sender is not filtered by the internal firewall, the connection is automatically accepted: the CONNECT indication is given and the modem goes into online data mode.

If the socket is closed by the network the following URC is received:

#SLUDP: ABORTED

when closing the listening socket <listenPort> is a don't care parameter

AT#SLUDP?

Read command returns all the actual listening UDP sockets.

AT#SLUDP=?

Test command returns the range of supported values for all the sub parameters.

Next command opens a socket listening for UDP on port 3500.

```
AT#SLUDP=1,1,3500
OK
```

AT#SA - Socket Accept

Execution command accepts an incoming socket connection.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SA=<connId>[,<connMode>]

Execution command accepts an incoming socket connection after an URC

SRING: <connId>

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	Socket connection identifier. Value: 1÷max : Socket connection identifier value (max is returned by the Test command)
<connMode>	integer	0	Connection mode, as for command #SD. Values: 0 : online mode connection 1 : command mode connection

The SRING URC has to be a consequence of a #SL issue.

Setting the command before to having received a SRING will result in an ERROR indication, giving the information that a connection request has not yet been received.

AT#SA=?

Test command reports the range of values for all the parameters.

AT#SSEND - Send Data in Command Mode

This command is used to send data through a connected socket.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SSEND=<connId>[,<Rai>]

Execution command permits, while the module is in command mode, to send data through a connected socket.

After entering AT#SSEND=... command, and terminated the command line with <CR>, the module returns the following four characters sequence prompt, and waits for data to send:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

To send the entered data, enter Ctrl-Z char (0x1A hex); to abort the operation enter ESC char (0x1B hex).

If data are successfully sent, the command returns OK. If data sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	Selection on which Socket connection identifier send data.
			Value:

			1÷10 : Socket connection identifier supported
<Rai>	integer	N/A	RAI (Release Assistance Indication) configuration. Values: 1 : Set RAI to: "No further uplink or downlink data transmission subsequent to this transmission" 2 : Set RAI to: "Only a single downlink data transmission and no further uplink data transmissions subsequent to this transmission"

- The maximum number of bytes to send is 1500 bytes; trying to send more data will cause the surplus to be discarded and lost.
- It is possible to use #SSEND only if the connection was opened by #SD, else the ME is raising an error.
- A byte corresponding to BS char (0x08) is treated with its corresponding meaning; therefore previous byte will be cancelled (and BS char itself will not be sent).
- RAI (Release Assistance Indication) is supported in NB-IoT only, otherwise is ignored.

  RAI (Release Assistance Indication) is supported in UDP only, otherwise is ignored.

AT#SSEND=?

Test command returns the range of supported values for parameter <connId> and <Rai>.

Send data through socket number 2

```
AT#SSEND=2
>Test<CTRL-Z>
OK
```

AT#SSENDEXT - Send Data in Command Mode extended

This command allows to send data through a connected socket including all possible octets (from 0x00 to 0xFF).

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SSENDEXT=<connId>,<bytesToSend>[,<Rai>]

Execution command allows, while the module is in command mode, to send data through a connected socket including all possible octets (from 0x00 to 0xFF).

After entering AT#SSENDEXT=... command, and terminated the command line with <CR>, the module returns the following four characters sequence prompt, and waits for data to send:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

When <bytesToSend> bytes have been sent, operation is automatically completed.

If data are successfully sent, the command returns OK. If data sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
	Value:		
	1÷10	:	socket connection identifier

<bytesToSend>	integer	N/A	number of bytes to be sent

Value:

1÷maxBytes	:	maxBytes is the maximum number of bytes that can be sent and it is reported by the test command

<Rai>	integer	N/A	RAI (Release Assistance Indication) configuration.

Values:

1	:	Set RAI to: "No further uplink or downlink data transmission subsequent to this transmission"
2	:	Set RAI to: "Only a single downlink data transmission and no further uplink data transmissions subsequent to this transmission"

- It is possible to use #SSENDEXT only if the connection was opened by #SD, else the modem returns an error.
- All special characters are sent like a generic byte. For example, 0x08 is not interpreted as a BS (BackSpace) but it is simply sent through the socket.
- RAI (Release Assistance Indication) is supported in NB-IoT only, otherwise is ignored.

RAI (Release Assistance Indication) is supported in UDP only, otherwise is ignored

AT#SSENDEXT=?

Test command returns the range of supported values for parameters <connId>, <bytesToSend> and <Rai>.

Open the socket in command mode:

AT#SD=1,0,<port>,"IP address",0,0,1
OK

Enter the command specifying total number of bytes as second parameter:

AT#SSENDEXT=1,256

> ..... ; Terminal echo of bytes sent is displayed here
OK

All possible bytes (from 0x00 to 0xFF) are sent on the socket as generic bytes.

AT#SRECV - Socket Receive Data in Command Mode

The command permits the user to read data arrived through a connected socket when the module is in command mode.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SRECV=<connId>,<maxByte>[,<UDPInfo>]

Execution command permits the user to read data arrived through a connected socket but buffered and not yet read because the module entered command mode before reading them; the module is notified of these data by a SRING: URC, whose presentation format depends on the last #SCFGEXT setting.

Parameters:

Name	Type	Default	Description
<connId>	integer	NA	socket connection identifier
	Value:		
	1÷conMax	:	socket connection identifier. conMax value is returned by test command
<maxByte>	integer	NA	max number of bytes to read
	Value:		
	1÷1500	:	max number of bytes to read
<UDPInfo>	integer	0	enables/disables the visualization of UDP datagram information.
	Values:		

0	:	UDP information disabled
1	:	UDP information enabled, see Additional info section.

Additional info:

If <UDPInfo> is set to 1 (AT#SRECV=<connId>,<maxBytes>,1), the command returns a message having the following format:

#SRECV: <remoteIP>,<remotePort><connId>,<recData>,<dataLeft>

Name	Type	Default	Description
<remoteIP>	string	-	remote ip address
<remotePort>	string	-	remote port address
<recData>	integer	-	received data
<dataLeft>	integer	-	remaining bytes in the datagram.

Issuing #SRECV when there is no buffered data raises an error.

AT#SRECV=?

Test command returns the range of supported values for parameters <connId> <maxByte> and <UDPInfo>.

AT#SSENDUDP - Send UDP Data to a Specific Remote Host

This command allows to send data over UDP to a specific remote host.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SSENDUDP=<connId>,<remoteIP>,<remotePort>[,<Rai>]

This command allows, while the module is in command mode, to send data over UDP to a specific remote host. UDP connection has to be previously completed with a first remote host through #SLUDP / #SA. Then, if module receives data from this or another host, it is able to send data to it. Like command #SSEND, the device responds with ">" prompt and waits for the data to send.

Parameters:

Name	Type	Default	Description
<connId>	integer	1	socket connection identifier
	Value:		
	1÷10	:	identifier number
<remoteIP>	string	-	IP address of the remote host in dotted decimal notation, string type: "xxx.xxx.xxx.xxx"
<remotePort>	integer	1	remote host port
	Value:		
	1÷65535	:	host port number

<Rai>	integer	N/A	RAI (Release Assistance Indication) configuration. Values: 1 : Set RAI to: "No further uplink or downlink data transmission subsequent to this transmission" 2 : Set RAI to: "Only a single downlink data transmission and no further uplink data transmissions subsequent to this transmission"

After SRING that indicates incoming UDP data and issuing #SRECV to receive data itself, through #SS is possible to check last remote host (IP/Port).

If successive resume of the socket to online mode is performed (#SO), connection with first remote host is restored as it was before.

RAI (Release Assistance Indication) is supported in NB-IoT only, otherwise is ignored.

AT#SSENDUDP=?

Test command reports the supported range of values for parameters <connId>,<remoteIP>, <remotePort> and <Rai>.

- Starts listening on <LocPort> (previous setting of firewall through #FRWL has to be done)

```
AT#SLUDP=1,1,<LocPort>
OK


SRING: 1              UDP data from a remote host available


AT#SA=1,1
OK


SRING: 1


AT#SI=1
#SI: 1,0,0,23,0       23 bytes to read
OK


AT#SRECV=1,23
#SRECV:1,23
message from first host
OK


AT#SS=1
#SS: 1,2,<LocIP>,<LocPort>,<RemIP1>,<RemPort1>
OK


AT#SSENDUDP=1,<RemIP1>,<RemPort1>
>response to first host
OK


SRING: 1              UDP data from a remote host available
```

AT#SI=1
#SI: 1,22,23,24,0 24 bytes to read
OK

AT#SRECV=1,24
#SRECV:1,24
message from second host
OK

AT#SS=1
#SS: 1,2,<LocIP>,<LocPort>,<RemIP2>,<RemPort2>
OK

Remote host has changed, we want to send a response:

AT#SSENDUDP=1,<RemIP2>,<RemPort2>
>response to second host
OK

AT#SSENDUDPEXT - Send UDP Data to a Specific Remote Host EXTENDED

This command allows, while the module is in command mode, to send data over UDP to a specific remote host including all possible octets (from 0x00 to 0xFF)

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

AT#SSENDUDPEXT=<connId>,<bytestosend>,<remoteIP>,<remotePort>[,<Rai>]

Set command allows, while the module is in command mode, to send data over UDP to a specific remote host including all possible octets (from 0x00 to 0xFF).

As indicated about #SSENDUDP, UDP socket has to be previously opened through #SLUDP / #SA, then we are able to send data to different remote hosts.

Like #SSENDEXT, the device responds with the prompt '> ' and waits for the data to send, operation is automatically completed when <bytestosend> have been sent.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
	Value:		
	1÷10	:	identifier number
<bytestosend>	integer	N/A	bytes to be sent
	Value:		

	1÷1500 : number of bytes to be sent		
<remoteIP>	string	-	IP address of the remote host in dotted decimal notation ("xxx.xxx.xxx.xxx")
<remotePort>	integer	N/A	remote host port Value: 1÷65535 : host port number
<Rai>	integer	N/A	RAI (Release Assistance Indication) configuration. Values: 1 : Set RAI to: "No further uplink or downlink data transmission subsequent to this transmission" 2 : Set RAI to: "Only a single downlink data transmission and no further uplink data transmissions subsequent to this transmission"

RAI (Release Assistance Indication) is supported in NB-IoT only, otherwise is ignored.

AT#SSENDUDPEXT=?

Test command reports the supported range of values for parameters <connId>, <bytestosend>, <remoteIP>, <remotePort> and <Rai>.

AT#SLASTCLOSURE - Detect the Cause of a Socket Disconnection

The command detects the cause of a socket disconnection.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SLASTCLOSURE=<connId>

Execution command reports the socket disconnection cause.

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax	:	socket connection identifier. conMax value is returned by test command

Additional info:

The execution command reports the disconnection cause of the selected socket. The format of the returned message is:

#SLASTCLOSURE: <connId>,<cause>

Name	Type	Default	Description
<cause>	hex	0	socket disconnection cause.

Values:

0 : not available (socket has not yet been closed)

1 : remote host TCP connection close due to FIN/END: normal remote disconnection decided by the remote application

2 : remote host TCP connection close due to RST, all other cases in which the socket is aborted without indication from peer (for instance because peer doesn't send ack after maximum number of retransmissions/peer is no more alive). All these cases include all the "FATAL" errors after recv or send on the TCP socket (named as different from EWOULDBLOCK)

3 : socket inactivity timeout

4 : network deactivation (PDP context deactivation from network)

5 : DNS Error

- Any time socket is re-opened, last disconnection cause is reset. Command report 0 (not available).
- User closure cause (#SH) is not considered and if a user closure is performed after remote disconnection, remote disconnection cause remains saved and is not overwritten.

- If more consecutive closure causes are received, the original disconnection cause is saved.
  (For instance: if a TCP FIN is received from remote and later a TCP RST because we continue to send data, FIN cause is saved and not overwritten)

- Also in case of <closureType> (#SD) set to 255, if the socket has not yet been closed by user after the escape sequence, #SLASTCLOSURE indicates remote disconnection cause if it has been received.

- In case of UDP, cause 2 indicates abnormal (local) disconnection. Cause 3 and 4 are still possible.
  (Cause 1 is obviously never possible)

- In case of command mode connection and remote closure with subsequent inactivity timeout closure without retrieval of all available data (#SRECV or SRING mode 2), it is indicated cause 1 for both possible FIN and RST from remote.

AT#SLASTCLOSURE=?

Test command reports the supported range for parameter <connId>

AT#SS - Socket Status

Execution command reports the current sockets status.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SS

Execution command reports the current sockets status using the following message format:

#SS: <connId>,<state>,<locIP>,<locPort>,<remIP>,<remPort><CR><LF>

[<connId>,<state>,<locIP>,<locPort>,<remIP>,<remPort><CR><LF>[...]]

Additional info:

Parameters meaning.

Name	Type	Default	Description
<connId>	integer	-	socket connection identifier
<state>	integer	0	actual state of the socket

Values:

0 : socket closed

1 : socket with an active data transfer connection

2 : socket suspended

3 : socket suspended with pending data

4 : socket listening

5 : socket with an incoming connection. Waiting for the user accept or shutdown command

6 : socket in DNS resolving process

7 : socket connecting

<locIP>	string	-	IP address associated by the context activation to the socket
<locPort>	integer	-	two meanings: the listening port if we put the socket in listen mode the local port for the connection if we use the socket to connect to a remote machine
<remIP>	string	-	when we are connected to a remote machine this is the remote IP address
<remPort>	string	-	it is the port we are connected to on the remote machine

AT#SS=?

Test command reports the range for <connId> parameter.

- Get information about all sockets.

  AT#SS

  #SS: 1,3,91.80.90.162,61119,88.37.127.146,10510

  #SS: 2,4,91.80.90.162,1000

  #SS: 3,0

  #SS: 4,0

  #SS: 5,3,91.80.73.70,61120,88.37.127.146,10509

  #SS: 6,0

  OK

  Socket 1: opened from local IP 91.80.90.162/local port 61119 to remote IP 88.37.127.146/remote port 10510 is suspended with pending data.

  Socket 2: listening on local IP 91.80.90.162/local port 1000.

  Socket 5: opened from local IP 91.80.73.70/local port 61120 to remote IP 88.37.127.146/remote port 10509 is suspended with pending data.

AT#SI - Socket Info

This command is used to get socket information.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SI[=<connId>]

Execution command returns information about all sockets data traffic.

Parameter:

Name	Type	Default	Description
<connId>	integer	NA	socket connection identifier. Refer to Additional info sections to have information about the use of the <connId> parameter

Value:

1÷conMax	:	socket connection identifier. conMax value is returned by test command

Additional info:

If the execution command is used with the <connId> socket identifier, it returns data traffic information on the selected socket. The format of the returned message is:

#SI: <connId>,<sent>,<received>,<buff_in>,<ack_waiting>

Name	Type	Default	Description

<sent>	integer	-	total amount (in bytes) of data sent since the last time the socket connection identified by <connId> has been opened
<received>	integer	-	total amount (in bytes) of received data since the last time the socket connection identified by <connId> has been opened
<buff_in>	integer	-	total amount (in bytes) of data just arrived through the socket connection identified by <connId> and currently buffered, not yet read
<ack_waiting>	integer	-	total amount (in bytes) of sent and "not yet acknowledged data" since the last time the socket connection identified by <connId> has been opened. The data "not yet acknowledged" are available only for TCP connections. For UDP connections <ack_waiting> value is always 0.

If the AT#SI command is used without the <connId> socket identifier, it returns data traffic information on all sockets. For each socket, the format of the returned message is:

#SI: <connId$_n$>,<sent$_n$>,<received$_n$>,<buff_in$_n$>,<ack_waiting$_n$>

AT#SI=?

Test command reports the range of <connId> parameter.

- Get information about data traffic of all sockets.

  AT#SI
  #SI: 1,123,400,10,50
  #SI: 2,0,100,0,0
  #SI: 3,589,100,10,100
  #SI: 4,0,0,0,0
  #SI: 5,0,0,0,0
  ...
  OK

- Assume that sockets 1,2,3 are opened and having some data traffic. To get traffic information only for the socket <connId>=1 enter the following command:

  AT#SI=1
  #SI: 1,123,400,10,50
  OK

  Socket <connId>=1 has 123 bytes sent, 400 bytes received, 10 bytes waiting to be read and 50 bytes waiting to be acknowledged from the remote side.

AT#ST - Socket Type

Socket Type

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#ST[=<connId>]

Set command reports the current type of the socket (TCP/UDP) and its direction (Dialer/Listener)

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMAX	:	socket connection identifier. conMax value is returned by test command

Additional info:

The response format is:

#ST: <connId>,<type>,<direction>

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

Values:

0	:	No socket
1	:	TCP socket
2	:	UDP socket

<direction> integer N/A direction of the socket

Values:

0	:	None
1	:	Dialer
2	:	Listener

Issuing #ST command without <connId> socket identifier, it returns information about type of all sockets. For each socket, the format of the returned message is:

#ST: <connId$_n$>,<type$_n$>,<direction$_n$><CR><LF>

AT#ST=?

Test command reports the range for parameter <connId>.

Examples for single socket and for all sockets

- For single socket

  AT#ST=3
  #ST: 3,2,1

  Socket 3 is an UDP dialer

- for all socket

  AT#ST
  #ST: 1,0,0
  #ST: 2,0,0
  #ST: 3,2,1
  #ST: 4,2,2
  #ST: 5,1,1

  ...

  Socket 1 is closed.

  Socket 2 is closed.

  Socket 3 is an UDP dialer

  Socket 4 is an UDP listener

  Socket 5 is a TCP dialer

AT#PADCMD - PAD Command Features

This command sets features of the pending data flush to socket, opened with #SD command.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#PADCMD=<mode>

Set command for features of the pending data flush to socket, opened with #SD command.

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	enable/disable forwarding

Values:

0 : Bit 1: disable forwarding

1 : Bit 1: enable forwarding

Forwarding depends on character defined by #PADFWD.

Other bits are reserved.

AT#PADCMD?

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

#PADCMD: mode

AT#PADCMD=?

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

AT#PADFWD - PAD Forward Character

PAD forward character

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#PADFWD=<char>[,<mode>]

Set command sets the char that immediately flushes pending data to socket opened by AT#SD command

Parameters:

Name	Type	Default	Description
<char>	integer	13	specifies the ascii code of the char used to flush data
	Value:		
	0÷255 : ascii code of the char used to flush data		
<mode>	integer	0	flush mode
	Values:		
	0 : normal mode		
	1 : reserved		

Use AT#PADCMD to enable the socket char-flush activity

AT#PADFWD?

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

#PADFWD: <char>,<mode>

AT#PADFWD=?

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

AT#E2SLRI - Socket Listen Ring Indicator

This command enables the Ring Indicator pin response to a Socket Listen connect.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#E2SLRI=[<n>]

Set command enables/disables the Ring Indicator pin response to a Socket Listen connect and, if enabled, the duration of the negative going pulse generated on receipt of connect.

Parameter:

Name	Type	Default	Description
<n>	integer	0	RI enabling

Values:

0	:	RI disabled for Socket Listen connect
50÷1150	:	RI enabled for Socket Listen connect; a negative going pulse is generated on receipt of connect and <n> is the duration in ms of this pulse

AT#E2SLRI?

Read command reports whether the Ring Indicator pin response to a Socket Listen connect is currently enabled or not, in the format: #E2SLRI: <n>

AT#E2SLRI=?

Test command returns the allowed values for parameter <n>.

AT#PING - Send PING Request

This command is used to send Ping Echo Request.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT#PING=<IPaddr>[,<retryNum>[,<len>[,<timeout>[,<ttl>[,<pdpId>]]]]]

Execution command is used to send Ping Echo Request messages and to receive the corresponding Echo Reply. Before sending PING Request the PDP context must be activated by #SGACT command.

Once the single Echo Reply message is received, a string like that is displayed:

#PING: <replyId>,<Ip Address>,<replyTime>,<ttl>

Parameters:

Name	Type	Default	Description
<IPaddr>	string	-	address of the remote host, string type. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query
<retryNum>	integer	4	the number of Ping Echo Request to send Value:

			1÷64 : Ping Echo Request number
<len>	integer	32	the length of Ping Echo Request message Value: 32÷1460 : Ping Echo Request length
<timeout>	integer	50	the timeout, in 100 ms units, waiting a single Echo Reply Value: 1÷600 : timeout, in 100 ms units
<ttl>	integer	128	time to live Value: 1÷255 : time to live
<pdpId>	integer	-	specifies a PDP context definition. Use the AT+CGDCONT=? test command to get the range of the supported values. Refer to additional info section for default value.

Additional info:

▶▶ <pdpId> default value.

The default value of this parameter depends on the software customization as shown in the following table.

Software customization	<pdpId> default value
Verizon	3
All other	1

Unsolicited fields:

Name	Type	Description
<replyId>	integer	Echo Reply number
<IpAddress>	string	IP address of the remote host
<replyTime>	integer	time, in 100 ms units, required to receive the response
<ttl>	integer	time to live of the Echo Reply message

When the Echo Request timeout expires (no reply received on time) the response will contain <replyTime> set to 600 and <ttl> set to 255.

To receive the corresponding Echo Reply is not required to enable separately #ICMP

AT#PING=?

Test command reports the supported range of values for the #PING command parameters.

```
AT#PING="www.telit.com"
#PING: 01,81.201.117.177,6,50
#PING: 02,81.201.117.177,5,50
#PING: 03,81.201.117.177,6,50
#PING: 04,81.201.117.177,5,50

OK
```

AT#NTP - Calculate and Update Date and Time with NTP

The command handles the date and time update using NTP protocol.

[1] Standard RFC2030

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#NTP=<NTPAddr>,<NTPPort>,<updModClock>,<timeout>[,<timeZone>]

Execution command permits to calculate and update date and time through NTP protocol sending a request to a NTP server, see standard [1]. The command returns an intermediate response having the following format:

#NTP: <time>

The <time> parameter is described in Additional info section.

Parameters:

Name	Type	Default	Description
<NTPAddr>	string	N/A	address of the NTP server. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" or "xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx" - any host name to be solved with a DNS query
<NTPPort>	integer Value:	N/A	NTP server port to contact

	1÷65535 : port		
<updModClock>	integer	N/A	update mode Values: 0 : no update module clock 1 : update module clock
<timeout>	integer	N/A	waiting timeout for server response in seconds. Due to internal algorithm the total timeout will be up to 3 * <timeout>. Value: 1÷10 : waiting timeout for server response in seconds
<timeZone>	string	0	Time Zone: indicates the difference, expressed in quarter of an hour, between the local time and GMT. Value: 47÷48 : Time Zone

Additional info:

▶▶ Intermediate response parameter.

Name	Type	Default	Description
<time>	string	-	current time as quoted string in the format: "yy/MM/dd,hh:mm:ssÂ±zz"

▶▶ In case of error, the command returns the following error message:

+CME ERROR: <err>

Parameter <err> can be either numeric or verbose (see +CMEE). The available values are reported in the table:

Numeric Format	Verbose Format
30001	sntp - not enough resources
30002	sntp - net timeout
30003	sntp - socket error
30005	sntp - host name resolve error
30006	sntp - invalid parameter
30008	sntp - send timeout
30009	sntp - send error
30011	sntp - response timeout
30015	sntp - context not opened
30020	sntp - generic error
30030	sntp - server authentication fail

30031	sntp - server keys file missing
30200	sntp - cannot set time

The Time Zone is applied directly in the Date and Time received by the NTP Server, that is, by definition, GMT+0.

#SGACT must be called to activate the PDP context before calling #NTP command.

AT#NTP=?

Test command returns the maximum length for <NTPAddr> string, and supported range of values of parameters: <NTPPort>, <updModClock>, <timeout> and <timeZone>.

MAX timeout indicates the time within which the command must be executed. MAX timeout for this command is 10 s.

Execution command with NTP server.

```
AT#NTP="0.it.pool.ntp.org",123,1,2,4
#NTP: 19/03/13, 13:16:33+04
OK

AT+CCLK?
+CCLK: "19/03/13, 13:16:34+04"
OK
```

AT#NTPCFG - Configure NTP Parameters

This command allows to configure additional parameters to be used for NTP operations.

[1] Standard RFC5905

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#NTPCFG=<cid>[,<authType>[,<keyId>,<keysFilePath>]]

Set command allows to configure additional parameters to be used for NTP operations.

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	Context id used to perform NTP operations. Refer to test command to know the supported range of values.

Values:

1÷16 : context id for NTP operations

<authType>	integer	0	Authentication type to be used with NTP server

Values:

0 : do not authenticate server

1 : use symmetric key to authenticate server (see standard [1]), using <keyId> and <keysFilePath> to retrieve the required parameters

<keyId>	integer	-	if <authType> is 1, it provides the key Id to authenticate the server.
<keysFilePath>	string	-	if <authType> is 1, it provides the absolute path of the file where the server keys can be found. Only MD5 keys are supported.

- The file containing the keys can be loaded in the module filesystem using #M2MWRITE command.
- The key content is loaded from the file only when #NTP is issued.

AT#NTPCFG?

Read command reports the parameters current values in the format:

#NTPCFG: <cid>,<authType>

AT#NTPCFG=?

Test command reports the available range of <cid>, <authType> and <keyId> parameters values.

Set <cid>=3
AT#NTPCFG=3
OK

Set <cid>=1, symmetric key mode, <keyId>=1 and load the keys from the provided file
AT#NTPCFG=1,1,1,"/mod/server_keys.txt"
OK

FTPEasy

AT#FTPAPP - FTP Append

This command is used to append data to an already existing file via FTP during an FTP session.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#FTPAPP=<fileName>[,<connMode>]

Set command, issued during an FTP connection, opens a data connection and append data to existing <fileName> file.

If the data connection succeeds, a CONNECT indication is sent, afterward a NO CARRIER indication is sent when the socket is closed.

Parameters:

Name	Type	Default	Description
<fileName>	string	-	the file name
<connMode>	integer	0	the connection mode

Values:

0	:	online mode
1	:	command mode

- If <connMode> is set to 1, the data connection is opened, the device remains in command mode and the OK result code is displayed (instead of CONNECT).
- Use the escape sequence +++ to close the data connection.
- The command causes an ERROR result code if no FTP connection has been opened yet.

AT#FTPAPP=?

Test command reports the maximum length of <fileName> and the supported range of values of <connMode>. The format is:

#FTPAPP: <length>, (list of supported <connMode>s)

Additional info:

Parameter meaning.

Name	Type	Default	Description
<length>	integer	-	is the maximum length of <fileName>

AT#FTPAPPEXT - FTP Append Extended

The command sends data on a FTP data port while the module is in command mode.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPAPPEXT=<bytesToSend>[,<eof>]

Execution command sends data on a FTP data port while the module is in command mode.

FTP data port must be previously opened by #FTPPUT (or #FTPAPP) with <connMode> parameter set to command mode connection.

After command line is terminated with <CR>, the module responds sending a four characters sequence prompt, and waits for the specified number of bytes:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

When <bytesToSend> bytes have been sent, operation is automatically completed. If (all or part of the) data are successfully sent, then the response is:

#FTPAPPEXT: <sentBytes>
OK

If data sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<bytesToSend>	integer	N/A	number of bytes to be sent
	Value:		
	1÷1500	:	number of bytes
<eof>	integer	0	data port closure
	Values:		

0 : normal sending of data chunk

1 : close data port after sending data chunk

Additional info:

Parameters:

Name	Type	Default	Description
<sentBytes>	integer	N/A	the number of sent bytes

Value:

1÷1500	:	number of bytes

<sentBytes> could be less than <bytesToSend>.

AT#FTPAPPEXT=?

Test command reports the supported values of parameters <bytesToSend> and <eof>.

```
AT#FTPOPEN="IP",username,password
OK
AT#FTPPUT=<filename>,1
OK
```

the second param (1) means that we open the connection in command mode

Here data socket will stay opened, but interface will be available (command mode)

AT#FTPAPPEXT=Size
>binary data
#FTPAPPEXT: <sentBytes>
OK

write here the binary data. As soon Size bytes are written, data are sent and OK is returned

Last #FTPAPPEXT will close the data socket, because second (optional) parameter has this meaning:

AT#FTPAPPEXT=Size,1
>binary data
#FTPAPPEXT: <sentBytes>
OK

write here the binary data. As soon Size bytes are written, data are sent and OK is returned and the data socket is closed.

If the user has to reopen the data port to send another (or append to the same) file, they can restart with #FTPPUT (or #FTPAPP).
Then #FTPAPPEXT to send the data chunks on the reopened data port.

If, while sending the chunks, the data port is closed from remote, user will be aware of it because #FTPAPPEXT will indicate ERROR and cause (available if previously issued the command AT+CMEE=2) will indicate that socket has been closed.

Also in this case obviously, data port will have to be reopened with #FTPPUT and the related commands.

AT#FTPCLOSE - FTP Close Command

The command purpose is to close the previously open FTP connection.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPCLOSE

Execution command closes an FTP connection.

AT#FTPCLOSE=?

Test command returns the OK result code.

AT#FTPCMD - FTP Send Commands

This command sends an FTP command or a combination of two commands to an FTP server.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT#FTPCMD=<command1>,<respCode1>[,<command2>,<respCode2>]

Execution command, issued during an FTP connection, sends <command1> to an FTP server and expects <respCode1> reply. Optionally, after the execution of the first command, a second command can be sent (<command2> and <respCode2>).

Parameters:

Name	Type	Default	Description
<command1>	string	-	name of the 1st command (maximum length 200 characters)
<respCode1>	integer	N/A	Expected response code from FTP server after <command1> execution

Values:

1	:	Expected code 1XY
2	:	Expected code 2XY
3	:	Expected code 3XY
4	:	Expected code 4XY
5	:	Expected code 5XY

<command2>	string	-	name of the 2nd command (maximum length 200 characters)

<respCode2>	integer	N/A	Expected response code from FTP server after <command2> execution

Values:

1	:	Expected code 1XY
2	:	Expected code 2XY
3	:	Expected code 3XY
4	:	Expected code 4XY
5	:	Expected code 5XY

The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

To read unexpected ERROR result codes returned from the FTP server, use AT#FTPMSG command.

AT#FTPCMD=?

Test command reports the maximum length of <command1> and <command2> and the supported range of values of <respCode1> and <respCode2>.

Additional info:

The format is:

#FTPCMD: <length>, (list of supported <respCode1>s), <length>, (list of supported <respCode2>s)

Name	Type	Default	Description

<length>	integer	-	maximum length of <command1> or <command2>

Examples of command executions.

- Rename file on remote server:

  at#ftpcmd="RNFR test.txt",3,"RNTO test2.txt",2

  350 File or directory exists, ready for destination name

  250 Rename successful

  OK

  ...

  ...

  Create directory on remote server:

  at#ftpcmd="MKD testDir",2

  257 "/testDir" - Directory successfully created

  OK

  ...

  ...

  Remove Directory on remote server:

  at#ftpcmd="RMD testDir",2

  250 RMD command successful

  OK

  ...

  ...

AT#FTPCWD - FTP Change Working Directory

Command to change the working directory on FTP server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPCWD=[<dirname>]

Execution command, issued during an FTP connection, changes the working directory on FTP server.

Parameter:

Name	Type	Default	Description
<dirname>	string	-	Name of the new working directory.

The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

AT#FTPCWD=?

Test command returns the OK result code.

AT#FTPDELE - FTP Delete

This command, issued during a FTP connection, allows to delete a file from the remote working directory.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPDELE=[<filename>]

Execution command, issued during a FTP connection, deletes a file from the remote working directory.

Parameter:

Name	Type	Default	Description
<filename>	string	-	Name of the file that must be deleted

This command returns an ERROR result code if no FTP connection has been opened yet.

This command returns an ERROR result code in case of delayed server response.

If this is the case, the #FTPMSG response is temporarily empty; a later check of the #FTPMSG response will show the server response.

AT#FTPDELE=?

Test command returns OK result code.

AT#FTPFSIZE - Get File Size from FTP Server

This command returns the size of a file located on a FTP server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPFSIZE=<filename>

Execution command, issued during an FTP connection, permits to get the size of a file located on a FTP server. The response format is:

#FTPFSIZE: <size>

Parameter:

Name	Type	Default	Description
<filename>	string	-	the name of the file that you want to know the size

Additional info:

Parameter:

Name	Type	Default	Description
<size>	integer	-	dimension in bytes of the file located on the FTP server

AT#FTPTYPE=0 command must be issued before #FTPFSIZE command, to set file transfer type to binary mode.

AT#FTPFSIZE=?

Test command returns OK result code.

AT#FTPGET - FTP Get Command

This command executes the FTP Get function during an FTP connection.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#FTPGET=[<filename>]

Execution command opens a data connection and starts getting a file from the FTP server. If the data connection succeeds a CONNECT indication is sent and the file is received on the serial port.

Parameter:

Name	Type	Default	Description
<filename>	string	-	file name to get from server.

- The command causes an ERROR result code to be returned in case no FTP connection has been opened yet.
- Command closure should always be handled by application. To avoid download stall situations a timeout should be implemented by the application.

AT#FTPGET=?

Test command returns the OK result code.

AT#FTPGETPKT - FTP Get in Command Mode

FTP gets in command mode.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPGETPKT=<fileName>[,<viewMode>]

Execution command, issued during an FTP connection, opens a data connection and starts getting a file from the FTP server while remaining in command mode.

The data port is opened, we remain in command mode and we see the result code OK.
Retrieval from FTP server of <fileName> is started, but data are only buffered in the module.
It is possible to read data afterwards issuing #FTPRECV command.

Parameters:

Name	Type	Default	Description
<fileName>	string	-	file name. Maximum length: 200 characters.
<viewMode>	integer	0	choose the view mode

Values:

0 : text format

1 : hexadecimal format

The command causes an ERROR result code to be returned in case no FTP connection has been opened yet.

Command closure should always be handled by application. To avoid download stall situations a timeout should be implemented by the application.

AT#FTPGETPKT?

Read command reports current download state for <fileName> with <viewMode> chosen, in the format:

#FTPGETPKT: <remotefile>,<viewMode>,<eof>

Additional info:

The following parameter signals the state of the file transmission.

Name	Type	Default	Description
<eof>	integer	N/A	End of file

Values:

0 : file currently being transferred

1 : complete file has been transferred to FTP client

AT#FTPGETPKT=?

Test command returns OK result code.

AT#FTPLIST - FTP List

This command is used during a FTP connection.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#FTPLIST[=[<name]]

Execution command, issued during an FTP connection, opens a data connection and starts getting from the server the list of contents of the specified directory or the properties of the specified file

Parameter:

Name	Type	Default	Description
<name>	string	-	is the name of the directory or file

The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

Issuing AT#FTPLIST<CR> opens a data connection and starts getting from the server the list of contents of the working directory.

AT#FTPLIST=?

Test command returns the OK result code.

AT#FTPMSG - FTP Read Message

This command returns the last response received from the FTP server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPMSG

Execution command returns the last response received from the server during an FTP connection.

AT#FTPMSG=?

Test command returns the OK result code.

AT#FTPOPEN - FTP Connection Opening

This execution command opens an FTP connection toward the FTP server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPOPEN=[<server:port>,<username>,<password>,<mode>[,<cid>]]

Parameters:

Name	Type	Default	Description
<server:port>	string	-	address and port of FTP server (factory default port 21), in the format: "ipv4" / "ipv4:port" "ipv6" / "[ipv6]" / "[ipv6]:port" "dynamic_name" / "dynamic_name:port"
<username>	string	-	authentication user identification for FTP
<password>	string	-	authentication password for FTP
<mode>	integer	0	active or passive mode
	Values:		
	0 : active mode		
	1 : passive mode		
<cid>	string	-	PDP context identifier

- In FTP Open case, the solution dependency limits the maximum time out to 1200 (120 seconds). The FTPTO value that exceed 1200 is considered as 1200.
- Before opening FTP connection the PDP context must been activated with #SGACT.

AT#FTPOPEN=?

Test command returns the OK result code

AT#FTPPUT - FTP Send File

This command sends a file to the FTP server.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT#FTPPUT=[<filename>[,<connMode>]]

Execution command, issued during an FTP connection, opens a data connection and starts sending <filename> file to the FTP server.

Parameters:

Name	Type	Default	Description
<filename>	string	-	name of the file (maximum length 200 characters)
<connMode>	integer	0	select online or command mode: If online mode is selected (default) and the data connection succeeds, a CONNECT indication is sent; afterward a NO CARRIER indication is sent when the socket is closed. If command mode is selected and the data connection succeeds, we remain in command mode and we see the result code OK (instead of CONNECT).

Values:

0	:	online mode
1	:	command mode

- Use the escape sequence +++ to close the data connection.
- The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

AT#FTPPUT=?

Test command reports the maximum length of <filename> and the supported range of values of <connMode>.

Additional info:

- The format is:

  #FTPPUT: <length>, (list of supported <connMode>s)

Name	Type	Default	Description
<length>	integer	-	maximum length of <filename>

AT#FTPPWD - FTP Print Working Directory

This command, issued during an FTP connection, shows the current working directory on FTP server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPPWD

Execution command, issued during an FTP connection, shows the current working directory on FTP server.

The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

AT#FTPPWD=?

Test command returns the OK result code.

AT#FTPRECV - Receive Data in Command Mode

The command permits the user to read a given amount of data already transferred via FTP from a remote file.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#FTPRECV=<blockSize>

Execution command permits the user to transfer at most <blocksize> bytes of remote file, provided that retrieving from the FTP server has been started with a previous #FTPGETPKT command, onto the serial port.

This number is limited to the current number of bytes of the remote file which have been transferred from the FTP server.

Parameter:

Name	Type	Default	Description
<blockSize>	integer	N/A	maximum number of bytes to read
	Value:		
	1÷3000 : maximum number of bytes to read		

- It is necessary to have previously opened FTP data port and started download and buffering of remote file through #FTPGETPKT command.
- Issuing #FTPRECV when there is no FTP data port opened raises an error.
- Data port will stay opened if socket is temporary waiting to receive data (#FTPRECV returns 0 and #FTPGETPTK gives an EOF 0 indication).

AT#FTPRECV?

Read command reports the number of bytes currently transferred from FTP server in the format:

#FTPRECV: <available>

Additional info:

Parameter:

Name	Type	Default	Description
<available>	integer	-	number of transferred bytes and available for reading

AT#FTPRECV=?

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

AT#FTPRECV?
#FTPRECV: 3000
OK

Read required part of the buffered data:

AT#FTPRECV=400
#FTPRECV:400

Text row number 1 * 11111111111111111111111111 *
Text row number 2 * 22222222222222222222222222 *
Text row number 3 * 33333333333333333333333333 *
Text row number 4 * 44444444444444444444444444 *
Text row number 5 * 55555555555555555555555555 *
Text row number 6 * 66666666666666666666666666 *
Text row number 7 * 77777777777777777777777777 *
Text row number 8 * 888888888888888888

OK

AT#FTPRECV=200
#FTPRECV:200

88888 *
Text row number 9 * 999999999999999999999999 *
Text row number 10 * AAAAAAAAAAAAAAAAAAAAAAAA*
Text row number 11 * BBBBBBBBBBBBBBBBBBBBBBBB *
Text row number 12 * CCCCCCCCCCCCCCC

OK

To check when you have received complete file it is possible to use #FTPGETPKT read command:

AT#FTPGETPKT?
#FTPGETPKT:sample.txt,0,1
OK

(you will get <eof> set to 1)

AT#FTPREST - Set Restart Position for FTP GET

Set command sets the restart position for successive #FTPGET (or #FTPGETPKT) command. It permits to restart a previously interrupted FTP download from the selected position in byte.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#FTPREST=[<restartPosition>]

Parameter:

Name	Type	Default	Description
<restartPosition>	integer	-	position in byte of restarting for successive #FTPGET (or #FTPGETPKT)

- It is necessary to issue #FTPTYPE=0 before successive #FTPGET (or #FTPGETPKT command) to set binary file transfer type.
- Setting <restartPosition> takes effect on successive FTP download. After successive successfully initiated #FTPGET (or #FTPGETPKT) command <restartPosition> is automatically reset.
- Value set for <restartPosition> takes effect on next data transfer (data port opened by #FTPGET or #FTPGETPKT). Then <restartPosition> value is automatically assigned to 0 for next download.

AT#FTPREST?

Read command returns the current <restartPosition>:

#FTPREST:<restartPosition>

AT#FTPREST=?

Test command returns the OK result code.

AT#FTPTO - FTP Time Out

Set the FTP time out.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPTO=[<tout>]

Set command sets the time out used when opening either the FTP control channel or the FTP traffic channel.

Parameter:

Name	Type	Default	Description
<tout>	integer	100	time out in 100 milliseconds units

Value:

100÷5000	:	hundreds of milliseconds

AT#FTPTO?

Read command returns the current FTP operations time out in the format:

#FTPTO: <tout>

AT#FTPTO=?

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

AT#FTPTYPE - FTP Type

This command sets the FTP file transfer type.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#FTPTYPE=[<type>]

Set command, issued during a FTP connection, sets the file transfer type.

Parameter:

Name	Type	Default	Description
<type>	integer	N/A	file transfer type

Values:

0	:	binary
1	:	ASCII

The command causes an ERROR result code to be returned if no FTP connection has been opened yet.

AT#FTPTYPE?

Read command returns the current file transfer type, in the format:

#FTPTYPE: <type>

AT#FTPTYPE=?

Test command returns the range of available values for parameter <type>:

#FTPTYPE: (0,1)

AT#FTPCFG - FTP Configuration

This command sets the time-out used when opening either the FTP control channel or the FTP traffic channel.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#FTPCFG=<tout>,<IPPignoring>[,<FTPSEn>[,<FTPext>]]

Parameters:

Name	Type	Default	Description
<tout>	integer	100	time out in 100 milliseconds units

Value:

100÷5000	: hundreds of ms

Name	Type	Default	Description
<IPPignoring>	integer	N/A	enable or disable IP private ignoring

Values:

0	:	No IP Private ignoring. During a FTP passive mode connection client uses the IP address received from server, even if it is a private IPV4 address.
1	:	IP Private ignoring enabled. During a FTP passive mode connection if the server sends a private IPV4 address the client doesn't consider this and connects with server using the IP address used in #FTPOPEN.

<FTPSEn>	integer	0	disable FTPS security

Values:

0 : disable FTPS security: all FTP commands will perform plain FTP connections.

1 : enable FTPS security

<FTPext>	integer	1	PORT/PASV and EPRT/EPSV commands. Option added to pass-through firewall that is unaware of the extended FTP commands for #FTPPUT, #FTPLIST, #FTPAPP, #FTPGET.

Values:

0 : always use EPRT and EPSV commands

1 : if both module and server ipv4 use PORT and PASV commands

If parameter <tout> is omitted the behavior of set command is the same as read command.

AT#FTPCFG?

Read command reports the currently selected parameters in the format:

#FTPCFG: <tout>,<IPPignoring>,<FTPSEn>,<FTPext>

AT#FTPCFG=?

Test command reports the supported range of values for parameter(s): <tout>, <IPPignoring>, <FTPSEn>, and <FTPext>.

HTTP

AT#HTTPCFG - Configure HTTP Parameters

This command sets the parameters needed to the HTTP connection.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#HTTPCFG=<prof_id>[,<server_address>[,<server_port>[,<auth_type>[,<username>[,<password>[,<ssl_enabled>[,<timeout>[,<cid>[,<pkt_size>[,<unused1>[,<unused2>]]]]]]]]]]

Parameters:

Name	Type	Default	Description
<prof_id>	integer	N/A	select the profile identifier. Value: 0÷2 : Profile identifier
<server_address>	string	-	IP address of the HTTP server. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any valid IPv6 address in one of the following format: "xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx. xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx" "xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx" - any host name to be solved with a DNS query. Default: "" for first and second profile "m2mlocate.telit.com" for third profile
<server_port>	integer	N/A	select TCP remote port.

for first and second profile 80, by default

for third profile 9978, by default

Value:

1÷65535	:	TCP remote port of the HTTP server to connect to

<auth_type> integer 0 select HTTP authentication type.

Values:

0	:	no authentication
1	:	basic authentication

<username> string - configure authentication user identification string for HTTP.

<password> string - configure authentication password string for HTTP.

<ssl_enabled> integer 0 enable/disable SSL encryption.

Values:

0	:	SSL encryption disabled
1	:	SSL encryption enabled

<timeout> integer 120 timeout, data from HTTPS server.

Value:

			1÷65535 : time interval in seconds to wait for receiving data from HTTP server.
<cid>	integer	-	PDP context identifier. See +CGDCONT command.
<pkt_size>	integer	1500	size for data sending (#HTTPSND) or receiving (#HTTPRCV). Values: 0 : select automatically default value 1÷1500 : send or receive size in bytes
<unused1>	integer	-	parameter for future use. Must be set to 0.
<unused2>	integer	-	parameter for future use. Must be set to 0.

A special form of the set command, AT#HTTPCFG=<prof_id>, causes the values for profile number <prof_id> to reset to default values.

Only one profile can use the SSL encryption.

AT#HTTPCFG?

Read command returns the current settings for each defined profile in the format:

#HTTPCFG:<prof_id>,<server_address>,<server_port>,<auth_type>,<username>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0,0<CR><LF>[<CR><LF>

#HTTPCFG:<prof_id>,<server_address>,<server_port>,<auth_type>,<username>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0,0]<CR><LF>[...]]

AT#HTTPCFG=?

Test command returns the supported range of parameters <prof_id>, <server_port>, <auth_type>, <ssl_enabled>, <timeout>, <cid>,<pkt_size>,<unused1>,<unused2>, and the maximum length of <server_address>, <username> and <password> parameters in the format:

#HTTPCFG:(list of supported <prof_id>s),<s_length>,(list of supported <server_port>s), (list of supported <auth_type>s),<u_length>,<p_length>,(list of supported <ssl_enabled>s),(list of supported <timeout>s),(list of supported <cid>s),(list of supported <pkt_size>s),(0),(0)

Additional info:

▶▶ Meaning of the <..._length> parameters:

Name	Type	Default	Description
<s_length>	integer	-	maximum length of parameter <server_address>
<u_length>	integer	-	maximum length of parameter <username>.
<p_length>	integer	-	maximum length of parameter <password>.

AT#HTTPQRY - Send HTTP GET, HEAD or DELETE Request

This command performs a GET, HEAD or DELETE request to HTTP server.

Standard RFC 2616

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#HTTPQRY=<prof_id>,<command>,<resource>[,<extra_header_line>]

Parameters:

Name	Type	Default	Description
<prof_id>	integer	N/A	profile identifier
	Value:		
	0÷2 : identifier values		
<command>	integer	0	identifies command requested to HTTP server
	Values:		
	0 : GET		
	1 : HEAD		
	2 : DELETE		
<resource>	string	-	is the HTTP resource (URI), object of the request. It must

			always start with "/" (slash character)
<extra_header_line>	string	-	is the optional HTTP header line

Additional info:

- When the HTTP server answer is received, then the following URC is put on the serial port:

  #HTTPRING: <prof_id>,<http_status_code>,<content_type>,<data_size>

  If there are no data from server or the server does not answer within the time interval specified in <timeout> parameter of #HTTPCFG command, then the URC #HTTPRING <http_status_code> parameter has value 0.

Name	Type	Default	Description
<http_status_code>	string	-	is the status code, as received from the server, see RFC 2616
<content_type>	string	-	reports the "Content-Type" header line, as received from the server, see RFC 2616. This field is empty if <http_status_code> has a value out of range (200-206).

<data_size>	string	-	is the byte amount of data received from the server. If the server does not report the "Content-Length:" header line, or <http_status_code> has a value out of range (200-206), the parameter value is 0.

To set more than one HTTP header line in parameter <extra_header_line>, they have to be separated by ">>"

Example:
AT#HTTPQRY=0,0, "myURI","Content-Type: xyz>>Authorization: something"

Where:
"myURI" must always start with "/" (slash).

Here an example where #HTTPQRY requests for the homepage of www.myhost.com:

AT#HTTPCFG=0,"www.myhost.com",80
OK
AT#HTTPQRY=0,0,"/"
OK

If sending ends successfully, the response is OK; otherwise an error code is reported.

The HTTP request header sent with #HTTPQRY always contains the "Connection: close" line, and it cannot be removed.

AT#HTTPQRY=?

Test command reports the supported range of values for the parameters <prof_id> and <command> and the maximum length of <resource> parameter in the format:

#HTTPQRY:(list of supported <prof_id>s),(list of supported <command>s),<r_length>, <m_length>

Additional info:

▶▶ Meaning of <..._length> parameters:

Name	Type	Default	Description
<r_length>	integer	-	maximum length of parameter <resource>.
<m_length>	integer	-	maximum length of parameter <extra_header_line>.

AT#HTTPSND - Send HTTP POST or PUT request

This command performs a POST or PUT request to HTTP server and starts sending data to the server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#HTTPSND=<profId>,<command>,<resource>,<dataLen>[,<postParam>[,<extraHeaderLine>]]

After entering AT#HTTPSND=... command, and terminated the command line with <CR>, the module returns the following three characters sequence prompt, and waits for data to send:

<greater_than><greater_than><greater_than> (see IRA character set: 62, 62, 62)

Now, data can be entered from TE, sized <dataLen> bytes. If sending ends successfully the response will be OK, otherwise an error code will be reported.

When the HTTP server answer is received, the URC will be available on the serial port with the following format:

#HTTPRING: <profId>,<httpStatusCode>,<contentType>,<dataSize>

The URC parameters are described in Unsolicited Field section.

Parameters:

Name	Type	Default	Description
<profId>	integer	N/A	profile identifier
	Value:		
	0÷2	:	profile identifier
<command>	integer	N/A	command requested to HTTP server
	Values:		

			0 : POST command 1 : PUT command
<resource>	string	-	HTTP resource (uri), object of the request
<dataLen>	integer	-	data length to send in bytes
<postParam>	string	N/A	HTTP Content-type identifier, used only for POST command, optionally followed by colon character (:) and a string that extends with sub-types the identifier Values: 0[:extension] : "application/x-www-form-urlencoded " with optional extension 1[:extension] : "text/plain" with optional extension 2[:extension] : "application/octet-stream" with optional extension 3[:extension] : "multipart/form-data" with optional extension other : free string corresponding to other content type and possible sub-types
<extraHeaderLine>	string	-	optional HTTP header line

Unsolicited fields:

Name	Type	Description
<httpStatusCode>	integer	status code, as received from the server (see RFC 2616)
<contentType>	string	"Content-Type" header line, as received from the server (see RFC 2616). This field is empty if <httpStatusCode> has a value out of range (200-206)
<dataSize>	integer	byte amount of data received from the server. If the server does not report the "Content-Length:" header line or <httpStatusCode> has a value out of range (200-206), the parameter value is 0.

The HTTP request header sent with #HTTPSND always contains the "Connection: close" line, and it cannot be removed.

If there are no data from server or the server doesn't answer within the time interval specified in <timeout> parameter of #HTTPCFG command, then the URC #HTTPRING <httpStatusCode> parameter will have value 0.

AT#HTTPSND=?

Test command returns the supported range of parameters <profId>, <command> and <dataLen> and the maximum length of <resource>, <postParam> and <extraHeaderLine> string parameters in the format:

HTTPSND: (list of supported <profId>s),(list of supported <command>s), <rLength>, (list of supported <dataLen>s),<pLength>,<mLength>

Additional info:

<...Length> parameters meaning:

Name	Type	Default	Description
<rLength>	integer	-	maximum length of parameter <resource>
<pLength>	integer	-	maximum length of parameter <postParam>
<mLength>	integer	-	maximum length of parameter <extraHeaderLine>

POST commands examples.

- Post 100 byte without "Content-type" header

  AT#HTTPSND=0,0,"/",100

  >>>

- Post 100 byte with "application/x-www-form-urlencoded"

  AT#HTTPSND=0,0,"/",100,0

  >>>

- Post 100 byte with "multipart/form-data" and extension

  AT#HTTPSND=0,0,"/",100,"3:boundary=----FormBoundary"

  >>>

AT#HTTPRCV - Receive HTTP Server Data

This command permits the user to read data from HTTP server in response to a previous HTTP module request.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#HTTPRCV=<profId>[,<maxByte>]

The module is notified of these data by the #HTTPRING URC.

The device shall prompt a three-character sequence followed by the data:

<less_than><less_than><less_than> (see IRA character set: 60,60,60)

If reading ends successfully, the response is OK; otherwise an error code is reported.

Parameters:

Name	Type	Default	Description
<profId>	integer	N/A	profile identifier
	Value:		
	0÷2	:	profile identifier
<maxByte>	integer	0	max number of bytes to read at a time
	Value:		
	0, 64÷1500	:	0 means infinite size.

If <maxByte> is unspecified, server data will be transferred all in once.

If the data are not present or the #HTTPRING <httpStatusCode> parameter has value 0, an error code is reported.

AT#HTTPRCV=?

Test command reports the supported range of values for <profId> and <maxByte> parameters in the format:

HTTPRCV: (list of supported <profId>s,<maxByte>)

AT#HTTPSETRESOURCE - HTTP resource Setting

This command sets the value of URI for subsequent AT#HTTPSND and AT#HTTPQRY commands in case the value of <resource> is empty.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#HTTPSETRESOURCE=<profId>

After command line is terminated with <CR>, the device responds sending a four character sequence prompt:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

At this point, URI string can be introduced to be used in subsequent AT#HTTPSND and AT#HTTPQRY commands in case the value of <resource> is empty in those commands.

To complete the operation, send Ctrl-Z char (0x1A hex). To exit without completing the operation send ESC char (0x1B hex).

Parameter:

Name	Type	Default	Description
<profId>	integer	N/A	profile identifier (see AT#HTTPSND and AT#HTTPQRY commands); currently not used

Value:

0÷2	:	profile identifier

Maximum length for HTTP resource (URI) string is 1500 characters.

AT#HTTPSETRESOURCE=?

Test command returns OK result code.

AT#HTTPRCVF - Receive and Store HTTP Server Data

This command permits the user to read data from HTTP server into a file in response to a previous HTTP module request.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#HTTPRCVF=<prof_id>,<dest_filename>[,<verbose_lev>]

Execution command permits the user to read data from HTTP server into a file in response to a previous HTTP module request.
The module is notified of these data by the #HTTPRING URC.
If reading ends successfully, the response is OK; otherwise an error code is reported.

Parameters:

Name	Type	Default	Description
<prof_id>	integer	N/A	profile identifier Value: 0÷2 : profile identifier
<dest_filename>	string	-	the name of file where received data is stored. It could be a folder name and a file name, in the format /folder name/file name, or just a file name. Maximum length for both folder name and file name is 28 characters
<verbose_lev>	integer	0	verbose level Values:

0 : hash mark printing disabled during file receiving

1 : hash mark printing enabled during file receiving every 4096 bytes

If the data are not present or the #HTTPRING <http_status_code> parameter has value 0, an error code is reported.

AT#HTTPRCVF=?

Test command reports the supported range of values for <prof_id> and <verbose_lev> parameters and the maximum length of <dest_filename> parameter in the format:

#HTTPRCVF: (list of supported <prof_id>s), <d_length>,(list of supported <verbose_lev>s)

Additional info:

Parameters meaning:

Name	Type	Default	Description
<d_length>	integer	-	indicating the maximum length of parameter <dest_filename>

AT#HTTPSNDF - Send HTTP POST or PUT request

This command performs a POST or PUT request to HTTP server and starts sending data read from a file to the server.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#HTTPSNDF=<prof_id>,<command>,<resource>,<source_filename>[,<verbose_lev>[,<post_param>[,<extra_header_line>]]]

Perform a POST or PUT request to HTTP server and start sending data read from a file to the server.

Parameters:

Name	Type	Default	Description
<prof_id>	integer	N/A	indicating the profile identifier
	Value:		
	0÷2 : profile identifier		
<command>	integer	N/A	indicating the command requested
	Values:		
	0 : POST command		
	1 : PUT command		

2 : transfer binary file that includes headers

<resource>	string	-	indicating the HTTP resource (uri), object of the request
<source_filename>	string	-	indicating the name of file to be transferred
<verbose_lev>	integer	0	verbose level

Values:

0 : hash mark printing disabled during file sending

1 : hash mark printing enabled during file sending every 4096 bytes

<post_param>	mixed	N/A	indicating the HTTP Content-type identifier, used only for POST command, optionally followed by colon character (:) and a string that extends with sub types the identifier

Values:

0[:extension] : "application/x-www-form-urlencoded" with optional extension

1[:extension] : "text/plain" with optional extension

2[:extension]	:	"application/octet-stream" with optional extension
3[:extension]	:	"multipart/form-data" with optional extension
other content	:	free string corresponding to other content type and possible sub-types

<extra_header_line>	string	-	indicating optional HTTP header line. If sending ends successfully, the response is OK; otherwise an error code is reported.

Additional info:

- The HTTP request header sent with #HTTPSND always contains the "Connection: close" line, and it can not be removed.

  When the HTTP server answer is received, then the following URC is put on the serial port:

  #HTTPRING:<prof_id>,<http_status_code>,<content_type>,<data_size>

Name	Type	Default	Description
<prof_id>	integer	-	profile identifier
<http_status_code>	integer	-	status code, as received from the server (see RFC 2616)

<content_type>	string	-	reporting the "Content-Type" header line, as received from the server (see RFC 2616). This field is empty if <http_status_code> has a value out of range (200-206).
<data_size>	integer	-	amount of data received from the server. If the server does not report the "Content-Length:" header line or <http_status_code> has a value out of range (200-206), the parameter value is 0.

If there are no data from server or the server does not answer within the time interval specified in <timeout> parameter of #HTTPCFG command, then the URC #HTTPRING <http_status_code> parameter has value 0.

AT#HTTPSNDF=?

Test command returns the supported range of parameters <prof_id>, <command> and <verbose_lev> and the maximum length of <resource>, <source_filename>, <post_param> and <extra_header_line> parameters in the format:

#HTTPSND: (list of supported <prof_id>s),(list of supported <command>s), <r_length>, <s_length>, (list of supported <verbose_lev>s), <p_length>,<m_length>

Additional info:

- Parameters meaning:

Name	Type	Default	Description
<r_length>	integer	-	indicating the maximum length of parameter <resource>
<s_length>	integer	-	indicating the maximum length of parameter <source_filename>
<p_length>	integer	-	indicating the maximum length of parameter <post_param>
<m_length>	integer	-	indicating the maximum length of parameter <extra_header_line>

AT#HTTPSETHEADER - HTTP Extra Header Setting

This command sets the value of an extra header for subsequent AT#HTTPSND and AT#HTTPQRY commands in case the parameter <extra_header_line> is not set.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#HTTPSETHEADER=<profId>

After command line is terminated with <CR>, the device responds sending a four character sequence prompt:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

At this point, extra header string can be introduced to be used in subsequent AT#HTTPSND and AT#HTTPQRY commands in case the value of <extra_header_line> is not present in those commands.

To complete the operation, send Ctrl-Z char (0x1A hex). To exit without completing the operation send ESC char (0x1B hex).

Parameter:

Name	Type	Default	Description
<profId>	integer	N/A	profile identifier (see AT#HTTPSND and AT#HTTPQRY commands); currently not used

Value:

0÷2	:	profile identifier

Maximum length for HTTP extra header string is 1500 characters.

AT#HTTPSETHEADER=?

Test command returns OK result code.

COAP

AT#COAPCFG - Configure COAP parameters

This command sets the connection parameters for the selected COAP client

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#COAPCFG=<instanceN>,<cid>[,<coap_timeout>,<sec_en>]

Set command writes the COAP parameters for the specified client.

Parameters:

Name	Type	Default	Description
<instanceN>	integer	N/A	Instance number
	Value:		
	1 : only one Instance supported.		
<cid>	integer	0	PDP Context ID to be used for the connection
	Values:		
	1÷6 : PDP Context ID		
<coap_timeout>	integer	N/A	response waiting timeout
	Values:		

			30÷45 : response waiting timeout in seconds
<sec_en>	integer	0	enable/disable DTLS (PSK method)
	Values:		
			0 : disable
			1 : enable

AT#COAPCFG?

Read command returns the configuration of active COAP client in the format:

#COAPCFG: <instanceN>,<cid>,coap_timeout>,<sec_en>

AT#COAPCFG=?

Test command reports the available range of values for parameters

Set command

AT#COAPCFG=1,1,45,0

OK

Read command

AT#COAPCFG?

#COAPCFG: 1,1,45,0

OK

Test command (refer to module output for real ranges)

AT#COAPCFG=?

#COAPCFG: (1), (1-6), (30-45), (0-1)

OK

AT#COAPCLOSE - Closing the COAP client connection

This command disconnects from COAP server

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#COAPCLOSE=<instanceN>

Disconnect from COAP server

Parameter:

Name	Type	Default	Description
<instanceN>	integer	N/A	Instance number

Value:

1 : only one Instance supported.

AT#COAPCLOSE=?

Test command reports the available range of values for parameter

Set command

Close active connection instance

AT#COAPCLOSE=1

OK

Test command (refer to module output for real ranges)

AT#COAPCLOSE=?

#COAP: (1)

OK

AT#COAPCMD - Communicate with COAP server

This command connects with provided URI and transfers data

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#COAPCMD=<instanceN>,<cmd>,<uri>[,<confirm>,<content>,<obs_opt>,<payloadlen>]

Set command establishes connection with COAP server and communicates with server.

Parameters:

Name	Type	Default	Description
<instanceN>	integer	N/A	Instance number

Value:

1 : only one Instance supported.

<cmd>	string	N/A	COAP method

Values:

"GET"	:	Trigger COAP GET
"PUT"	:	Trigger COAP PUT
"POST"	:	Trigger COAP POST
"DELETE"	:	Trigger COAP DELETE

<uri>	string	N/A	URI of the target resource at server
<confirm>	integer	0	confirmation mode

Values:

0	:	Non-confirmed mode
1	:	confirmation mode

<content>	integer	N/A	Content type for "GET", "PUT" and "POST"

Values:

0	:	Text/plain
40	:	Application/link-format
41	:	Application/xml
42	:	Application/octet-stream
50	:	Application/json

<obs_opt>	integer	0	Observer option enabled or cancelled

Value:

0	:	Not enabled
1	:	Enable Observe for resource
2	:	Cancel Observe for resource

<payloadlen>	integer	N/A	payload length in bytes

Values:

0	:	for "GET" and "DELETE"
1÷1024	:	actual <data> payload size to send in "PUT" and "POST"

Additional info:

▶▶ #COAPRCV - Received data for COAP COMMANDS

#COAPRCV: <rsp_code>, <content>, <payloadlen>

followed by the payload

Name	Type	Default	Description
<rsp_code>	integer	N/A	Response code: holds information of command status

Values:

201	:	The resource was created at the request URI
202	:	The resource was successfully deleted at the request URI
203	:	The resource was processed successfully and valid at the request URI

204	:	The resource was modified or updated at the request URI
205	:	The resource content at the request URI
400	:	The request is incorrect or not valid (Bad Request)
401	:	The request is unauthorized
402	:	The request has bad option
404	:	The request URL not found
405	:	The Request method not allowed
406	:	The Request method not acceptable
500	:	The Request failed due to Internal server error
501	:	The Request method not implemented on server
502	:	Bad gateway error
503	:	The Requested service not available on server
504	:	Gateway time out error

<content>	integer	N/A	Content type for "GET", "PUT" and "POST"

Values:

0	:	Text/plain
40	:	Application/link-format
41	:	Application/xml
42	:	Application/octet-stream
50	:	Application/json

<payloadlen>	integer	N/A	Length in bytes of received payload

URC Messages

#COAPURC: <rsp_code>,<token>, <content>,<payload_len,<payload>

This will be the URC Notification from the Server when Observe on a resource is set.

Name	Type	Default	Description
<token>	string	N/A	Token value in string
<content>	integer	N/A	Content type for "GET", "PUT" and "POST"
			Values:

0	:	Text/plain
40	:	Application/link-format
41	:	Application/xml
42	:	Application/octet-stream
50	:	Application/json

<payloadlen>	integer	N/A	Length in bytes of received payload
<payload>	string	N/A	Response from server

- Non-confirmed will be supported in next phase
- Max payload length 1024 bytes
- Enter payload after appearing of the symbol >>>

AT#COAPCMD=?

Test command reports the available range of values for parameters

For PUT and POST methods, after the command is issued, the module enters data entry mode (indicated by the >>> prompt).

The terminal (TE) must then send the payload data, up to <payloadLen> bytes.

If no data is entered within 10 seconds, the command is automatically terminated with an error.

The entered data is transmitted as the COAP message payload to the specified server.

Set command

AT#COAPCMD=1,"GET","coap://coap.me:5683/hello",0,,0,0,,,0,

#COAPRCV: 205,0,5

World

OK

AT#COAPCMD=1,"PUT","coap://10.145.60.23:5683/hello",1,0,0,10,

>>>

#COAPURC: 204,0

OK

Test command (refer to module output for real ranges)

AT#COAPCMD=?

#COAPCMD: (1),("GET", "PUT","POST","DELETE"),"",(0-1),(0,40-42,50),(0-2),(0,1-1024)

OK

AT#COAPSCFG - Configure Secure COAP parameters

This command sets the security connection parameters for the COAP client

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#COAPSCFG=<instanceN>,<psk>,<psk_id>

Set command writes the COAP secure parameters for the specified client.

Parameters:

Name	Type	Default	Description
<instanceN>	integer	N/A	Instance number Value: 1 : only one Instance supported.
<psk>	string	N/A	PSK value Length of string varies from 8 bytes to 64 bytes
<psk_id>	string	N/A	PSK identity value Length of string varies from 1 byte to 128 bytes

AT#COAPSCFG?

Read command returns the secure configuration of all active COAP client in the format:

#COAPSCFG: <instanceN>,<psk>,<psk_id>

AT#COAPSCFG=?

Test command reports the available range of values for parameters

Set command

AT#COAPSCFG=1,"321f24e0f22e24542657ad0e0db8b887",

"75d3a4e3013f75c44d1bb382b7c62b69"

OK

Read command

AT# COAPSCFG? #COAPSCFG:1,"321f24e0f22e24542657ad0e0db8b887",

"75d3a4e3013f75c44d1bb382b7c62b69"

OK

Test command (refer to module output for real ranges)

AT#COAPSCFG=?

#COAPSCFG: (1),(8-64),(1-128)

OK

SSL

AT#SSLCFG - Configure General Parameters of a SSL Socket

This command configures SSL connection parameters.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#SSLCFG=<SSId>,<cid>,<pktSz>,<maxTo>,<defTo>,<txTo>[,<SSLSRingMode>[,<noCarrierMode>[,<skipHostMismatch>[,<equalizeTX> [,<connTo >[,<Unused1>]]]]]]

Set command allows configuring SSL connection parameters.

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1÷conMax :		Secure Socket Identifier value; conMax value is returned by Test command
<cid>	integer	-	PDP context identifier, see +CGDCONT command.
<pktSz>	integer	0	packet size to be used by the SSL/ TCP/IP stack for data sending
	Values:		
	0 :		select automatically default value (300)
	1÷1500 :		number of bytes

<maxTo>	integer	90	exchange timeout or socket inactivity timeout. In online mode, if there is no data exchange within this timeout period, the connection is closed.

Values:

0	:	no timeout
1÷65535	:	timeout in seconds

<defTo>	integer	100	timeout that will be used by default whenever the corresponding parameter of each command is not set.

Value:

10÷5000	:	timeout in tenth of seconds

<txTo>	integer	50	data sending timeout. In online mode, after this period data are sent also if they're less than max packet size.

Values:

0	:	no timeout
1÷255	:	timeout value in hundreds of milliseconds

<SSLSRingMode>	integer	0	SSLRING unsolicited mode

Values:

			0 : disable 1 : enable decoded data format, see Additional info section 2 : enable chunk of data format, see Additional info section
<noCarrierMode>	integer	0	selects the NO CARRIER indication format when the secure socket is closed. Values: 0 : NO CARRIER without additional information 1 : NO CARRIER:SSL,<SSId> See Additional info section 2 : NO CARRIER:SSL,<SSId>,<cause> See Additional info section
<skipHostMismatch>	integer	1	enables/disables Host Mismatch alert Values: 0 : do not ignore 1 : ignore
<equalizeTX>	integer	0	enable/disable equalized data transmission Values:

			0 : disable equalized data transmission 1 : enable equalized data transmission, i.e.: after successful data write for sending on SSL connection, next check for available <pktSz> data is triggered after <txTo>
<connTo>	integer	0	Dummy (for backward compatibility) Value: 0 : default value
<Unused1>	integer	-	parameter for future use. Must be set to 0.

Additional info:

- When <SSLSRingMode>= 1 a new unsolicited is sent whenever the amount of data ready to be read changes, the unsolicited format is:

  SSLSRING: <SSId>,<recData>

  <recData> is described in the Unsolicited fields section.

- When <SSLSRingMode>= 2 the unsolicited format is:

  SSLSRING: <SSId>,<dataLen>,<data>

  <dataLen> and <data> are described in the Unsolicited fields section.

- The NO CARRIER indication can be followed by additional information:

  NO CARRIER:SSL,<SSId>

  NO CARRIER:SSL,<SSId>,<cause>

  The fixed "SSL" string distinguishes secure sockets from TCP sockets.

Name	Type	Default	Description
<cause>	integer	N/A	cause of the secure socket closure

Values:

0 : not available (secure socket has not yet been closed)

1 : the remote TCP connection has been closed (RST, or any fatal error in send/recv are all included within this case)

2 : socket inactivity timeout

3 : network deactivation (PDP context deactivation from network)

4 : SSL "Close Notify Alert" message has been received

5 : the remote TCP connection has been closed (FIN) after all data have been retrieved from socket

6 : closure due to any other SSL alert different from the previous ones

Unsolicited fields:

Name	Type	Description
<recData>	integer	number of bytes available to be read from the TLS/SSL record that is currently being processed (obviously: already

		decoded from TLS/SSL record) plus the number of bytes available to be read in the TCP/IP stack.
<dataLen>	integer	length of the current chunk of data in bytes
<data>	hex	received data in ASCII format

If secure socket is not enabled using #SSLEN only test requests can be made.

This version of command reordered the parameters of the command, so this is not interchangeable with previous version

AT#SSLCFG?

Read command reports the parameters current values in the format:

#SSLCFG:<SSId>,<cid>,<pktSz>,<maxTo>,<defTo>,<txTo>,<SSLSRingMode>,<noCarrierMode>,<skipHostMismatch>,<equalizeTX>,0,0

AT#SSLCFG=?

Test command reports the ranges of all parameters values.

AT#SSLSECCFG - Configure Security Parameters of a SSL Socket

This command allows configuring SSL connection parameters.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLSECCFG=<SSId>,<CipherSuite>,<auth_mode>[,<cert_format>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier Value: 1÷conMax : Secure Socket Identifier value; conMax value is returned by Test command
<CipherSuite>	integer	-	identify the cipher suite. The value 0 means that the cipher suite is chosen by remote server, see Additional info section. Other values are expressed in hex format and identify the cipher suite though its RFC value. The supported values are listed in the Additional info section.
<auth_mode>	integer	0	authentication mode

Values:

0 : SSL Verify None

1 : manage server authentication

2 : manage server and client authentication if requested by the remote server

<cert_format> integer - dummy

Additional info:

▶▶ With <CipherSuite> =0 cipher suite is chosen by remote server among the following:

TLS 1.2:

TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256,

TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384,

TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256,

TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384,

TLS_RSA_WITH_AES_128_CBC_SHA,

TLS_RSA_WITH_AES_256_CBC_SHA,

TLS_DHE_RSA_WITH_AES_128_CBC_SHA,

TLS_DHE_RSA_WITH_AES_256_CBC_SHA,

TLS_RSA_WITH_AES_128_CBC_SHA256,

TLS_DHE_RSA_WITH_AES_128_CBC_SHA256,

TLS_RSA_WITH_AES_256_CBC_SHA256,

TLS_DHE_RSA_WITH_AES_256_CBC_SHA256

TLS 1.3:

TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256,

TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384,

TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256,

TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384,

TLS_RSA_WITH_AES_128_CBC_SHA,

TLS_RSA_WITH_AES_256_CBC_SHA,

TLS_DHE_RSA_WITH_AES_128_CBC_SHA,

TLS_DHE_RSA_WITH_AES_256_CBC_SHA,

TLS_RSA_WITH_AES_128_CBC_SHA256,

TLS_DHE_RSA_WITH_AES_128_CBC_SHA256,

TLS_RSA_WITH_AES_256_CBC_SHA256,

TLS_DHE_RSA_WITH_AES_256_CBC_SHA256,

TLS_AES_128_GCM_SHA256,

TLS_AES_256_GCM_SHA384,

TLS_CHACHA20_POLY1305_SHA256

▶▶ The first column shows the <CipherSuite> (RCF) values expressed in hex format, the second column indicates the related cipher suite name.

0x002F : TLS_RSA_WITH_AES_128_CBC_SHA
0x0033 : TLS_DHE_RSA_WITH_AES_128_CBC_SHA
0x0035 : TLS_RSA_WITH_AES_256_CBC_SHA
0x0039 : TLS_DHE_RSA_WITH_AES_256_CBC_SHA
0x003C : TLS_RSA_WITH_AES_128_CBC_SHA256
0x003D : TLS_RSA_WITH_AES_256_CBC_SHA256
0x0067 : TLS_DHE_RSA_WITH_AES_128_CBC_SHA256
0x006B : TLS_DHE_RSA_WITH_AES_256_CBC_SHA256
0x009C : TLS_RSA_WITH_AES_128_GCM_SHA256
0x009D : TLS_RSA_WITH_AES_256_GCM_SHA384
0x009E : TLS_DHE_RSA_WITH_AES_128_GCM_SHA256

0x009F : TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
0xC004 : TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA
0xC005 : TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA
0xC009 : TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA
0xC00A : TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA
0xC00E : TLS_ECDH_RSA_WITH_AES_128_CBC_SHA
0xC00F : TLS_ECDH_RSA_WITH_AES_256_CBC_SHA
0xC013 : TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
0xC014 : TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
0xC023 : TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
0xC024 : TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
0xC025 : TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256
0xC026 : TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384
0xC027 : TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
0xC028 : TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
0xC029 : TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256
0xC02A : TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384
0xC02B : TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
0xC02C : TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
0xC02D : TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256
0xC02E : TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384
0xC02F : TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
0xC030 : TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
0xC031 : TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256
0xC032 : TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384
0xC0A0 : TLS_RSA_WITH_AES_128_CCM_8
0xC0A1 : TLS_RSA_WITH_AES_256_CCM_8
0xCCAA : TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256
0x1301 : TLS_AES_128_GCM_SHA256
0x1302 : TLS_AES_256_GCM_SHA384
0x1303 : TLS_CHACHA20_POLY1305_SHA256
0x1304 : TLS_AES_128_CCM_SHA256
0x1305 : TLS_AES_128_CCM_8_SHA256

- Server CA certificate must be stored through #SSLSECDATA.
- Setting an obsolete cipher suite have the same effect as setting it to 0.

  If secure socket is not enabled using #SSLEN command, only test command can be used.
- If <auth_mode> is different from 0, the module uses its internal time and date to validate the certificate validity period.

  If time and date are incorrectly set, the certificate validation may fail. For additional information refer to AT+CCLK, AT#NITZ or AT#NTP.
- It is supposed that the module is just powered on and the AT#SSLSECCFG command is entered without <cert_format> parameter, the default format is PEM.

  In this case the AT#SSLSECCFG? read command does not return the setting of the format in order to meet backward compatibility.

  Now, let's assume that AT#SSLSECCFG command is entered again, but using the <cert_format> parameter for the first time: if the read command is entered, it reports the parameter value just used.

  If subsequently the <cert_format> is omitted, the AT#SSLSECCFG? read command reports the parameter value entered the last time.

  Authentication Mode 0 (SSL certificate verification disabled) is not supported in TLS1.3.

  Setting <auth_mode> to 0 in #SSLSECCFG and <MinVersion> to 4 in #SSLSECCFG2 will lead to a connection error caused by a handshake failure.

AT#SSLSECCFG?

Read command reports the currently selected parameters in the format:

#SSLSECCFG: <SSId>,<CipherSuite>,<auth_mode>,<cert_format>

Read command returns ERROR if secure socket has not been enabled using #SSLEN command.

AT#SSLSECCFG=?

Test command returns the range of supported values for all the parameters.

AT#SSLEN - Enable a SSL Socket

This command activates/deactivates a socket secured by SSL.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLEN=<SSId>,<Enable>

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1÷conMax	:	Secure Socket Identifier value; conMax value is returned by Test command

Name	Type	Default	Description
<Enable>	integer	0	activate/deactivate secure socket

Values:

0	:	deactivate
1	:	activate

If the unique available secure socket is not activated, all the commands - belonging to the SSL set (example: #SSLSECDATA, #SSL..., etc.) and different from test commands - return an error message. #SSLS command is an exception, it can be issued also if the socket is deactivated.

If the unique available secure socket is connected, it cannot be deactivated issuing AT#SSLEN=1,0.

AT#SSLEN?

Read command reports the current status of secure socket in the format:

#SSLEN: <SSId>,<Enable>
OK

AT#SSLEN=?

Test command returns the range of supported values for all the parameters:

#SSLEN: (1-10),(0,1)

AT#SSLD - Open a SSL Socket to a Remote Server

This command opens a remote connection via socket secured through SSL.

SIM Presence	Setting saved	Can be aborted
Required	Other	No

AT#SSLD=<SSId>,<rPort>,<IPAddress>,<ClosureType>
[,<connMode>[,<Timeout>[,<txProt>]]]

Execution command opens a remote connection via socket secured through SSL.

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1÷conMax : Secure Socket Identifier value; conMax value is returned by Test command		
<rPort>	integer	1	Remote TCP port to contact
	Value:		
	1÷65535 : TCP port number		
<IPAddress>	string	-	address of SSL server.

<ClosureType>	integer	0	Closure type

Value:

0 : Until now only closure type 0 is supported. SSL session id and keys are free.

<connMode>	integer	1	connection mode

Values:

0 : online mode connection, see Additional info section.

1 : command mode connection, see Additional info section.

<Timeout>	integer	100	It represents the maximum allowed TCP inter-packet delay. It means that, when more data is expected during the handshake, the module awaits <Timeout> * 100 msec for the next packet. If no more data can be read, the module gives up the handshake and raises an ERROR response. <Timeout> is the total handshake timeout or, in other words, it is not the absolute maximum time between the #SSLD issue and the CONNECT/OK/ERROR response. Though by changing this parameter you can limit the handshake duration (for example in case of congested network or busy server), there is no way to be sure to get the command response within a certain amount of time, because it depends on the TCP connection time, the handshake time and the computation time (which depends on the authentication mode and on the size of keys and certificates). Value: 1÷5000 : hundreds of ms
<txProt>	integer	0	Transmission Protocol Values: 0 : TLS

1 : DTLS

Additional info:

- <connMode>=0: online mode connection

  If <connMode> is set to online mode connection and the command is successful, the module enters into online data mode and returns the intermediate result code CONNECT. After the CONNECT, you can suspend the direct interface to the socket connection (the socket stays open) using the escape sequence (+++): the module moves back to command mode and returns the final result code OK after the suspension.

  After such a suspension, it is possible to resume it by using the #SSLO command with the corresponding <connId>.

- <connMode>=1: command mode connection

  If <connMode> is set to command mode connection and the command is successful, the socket is opened, the module remains in command mode and returns result code OK.

- If secure socket is not enabled using #SSLEN only test requests can be made.
- If timeout is not set for SSL connection the default timeout value, set by #SSLCFG, is used.
- In online mode the socket is closed after an inactivity period (configurable with #SSLCFG, with a default value of 90 seconds), and the NO CARRIER message is printed.
- In online mode data are transmitted as soon as the data packet size is reached or as after a transmission timeout. Both these parameters are configurable by using #SSLCFG.

- Before opening a SSL connection, the PDP context must have been activated by #SGACT=x,1
- Before opening a SSL connection, make sure to have stored the needed secure data (CA certificate), using #SSLSECDATA, for the security level set through AT#SSLSECCFG.
- The PDP context definition that will be used, is set by AT#SSLCFG command

AT#SSLD=?

Test command returns the range of supported values for all the parameters:

#SSLD: (1-10),(1-65535),,(0),(0,1),(1-5000),(0,1)

See the following examples:

- Start online mode:

  AT#SSLD =1,8500,"84.94.194.21",0,1

  OK

  CONNECT

- Start command mode:

  AT#SSLD=1,8500,"84.94.194.21",1,1

  OK

- Configure correct PDP context with AT#SSLCFG command:

  AT#SGACT=3,1

  #SGACT: XX.XXX.XXX.XXX

  OK

Note the second parameter of #SSLCFG

AT#SSLCFG=1,3,300,90,100,50,0,0,0,0

OK

AT#SSLD=1,<port>,"IP or URL",0,1

OK

CONNECT

AT#SSLO - Restore a SSL Socket after a +++

This command restores a SSL connection (online mode) suspended by an escape sequence (+++).

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SSLO=<SSId>

This command restores a SSL connection (online mode) suspended by an escape sequence (+++). After the connection restore, the CONNECT message is printed. Please note that this is possible even if the connection has been started in command mode (#SSLD with <connMode>=1).

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1÷conMax	:	Secure Socket Identifier value; conMax value is returned by Test command

- If secure socket has not be enabled through #SSLEN command, only test command can be used.
- Before opening a SSL connection, the PDP context must have been activated by AT#SGACT=X,1.
- If an error occurs during reconnection the socket cannot be reconnected, then a new connection has to be done.

AT#SSLO=?

Test command returns the range of supported values for all the parameters:

#SSLO: (1-10)

AT#SSLH - Close a SSL Socket

This command allows closing the SSL connection.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SSLH=<SSId>[,<ClosureType>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1÷conMax :		Secure Socket Identifier value; conMax value is returned by Test command
<ClosureType>	integer	0	type of socket closure.
	Value:		
	0 :		only value 0 is supported

If secure socket has not be enabled through #SSLEN command, only test command can be used.

AT#SSLH=?

Test command returns the range of supported values for all the parameters:

#SSLH: (1-10),(0)

AT#SSLSEND - Send Data through a SSL Socket

This command allows sending data through a secure socket.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SSLSEND=<SSId>[,<Timeout>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1÷conMax : Secure Socket Identifier value; conMax value is returned by Test command		
<Timeout>	integer	100	socket send timeout
	Value:		
	1÷5000 : timeout in 100 ms units		

Additional info:

After command line is terminated with <CR>, the command returns the following four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the data to be send.

to end the data editing and start the sending, enter Ctrl-Z char (0x1A hex). The maximum number of bytes to send is 1023, trying to send more data will cause the data excess to be discarded and lost.

to exit without sending the message, enter ESC char (0x1B hex).

If data are successfully sent, the command returns OK. If data sending fails, an error code is reported.

If secure socket has not be enabled through #SSLEN command, only test command can be used.

If timeout is not set for SSL connection, is used the timeout value set by #SSLCFG.

Before sending data through the SSL connection, it must be established using #SSLD.

AT#SSLSEND=?

Test command returns the range of supported values for all the parameters.

AT#SSLRECV - Read Data from a SSL Socket

This command reads data from a SSL socket.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SSLRECV=<SSId>,<MaxNumByte>[,<Timeout>]

Set command allows to receive data, arrived through a connected secure socket. Data has been buffered and not read yet.

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1÷conMax :		Secure Socket Identifier value; conMax value is returned by Test command
<MaxNumByte>	integer	N/A	maximum number of bytes to read
	Value:		
	1÷1000 :		maximum number of bytes to read
<Timeout>	integer	100	time-out in 100 ms units
	Value:		

1÷5000	:	hundreds of ms

Additional info:

- If data are received, the device responds:

  #SSLRECV: NumByteRead
  ...(Data read)...
  OK

- If no data are received, the device responds:

  #SSLRECV: 0
  TIMEOUT
  OK

- If the remote host closes the connection, the device responds:

  #SSLRECV: 0
  DISCONNECTED
  OK

- If secure socket is not enabled using AT#SSLEN, only test requests can be made.
- If timeout is not set for SSL connection, the default timeout value, set through AT#SSLCFG, is used.
- Before receiving data from the SSL connection, it has to be established using AT#SSLD.

AT#SSLRECV=?

The test command returns the ranges of the parameters values in the form:

#SSLRECV: (1-10),(1-1000),(10-5000)

AT#SSLS - Report the Status of a SSL Socket

This command reports the status of secure sockets.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#SSLS=<SSId>

The command reports the status of secure sockets. The response message of the command can have the following formats:

if secure socket is connected, the format is:
#SSLS: <SSId>,<ConnectionStatus>,<CipherSuite>

otherwise:
#SSLS: <SSId>,<ConnectionStatus>

The response messages parameters are described in the Additional info section.

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1÷conMax	:	Secure Socket Identifier value; conMax value is returned by Test command

Additional info:

List of the meaning of the response message parameters.

Name	Type	Default	Description

<CipherSuite>	integer	-	identify the cipher suite. It is expressed in hex format and identified by RFC value. The supported values are listed in the #SSLSECCFG command
<ConnectionStatus>	integer	N/A	Connection Status identifier Values: 0 : socket disabled 1 : connection closed 2 : connection open

This command can be issued even if the <SSId> is not enabled.

In case of error when reading the <CipherSuite> 0xffff is returned

AT#SSLS=?

Test command returns the ranges of the parameters values in format:

#SSLS: (1-10)

</>

- AT#SSLS=1
  #SSLS: 1,1
  OK

- AT#SSLS=1
  #SSLS: 1,2,0x0035
  OK

AT#SSLI - Secure Socket Info

This command is used to get information about secure socket data traffic.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLI=<SSId>

Execution command is used to get information about secure socket data traffic. The response is in the format:

#SSLI: <SSId>,<DataSent>,<DataRecv>,<PendingData>,<TCPConnWaitingAck>

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1÷conMax	:	Secure Socket Identifier value; conMax value is returned by Test command

Additional info:

Parameters returned by the response message and not described in the previous sections.

Name	Type	Default	Description

<DataSent>	integer	-	total amount (in bytes) of data sent to the TLS/SSL connection since the beginning of the connection itself (obviously: not yet encoded into TLS/SSL record)
<DataRecv>	integer	-	total number of bytes received from the TLS/SSL connection since the beginning of the connection itself (obviously: already decoded from TLS/SSL record)

<PendingData>	integer	-	number of bytes available to be read from the TLS/SSL record that is currently being processed (obviously: already decoded from TLS/SSL record) plus the number of bytes available to be read in the TCP/IP stack.
<TCPConnWaitingAck>	integer	N/A	indication of the underlying TCP socket condition, if there are TCP/IP packets sent but not yet acknowledged or not Values: 0 : no TCP/IP packets sent waiting for ack

1 : TCP/IP packets sent
waiting for ack

AT#SSLI=?

Test command returns the range of supported values for all the parameters.

#SSLI: (1-10)

AT#SSLSENDEXT - Send Data through a SSL Socket in Command Mode

This command sends data through a secure socket.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#SSLSENDEXT=<SSId>,<bytestosend>[,<Timeout>]

Execution command sends data through a secure socket.

After command line is terminated with <CR>, the command returns the following four-character sequence prompt:

<CR><LF><greater_than><space> (see IRA 13, 10, 62, 32)

and waits for the data to be send.

When <bytestosend> bytes have been sent, the sending is automatically completed. If data are successfully sent, the command returns OK. If data sending fails, an error code is reported.

Parameters:

Name	Type	Default	Description
<SSId>	integer	N/A	Secure Socket Identifier Value: 1÷conMax : Secure Socket Identifier value; conMax value is returned by Test command
<bytestosend>	string	-	number of bytes to be sent. Refer to test command for range
<Timeout>	integer	100	time-out in 100 ms units.

Value:

1÷1500	:	hundreds of ms.

If secure socket has not be enabled through #SSLEN command, only test command can be used.

If timeout is not set for SSL connection, is used the timeout value set by #SSLCFG.

Before sending data through the SSL connection, it must be established using #SSLD.

All special characters are sent like a generic byte. For instance: 0x08 BS (Backspace) is sent through the socket, it does not delete the previous character.

AT#SSLSENDEXT=?

Test command returns the range of supported values for parameters <SSId>, <bytestosend> and <Timeout>.

Open the socket in command mode:
AT#SSLD=1,443,<port>,"IP address",0,1
OK

Send data specifying total number of bytes:
AT#SSLSENDEXT=1,256,100
>...

AT#SSLSECDATA - Manage the Security Data

The command stores, reads, and deletes security data (Certificate, CA certificate, private key) in / from NVM.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLSECDATA=<CertId>,<action>,<dataType>[,<size>[,<Password>[,<hashWhenReading>]]]

Parameters:

Name	Type	Default	Description
<CertId>	integer	1	Certificate Identifier.

Value:

1 : Certificate identifier number 1

<action>	integer	0	required action

Values:

0 : delete data from NVM

1 : store data in NVM

2 : read data from NVM

<dataType>	integer	0	security data type

Values:

0	:	certificate
1	:	CA certificate
2	:	RSA Private key. Private keys with password are not supported

<size>	integer	N/A	size of security data to be stored. The parameter is mandatory if write action is issued, can be omitted for delete or read actions.

Value:

1÷4095	:	size

<Password>	string	-	dummy parameter, unused.
<hashWhenReading>	integer	2	enable/disable showing sha256 hash when reading the private key

Values:

0	:	disables private key read protection
2	:	shows sha256 hash when reading the private key instead of the full key in clear-text

Additional info:

▶▶ Store security data in NVM

<action>=1 specifies the storing in NVM, <size> parameter is mandatory. After command line is terminated with <CR>, the command returns the following four-character sequence prompt:

<CR><LF><greater_than><space> (see IRA 13, 10, 62, 32)

If data are successfully stored, the command returns OK, otherwise an error code is reported.

▶▶ Read security data from NVM

<action>=2 specifies the reading from NVM, the <size> parameter is not mandatory. The command returns the following message:

#SSLSECDATA: <CertId>,<dataType>
<DATA>
OK

If the required security data has not been stored in NVM (or it has been deleted) the response has the following format:

#SSLSECDATA: <CertId>,<dataType>
No data stored
OK

▶▶ Read security data from NVM

<action>=2 is not allowed for RSA Private key

Certificate format

Secured data have to be in PEM format.

To complete the operation send Ctrl-Z char (0x1A hex); to exit without writing the message send ESC char (0x1B hex).

If secure socket has not be enabled through #SSLEN command, only test command can be used.

If socket is connected an error code is reported.

Only "rsa_sign" certificates are supported by the Telit Module in client authentication. The remote server must support this certificate type, otherwise the handshake will fail.

CA certificate stored in NVM

CA certificates stored in NVM are shared among all secure sockets <SSId>s

When the key is deleted, <hashWhenReading> gets restored to the default value.

AT#SSLSECDATA?

Read command reports what security data are stored for each <CertId>. The returned message has the following format:

#SSLSECDATA:
<CertId>,<CertIsSet>,<CACertIsSet>,<PrivKeyIsSet>[,,<hashWhenReading>]

<CertIsSet>, <CAcertIsSet>, <PrivKeIsset> are 1 if related data are stored into NVM otherwise 0.

Additional info:

▶▶ This Additional info section describes the parameters, if not described in the previous sections, returned by the AT#SSLSECDATA? read command.

Name	Type	Default	Description
<CertIsSet>	integer	0	identifies the certificate presence in the NVM
	Values:		
	0 : not present		
	1 : present		
<CAcertIsSet>	integer	0	identifies the CA certificate presence in the NVM
	Values:		
	0 : not present		
	1 : present		
<PrivKeyIsSet>	integer	0	identifies the RSA Private key presence in the NVM
	Values:		

0	:	not present
1	:	present

AT#SSLSECDATA=?

Test command returns the supported values for the parameters <CertId>, <action>, <dataType>, <size> and <hashWhenReading>.

AT#SSLSECCFG2 - Configure Additional Parameters of a SSL Socket

This command allows configuring additional SSL security parameters.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLSECCFG2=<SSId>,<version>[,<SNI>[,<CustomCA>[,<PreloadedCA>[,<MinVersion>]]]]

Parameters:

Name	Type	Default	Description
<SSId>	integer	N/A	Secure Socket Identifier

Value:

1÷conMax	:	Secure Socket Identifier value; conMax value is returned by Test command

Name	Type	Default	Description
<version>	integer	4	select TLS/DTLS protocol version

Values:

3	:	protocol version TLSv1.2 / DTLSv1.2
4	:	protocol version TLSv1.3 / DTLSv1.3 (see note)

<SNI>	integer	0	enable/disable Service Name Indication

Values:

0	:	SNI disabled
1	:	SNI enabled

<CustomCA>	integer	0	Dummy (for backward compatibility)

Value:

0	:	No CA certificate

<PreloadedCA>	integer	0	Dummy (for backward compatibility)

Value:

0	:	No CA certificate

<MinVersion>	integer	3	Set the Minimum acceptable TLS/ DTLS version

Values:

3	:	protocol version TLSv1.2/DTLSv1.2
4	:	protocol version TLSv1.3/DTLSv1.3 (see note)

Additional info:

<MinVersion> must be minor or equal to <version>.

Authentication Mode 0 (SSL certificate verification disabled) is not supported in TLSv1.3.

Setting <auth_mode> to 0 in #SSLSECCFG and <MinVersion> to 4 in #SSLSECCFG2 will lead to a connection error caused by a handshake failure.

If <SNI> is enabled in AT#SSLSECCFG2 then <skipHostMismatch> in AT#SSLCFG will be ignored as peer certificate name verification is always enabled when the SNI functionality is enabled.

DTLSv1.3 not supported.

The protocol selection between TLS and DTLS of the <version> and <MinVersion> parameters is performed by the <txProt> parameter of AT#SSLD.

AT#SSLSECCFG2?

Read command reports the currently selected parameters in the format:

#SSLSECCFG2: <SSId>,<version>,<SNI>,< CustomCA >,< PreloadedCA >, <MinVersion>

AT#SSLSECCFG2=?

Test command reports the range of supported values for all the parameters.

AT#SSLSECCS - Configure Cipher Suites List

This command configures a list of cipher suites, used for secure sockets

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#SSLSECCS=<ListId>[,<Action>[,<CipherSuite>]]

Parameters:

Name	Type	Default	Description
<ListId>	integer	1	Cipher Suites list Identifier

Value:

1 : Cipher Suites list Identifier (currently limited to 1)

Name	Type	Default	Description
<Action>	integer	N/A	command action if this parameter is omitted, it prints the current content of the list.

Values:

0 : Remove <CipherSuite> from <ListId>

1 : Add <CipherSuite> to <ListId>

2 : Remove all cipher suites from <ListId>

3 : Add all supported cipher suites to <ListId>

4 : Reset <ListId> to the default set of cipher suites

<CipherSuite>	integer	-	Cipher Suite identifier The <CipherSuite> is identified by its RCF value and it is expressed in hex format. The range of supported values is available in the Additional info section

Additional info:

▶▶ The first column shows the <CipherSuite> (RCF) values expressed in hex format, the second column indicates the related cipher suite name.

0x002F : TLS_RSA_WITH_AES_128_CBC_SHA
0x0033 : TLS_DHE_RSA_WITH_AES_128_CBC_SHA
0x0035 : TLS_RSA_WITH_AES_256_CBC_SHA
0x0039 : TLS_DHE_RSA_WITH_AES_256_CBC_SHA
0x003C : TLS_RSA_WITH_AES_128_CBC_SHA256
0x003D : TLS_RSA_WITH_AES_256_CBC_SHA256
0x0067 : TLS_DHE_RSA_WITH_AES_128_CBC_SHA256
0x006B : TLS_DHE_RSA_WITH_AES_256_CBC_SHA256
0x009C : TLS_RSA_WITH_AES_128_GCM_SHA256
0x009D : TLS_RSA_WITH_AES_256_GCM_SHA384
0x009E : TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
0x009F : TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
0xC004 : TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA
0xC005 : TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA
0xC009 : TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA
0xC00A : TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA
0xC00E : TLS_ECDH_RSA_WITH_AES_128_CBC_SHA
0xC00F : TLS_ECDH_RSA_WITH_AES_256_CBC_SHA
0xC013 : TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
0xC014 : TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
0xC023 : TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
0xC024 : TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
0xC025 : TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256

0xC026 : TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384
0xC027 : TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
0xC028 : TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
0xC029 : TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256
0xC02A : TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384
0xC02B : TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
0xC02C : TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
0xC02D : TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256
0xC02E : TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384
0xC02F : TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
0xC030 : TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
0xC031 : TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256
0xC032 : TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384
0xC0A0 : TLS_RSA_WITH_AES_128_CCM_8
0xC0A1 : TLS_RSA_WITH_AES_256_CCM_8
0xCCAA : TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256
0x1301 : TLS_AES_128_GCM_SHA256
0x1302 : TLS_AES_256_GCM_SHA384
0x1303 : TLS_CHACHA20_POLY1305_SHA256
0x1304 : TLS_AES_128_CCM_SHA256
0x1305 : TLS_AES_128_CCM_8_SHA256

- The Cipher Suites list (when configured) is used instead of the list of default ciphers, when parameter <CipherSuites> in AT#SSLSECCFG is set to 0 (cipher suite is chosen by remote server).
- The <CipherSuite>(s) are proposed to the server in the same order as they are added to the list.
- When <Action> is 3, all supported <CipherSuite>s are added to the list from strongest to weakest.

  PSK <CipherSuite>s are NOT included.
- If only <ListID> parameter is set, the command prints out the <CipherSuite>(s) currently configured on <ListID> in the following format:

  AT#SSLSECCS=<ListId>

  #SSLSECCS:

LIST<ListId>:

<01>: <CipherSuite_#1>

..

<n>: <CipherSuite_#n>

OK

AT#SSLSECCS=?

Test command returns the range of supported values for all the parameters

Add cipher suite 0x1302, 0x1301 and 0x003D to List 1 and display the new list content:

AT#SSLSECCS=1,1,0x1302

OK

AT#SSLSECCS=1,1,0x1301

OK

AT#SSLSECCS=1,1,0x003D

OK

AT#SSLSECCS=1

#SSLSECCS:

LIST1:

01: 0x1302

02: 0x1301

CIoT Optimization

AT+CCIOTOPT - CIoT Optimization Configuration

This command controls CIoT EPS (Cellular Internet of Things, Evolved Packet System) optimizations.

3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT+CCIOTOPT=[<n>[,<supportedUEopt>[,<preferredUEopt>]]]

The set command controls which CIoT EPS optimizations the UE indicates as supported and preferred in the ATTACH REQUEST and TRACKING AREA UPDATE REQUEST messages. The command also allows reporting of the CIoT EPS optimizations that are supported by the network; an unsolicited result code is used to indicate the supported CIoT EPS optimizations by the network:

+CCIOTOPTI: <supportedNetworkopt>

For parameter meaning refer to Unsolicited code values.

Parameters:

Name	Type	Default	Description
<n>	integer	0	enables or disables reporting of unsolicited result code +CCIOTOPTI:

Values:

0 : Disable reporting

1 : Enable reporting

			3 : Disable reporting and reset the parameters for CIoT EPS optimization to the default values
<supportedUEopt>	integer	0	indicates the UE's support for CIoT EPS optimizations. Values: 0 : No support 1 : Support for control plane CIoT EPS optimization
<preferredUEopt>	integer	0	indicates the UE's preference for CIoT EPS optimizations. Values: 0 : No preference 1 : Preference for control plane CIoT EPS optimization

Unsolicited field:

Name	Type	Description
<supportedNetworkopt>	integer	indicates the Network support for CIoT EPS optimizations. Values:

0	:	No support.
1	:	Support for control plane CIoT EPS optimization

In CAT-M it is possible to enable or disable CP-CIoT optimization.

While CP-IoT optimization is enabled, then it is possible set preferred UE optimization to none or CP-CIoT.

In NBIOT there is only possibility to enable CP-CIoT optimization and set it as preferred.

No possibility to disable since it is mandatory in NB-S1 -mode.

AT+CCIOTOPT?

Read command returns the current parameter values in the format:

+CCIOTOPT :<n>,<supportedUEopt>,<preferredUEopt>

AT+CCIOTOPT=?

Test command reports the range for the parameters in the format:

+CCIOTOPT: (list of supported <n>s),(list of supported <supportedUEopt>s),(list of supported <preferredUEopt>s)

FOTA & OMA

FOTA Legacy

AT#OTAUPW - OTA Delta Write

Execution command starts injection of a delta file into the device.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#OTAUPW=[<verbose_lev>[,<size>]]

Parameters:

Name	Type	Default	Description
<verbose_lev>	integer	0	Hash mark printing during injection Values: 0 : Hash mark printing disabled during injection 1 : Hash mark printing enabled during injection every 8192 bytes
<size>	integer	-	size in bytes of data to be injected

If the <size> parameter is added, #OTAUPW will finish with OK (or ERROR), otherwise must be closed with +++.

Escape sequence detection (+++) works after 6 seconds from last data received. In escape sequence detection mode, any other characters except escape sequence +++ will return ERROR.

AT#OTAUPW<CR>

has the same behavior of

AT#OTAUPW=0

AT#OTAUPW=?

Test command returns OK result code.

AT#OTAUP - OTA Check and Start Update

Execution command performs validation of delta and firmware update process.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#OTAUP=<type>[,<verbose>]

Parameters:

Name	Type	Default	Description
<type>	integer	0	Type of FOTA action

Value:

0 : delta validation and, if delta valid, start of firmware update

Name	Type	Default	Description
<verbose>	integer	0	FOTA trace verbose level

Values:

0 : no output information during validation/update process

1 : minimal output information during validation/ update process: validation percentage, update percentage, restart unsolicited message

Update process output is valid only for main UART port

AT#OTAUP=?

Test command returns OK result code.

AT#FTPGETOTA - OTA FTP Delta Download

This command starts delta download.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#FTPGETOTA=[<filename>,<verbose_lev>[,<restart>]

Set command starts delta download.

Parameters:

Name	Type	Default	Description
<filename>	string	N/A	delta file name on FTP server
<verbose_lev>	integer	0	verbose level
			Values:
			0 : hash mark printing disabled during download
			1 : hash mark printing enabled during download every 4096 bytes
<restart>	integer	0	restart required or not
			Values:
			0 : no restart required

1 : restart required: previous download of <filename> file will restart from the point it was interrupted

If reboot occurs, restart is also possible but from last sector already written.

FTP server must support "SIZE" command.

AT#FTPGETOTA=?

Test command returns the OK result code.

M2M

AT#M2MCHDIR - M2M File System Change Current Directory

This command manages the M2M File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MCHDIR=<path>

Set command sets the current working directory in the M2M file system.

Parameter:

Name	Type	Default	Description
<path>	string	-	can be: full directory path name starting with "/" relative directory path name directory name (in current directory)

- Maximum full directory length is 128 chars, maximum folder name is 64 chars.
- If <path> is not present an error code is reported.
- <path> is case sensitive.
- <path> can be equivalently enclosed on quote or not.
- Path separator must be "/".
- The current directory in M2M file system at every power on is "/mod".

AT#M2MCHDIR?

Read command reports the current working directory in the M2M file system in the format:

#M2MCHDIR: "<path>"

Additional info:

Parameter description is:

Name	Type	Default	Description
<path>	string	-	Absolute path name, quoted string type (max 128 chars, case sensitive)

AT#M2MCHDIR=?

Test command returns OK result code.

Check directory and move to dir1 directory.

- AT#M2MCHDIR?

  #M2MCHDIR: "/mod"

  OK

  AT#M2MCHDIR="dir1"

  OK

  AT#M2MCHDIR?

  #M2MCHDIR: "/mod/dir1"

  OK

AT#M2MMKDIR - M2M File System Make Directory

This command manages the M2M File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MMKDIR=<directory_name>

Set command makes a new directory in current directory (see #M2MCHDIR) or on a specified path. The new directory must be created on existing path, only one directory at time can be created.

Parameter:

Name	Type	Default	Description
<directory_name>	string	-	can be: full directory path name starting with "/" (parent directory must exist) relative directory path name (parent directory must exist) directory name (in current directory)

- Maximum full directory length is 128 chars, maximum folder name is 64 chars.
- <directory_name> is case sensitive.
- <directory_name> can be equivalently enclosed on quote or not.

AT#M2MMKDIR=?

Test command returns OK result code

```
AT#M2MMKDIR=myFolder
OK

AT#M2MMKDIR="myfolder/mySubfolder"
OK

AT#M2MCHDIR="myfolder/mySubfolder"
OK

AT#M2MMKDIR=newFolder
OK

AT#M2MCHDIR="newFolder"
OK
```

AT#M2MRMDIR - M2M File System Remove Directory

This command removes a directory in the M2M file system.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MRMDIR=<directory_name>

Set command deletes a specified directory in current directory (see #M2MCHDIR) or a directory in a specified path.

Parameter:

Name	Type	Default	Description
<directory_name>	string	-	can be: full directory path name starting with "/" relative directory path name directory name (in current directory)

- Maximum full directory length is 128 chars, maximum folder name is 64 chars
- If <directory_name> is not present an error code is reported
- <directory_name> is case sensitive
- <directory_name> can be equivalently enclosed on quote or not
- To be removed, the <directory_name> must be empty otherwise an error is returned.

AT#M2MRMDIR=?

Test command returns OK result code.

```
AT#M2MRMDIR=dir1
OK

AT#M2MRMDIR="myfolder/dir2"
OK

AT#M2MCHDIR="myfolder"
OK

AT#M2MRMDIR="mySubfolder/dir3"
OK
```

AT#M2MDEL - M2M Delete File

This command deletes specified file stored in the File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MDEL=<file_name>

Set command removes the <file_name> in the file system.

Parameter:

Name	Type	Default	Description
<file_name>	string	-	can be: full file path name starting with "/" relative file path name file name (in current directory)

- Maximum full path length is 128 chars, maximum folder or file name is 64 chars. Overall max full file path is 128 + 64 = 192 chars.
- If the file <file_name> or its path is not present an error code is reported.
- <file_name> and its path are case sensitive.
- <file_name> can be equivalently enclosed on quote or not.

AT#M2MDEL=?

Test command returns OK result code.

Remove myFile.txt file in "/mod/mySubfolder" folder

```
AT#M2MDEL=mySubfolder/myFile.txt
OK
```

AT#M2MWRITE - M2M Write a File

This command stores a file in the file system.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MWRITE=<file_name>,<size>[,<binToMod>]

Execution command stores a generic file in the folder specified by <file_name> parameter. The file should be sent using RAW ASCII file transfer, and hardware flow control should be used. After command line is terminated with <CR>, the module prompts the following five-character sequence:

<CR>,<LF>,<greater_than><greater_than><greater_than> (see IRA 13, 10, 62, 62, 62)

then a file sized <size> bytes can be sent from TE.

The operations complete when all bytes are received. If writing ends successfully the response is OK, otherwise, an error code is reported.

Parameters:

Name	Type	Default	Description
<file_name>	string	-	can be: full file name path starting with "/" relative file name path file name (in current directory)
<size>	integer	-	file size
<binToMod>	integer	-	if <file_name> is provided as filename with ".bin" extension, using <binToMod> set to 1, force the file to be automatically written on "/mod" folder whichever is the current directory.

- Maximum full path length is 128 chars, maximum folder or file name is 64 chars. Overall max full file path is 128 + 64 = 192 chars.
- If the file <file_name> or its path is not present an error code is reported.
- <file_name> can be equivalently enclosed on quote or not.
- <file_name> and its path are case sensitive.

AT#M2MWRITE=?

Test commands returns OK result code.

The partition where AT#M2MWRITE stores the files is erased after flashing via XFP or download of a FOTA delta.

```
AT#M2MCHDIR=myFolder
OK

Store "Readme.txt" file in "myFolder" folder.
AT#M2MWRITE=Readme.txt,2128
>>> here receives the prompt; then type or send the file, sized 2128 bytes
OK
```

AT#M2MREAD - M2M Read File

This command reports the content of a file stored in the File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MREAD=<file_name>

Execution command reads the content of a generic file stored in the folder specified by <file_name> parameter. After command line is terminated with <CR>, the module prompts the following five-character sequence:

<CR><LF><less_than><less_than><less_than> (see IRA 13, 10, 60, 60, 60)

followed by the file content.

Parameter:

Name	Type	Default	Description
<file_name>	string	-	can be: full file name path starting with "/" relative file name path file name (in current directory)

- Maximum full path length is 128 chars, maximum folder or file name is 64 chars. Overall max full file path is 128 + 64 = 192 chars.
- If the file <file_name> or its path is not present in the file system, an error code is reported.
- <file_name> and its path are case sensitive
- <file_name> can be equivalently enclosed on quote or not

AT#M2MREAD=?

Test command returns OK result code.

AT#M2MREAD="xxfolder/config/config.txt"
<<< here receive the prompt; then the file is displayed, immediately after the prompt
OK

AT#M2MCHDIR="xxfolder"
OK

AT#M2MREAD=config/config.txt
<<<here receive the prompt; then the file is displayed, immediately after the prompt
OK

AT#M2MLIST - M2M File System List

This command lists the contents of a folder in the File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MLIST[=<path>]

Execution command reports the list of directories and files stored in current directory of the file system (see #M2MCHDIR for current path) or in path specified by <path>. The report is shown in Additional info section.

Parameter:

Name	Type	Default	Description
<path>	string	-	can be: full directory path if starting with "/" relative directory path name directory name (in current directory)

Additional info:

Here is the report format:

[<CR><LF>#M2MLIST: <.>
<CR><LF>#M2MLIST: <..>]
[<CR><LF>#M2MLIST: <<dir_name$_1$>>...
<CR><LF>#M2MLIST: <<dir_name$_n$>>]
[<CR><LF>#M2MLIST: "<file_name$_1$>",<size$_1$>...
<CR><LF>#M2MLIST: "<file_name$_n$>",<size$_n$>]

Name	Type	Default	Description
<.>	string	-	current directory

<..>	string	-	upper directory
<dir_name>	string	-	directory name, string type delimited by characters '<' and '>' (max 64 characters, case sensitive).
<file_name>	string	-	file name, quoted sting type (max 64 characters, case sensitive).
<size>	string	-	size of file in bytes

- Maximum full directory length is 128 chars, maximum folder name is 64 chars.
- If <path> is not present an error code is reported.
- <path> is case sensitive.
- <path> can be equivalently enclosed on quote or not.
- Path separator must be "/".
- The current directory in M2M file system at every power on is "/mod".

AT#M2MLIST=?

Test command returns OK result code.

```
AT#M2MLIST
#M2MLIST: <.>
#M2MLIST: <..>
```

```
#M2MLIST: <dir1>
#M2MLIST: "file_load.bin",58044
```

```
AT#M2MLIST=/mod/mypath/myfolder
#M2MLIST: <.>
#M2MLIST: <..>
#M2MLIST: <mysubfolder>
#M2MLIST: "myfile.txt",512
#M2MLIST: "readm.txt",140
```

```
AT#M2MCHDIR=mypath
OK
```

```
AT#M2MLIST=myfolder
#M2MLIST: <.>
#M2MLIST: <..>
#M2MLIST: <mysubfolder>
#M2MLIST: "myfile.txt",512
#M2MLIST: "readm.txt",140
```

AT#M2MREADEXT - M2M Read File Extended

This command reports the content of a file stored in the File System.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#M2MREADEXT=<file_name>[,<maxByte>[,<viewMode>[,<chunkPrint>]]]

Execution command reads the content of a generic file stored in the folder specified by <file_name> parameter. After command line is terminated with <CR>, the module prompts the following five-character sequence:

<CR><LF><less_than><less_than><less_than> (see IRA 13, 10, 60, 60, 60)

followed by the file content.

Parameters:

Name	Type	Default	Description
<file_name>	string	-	can be: full file name path starting with "/" relative file name path file name (in current directory)
<maxByte>	integer	0	maximum number of bytes to read Value: 0÷4096 : maximum number of bytes to read
<viewMode>	integer	0	enable/disable verbose mode Values:

0	:	text format
1	:	hexadecimal format

<chunkPrint>	integer	0	chunk print mode

Values:

0	:	print whole file content at once or one <maxByte> and exit
1	:	print one < maxByte > and wait for <CR> char to continue

- <maxByte>=0 and <chunkPrint>=1 combination is not allowed.
- Maximum full path length is 128 chars, maximum folder or file name is 64 chars. Overall max full file path is 128 + 64 = 192 chars.
- If the file <file_name> or its path is not present in the file system, an error code is reported.
- <file_name> and its path are case sensitive.
- <file_name> can be equivalently enclosed on quote or not.
- When printing the file content in <maxByte> chunks, omit the <file_name> on all subsequent AT command executions. Check code examples for further details.

AT#M2MREADEXT=?

Test command returns OK result code.

AT#M2MREADEXT="xxfolder/config/config.txt"
<<< here receives the prompt and then the file content is displayed immediately after the prompt
OK

AT#M2MCHDIR="xxfolder"
OK

AT#M2MREADEXT=config/config.txt
<<< here receives the prompt and then the file content is displayed immediately after the prompt
OK

Single chunk print mode:

AT#M2MREADEXT=config/config.txt,1000
<<< here receives the prompt; then the first 1000 bytes after the prompt
OK

AT#M2MREADEXT=,1000
<<< here receives the prompt and the subsequent 1000 bytes after the prompt.
OK

AT#M2MREADEXT=,1000 continue until the end of the file

<<< here receives the prompt and the subsequent 1000 bytes after the prompt.
OK

Continuous chunk print mode:

AT#M2MREADEXT=config/config.txt,1000,0,1

<<<

here receives the prompt (only once) and the subsequent 1000 bytes after the prompt. The <CR> char triggers the next print of 1000 bytes.

The OK is printed once the whole file content has been printed.

OK

MQTT

AT#MQEN - Enable MQTT Feature

This command initializes a MQTT client and allocates the necessary resources.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQEN=<instanceNumber>,<enable>

Set command enables/disables the MQTT client for further configuration and usage.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance to activate or deactivate
	Value:		
	1÷maxClients : client instance range. To know maxClients value use test command		
<enable>	integer	N/A	selects if client must be activated or deactivated
	Values:		
	0 : disable		
	1 : enable		

AT#MQEN?

Read command returns the status of the MQTT stack in the format

#MQEN: <instanceNumber>,<enabled>

AT#MQEN=?

Test command reports the available range of values for parameters.

Read command
AT#MQEN?
#MQEN: 1,1
#MQEN: 2,0
OK

Test command
AT#MQEN=?
#MQEN: (1-maxClients),(0-1)
OK

AT#MQCFG - Configure MQTT Parameters

This sets the connection parameters for the selected MQTT client.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQCFG=<instanceNumber>,<hostname>,<port>,<cid>[,<sslEn>,<sslInstance>]

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance. The list of available clients is obtained with AT#MQEN? or the read command Value: 1÷maxClients : client instance range. To know maxClients value use test command
<hostname>	string	-	URL of the MQTT broker. Default value: 0. Maximum length of <hostname> is 512 characters.
<port>	integer	0	TCP port of the MQTT broker Value: 1÷65535 : TCP port range

<cid>	integer	N/A	PDP Context ID to be used for the connection. PDP context should be enabled before giving this command. Default value 0.

Value:

1÷6	:	<cid> range

<sslEn>	integer	0	enable/disable SSL

Values:

0	:	disable
1	:	enable

<sslInstance>	integer	1	selects the ssl instance configuration to be used for this MQTT client. The list of available ssl instances is obtained with the read command.

Value:

1÷maxClients	:	ssl instance range. To know ssl instance value use test command. If the value is not provided it will select ssl instance 1 by default

AT#MQCFG?

Read command returns the configuration of all active MQTT clients in the format:

#MQCFG: <instanceNumber>,<hostname>,<port>,<cid>[,<sslEn>,<sslinstance>]

AT#MQCFG=?

Test command reports the available range of values for parameters.

- SSL disabled (by default)

  AT#MQCFG=1,api.mybroker.com,1883,3
  OK

  Read command
  AT#MQCFG?
  #MQCFG: 1,api.mybroker.com,1883,3,0
  #MQCFG: 2,,1883,1
  OK

  Test command
  AT#MQCFG=?
  #MQCFG: (1-maxClients),512,(1-65535),(1-6),(0-1),(1-maxSSLInstance)
  OK

- SSL enabled

  AT#MQCFG=1,api.mybroker.com,8883,3,1
  OK

  Read command
  AT#MQCFG?
  #MQCFG: 1,api.mybroker.com,8883,3,1
  #MQCFG: 2,,1883,1,0
  OK

  Test command
  AT#MQCFG=?
  #MQCFG: (1-maxClients),512,(1-65535),(1-6),(0-1)),(1-maxSSLInstance)
  OK

AT#MQDISC - Log Out and Disconnect from the MQTT Broker

This command performs the logout and disconnection from to the MQTT broker.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQDISC=<instanceNumber>

Disconnects gracefully from the MQTT broker, then closes the network connection

Parameter:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance to activate or deactivate
	Value:		
	1÷maxClients :		client instance range. To know maxClients value use test command

AT#MQDISC=?

Test command reports the available range of values for parameters.

```
AT#MQDISC=1
OK

Test command
AT#MQDISC=?
#MQDISC: (1-maxClients)
OK
```

AT#MQCONN - Connect and Log in the MQTT Broker

This command performs the connection and login to the MQTT broker.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQCONN=<instanceNumber>,<clientID>,<userName>,<passWord>

Set command performs network connection (using parameters set with #MQCFG) and sends the CONNECT packet to the MQTT broker.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance. The list of available clients is obtained with AT#MQEN? or the read command. Value: 1÷maxClients : client instance range. To know maxClients value use test command
<clientID>	string	-	identifies each MQTT client that connects to the MQTT broker. Maximum length of <clientID> is 512.
<userName>	string	-	authentication and authorization. Maximum length of <userName> is 512.

<passWord>	string	-	authentication and authorization. Maximum length of <passWord> is 512.

If connection status is other than init state or connected, disconnect using #MQDISC before reconnecting using #MQCONN.

AT#MQCONN?

Read command reports the configuration of active MQTT connections in the format:

#MQCONN=<instanceNumber>,<state>

Additional info:

The following tables shows the <state> values and meanings:

Client status: <state>	Normal/ Failure Events Values
0	client is initialized but not connected
1	client performed MQTT authentication with broker
2	connection closed or reset by the server
3	the answer to the ping request packet was not received
4	the CONNACK packet was not received
5	the CONNECT packet was not delivered

6	failure in the m2mb APIs
7	socket timeout or read error

AT#MQCONN=?

Test command reports the available range of values for parameters.

AT#MQCONN=1,myClientID,myUser,myPassword
OK

Scenario (1)
Read command
AT#MQCONN?
#MQCONN: 1,1
#MQCONN: 2,0
OK

Test command
AT#MQCONN=?
#MQCONN: (1-maxClient),100,512,512
OK

Scenario (2)
Read command
AT#MQCONN?
#MQCONN: 1,2
OK

Set command
AT#MQDISC=1
OK

Read command
AT#MQCONN?
#MQCONN: 1,0
OK

AT#MQCFG2 - Configure Additional MQTT Parameters

This command sets the optional connection parameters for the selected MQTT client.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQCFG2=<instanceNumber>,<keepAlive>,<cleanSession>

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance. The list of available clients is obtained with AT#MQEN? or the read command. Value: 1÷maxClients : client instance range. To know maxClients value use test command
<keepAlive>	integer	60	timeout of periodic packet to keep connection open Value: 60÷3600 : timeout expressed in sec

<cleanSession>	integer	1	Indicates whether a persistent connection is required. Without a persistent connection, when the client is offline all information and messages that are queued from a previous persistent session are lost.

Values:

1 : clean session

0 : persistent session

AT#MQCFG2?

Read command returns the configuration of all active MQTT clients in the format:

#MQCFG2: <instanceNumber>,<keepAlive>,<cleanSession>

AT#MQCFG2=?

Test command reports the available range of values for parameters.

AT# MQCFG2=1,60,1
OK

Read command
AT#MQCFG2?
#MQCFG2: 1,60,1
#MQCFG2: 2,70,1
OK

Test command
AT#MQCFG2=?
#MQCFG2: (1-maxClients),(60-3600),(0-1)

AT#MQWCFG - Configure MQTT Last Will and Testament

This command sets Last Will and Testament for the selected MQTT client.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQWCFG=<instanceNumber>,<willFlag>[,<willRetain>,<willQos>,<willTopic>,<willMsg>]

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance. The list of available clients is obtained with AT#MQEN? or the read command. Value: 1÷maxClients : client instance range. To know maxClients value use test command
<willFlag>	integer	0	selects whether the client needs to specify a Last Will and Testament. If set to 0, this is the last parameter to be set. Values: 0 : the client does not need to specify a Last Will and Testament 1 : the client needs to specify a Last Will and Testament

<willRetain>	integer	0	selects whether the Last Will message needs to be retained by the server Values: 0 : the Last Will message does not need to be retained by the server 1 : the Last Will message needs to be retained by the server
<willQos>	integer	0	Quality of Service of the Last Will message Value: 0÷2 : Quality of Service range
<willTopic>	string	-	Topic to publish the Last Will message to. Unused. Maximum length of <willTopic> is 256.
<willMsg>	string	-	Last Will message. Maximum length of <willMsg> is 1024.

AT#MQWCFG?

Read command returns the Last Will and Testament (if any) of all active MQTT clients in the format:

#MQWCFG:<instanceNumber>,<willFlag>[,<willRetain>,<willQos>,<willTopic>, <willMsg>]

AT#MQWCFG=?

Test command reports the available range of values for parameters.

AT#MQWCFG=1,0
OK

AT#MQWCFG=1,1,1,2,myLastWillTopic,myLastWillMessage
OK

Read command
AT#MQWCFG?
#MQWCFG: 1,0
#MQWCFG: 2,1,0,2,myTopic,myMessage
OK

Test command
AT#MQWCFG=?
#MQWCFG: (1-maxClients),(0-1),(0-1),(0-2),256,1024
OK

AT#MQUNS - Unsubscribe from a Topic

This command revokes the subscription to a MQTT topic.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQUNS=<instanceNumber>,<topic>

Parameters:

Name	Type	Default	Description
<instanceNumber>	string	N/A	selects the client instance to activate or deactivate Value: 1÷maxClients : client instance range. To know maxClients value use test command
<topic>	string	-	name of the topic. Maximum length of <topic> is 256.

AT#MQUNS=?

Test command reports the available range of values for parameters.

AT#MQUNS=1,topicToUnsubscribe

OK

Test command

AT#MQUNS=?

#MQUNS: (1-maxClients),

OK

AT#MQTCFG - Configure Timeout Parameters for MQTT Transmission

This command writes the timeout options for the specified client.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQTCFG=<instanceNumber>,<pktTimeout>

Parameters:

Name	Type	Default	Description
<instanceNumber>	string	N/A	selects the client instance. The list of available clients is obtained with AT#MQEN? or the read command. Value: 1÷maxClients : client instance range. To know maxClients value use test command
<pktTimeout>	integer	10	timeout of the packet delivery Value: 1÷60 : timeout range. Value expressed in seconds

AT#MQTCFG?

Read command returns the timeout configuration of all active MQTT clients in the format

#MQTCFG: <instanceNumber>,<pktTimeout>

AT#MQTCFG=?

Test command reports the available range of values for parameters

AT#MQTCFG=1,10
OK

Read command
AT#MQTCFG?
#MQTCFG: 1,5
#MQTCFG: 1,4
OK

Test command
AT#MQTCFG=?
#MQTCFG: (1-maxClients),(1-60)
OK

AT#MQSUB - Subscribe to a Topic

This command performs the subscription to a MQTT topic

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSUB=<instanceNumber>,<topic>[,<qos>]

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance to activate or deactivate Value: 1÷maxClients : client instance range. To know maxClients value use test command
<topic>	string	-	name of the topic. Maximum length of <topic> is 256.
<qos>	integer	1	Configures qos for the subscription. This is an optional parameter. If <qos> is not specified, <qos> 1 is taken as default. Value:

0÷2	:	qos range

AT#MQSUB=?

Test command reports the available range of values for parameters.

AT#MQSUB=1,topicToSubscribe
OK

AT#MQSUB=1,topicToSubscribe_2,0
OK

Test command
AT#MQSUB=?
#MQSUB: (1-maxClients),256, (0-2)
OK

AT#MQPUBS - Publish ASCII String

This command publishes an ASCII string to the specified MQTT topic.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQPUBS=<instanceNumber>,<topic>,<retain>,<qos>,<message>

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance to activate or deactivate Value: 1÷maxClients : client instance range. To know maxClients value use test command
<topic>	string	-	name of the topic. Maximum length of <topic> is 256.
<retain>	integer	N/A	specifies if the broker must retain this message or not Values: 0 : Not retained 1 : Retain

<qos>	integer	N/A	specifies the Quality of Service of this message Value: 0÷2 : Quality of Service range
<message>	string	-	message to publish on the topic. Maximum length of <message> is 1024. Please refer to #PUBSEXT command for higher message length.

AT#MQPUBS=?

Test command reports the available range of values for parameters.

AT#MQPUBS=1,myTopic,0,0,myMessage
OK

Test command
AT#MQPUBS=?
#MQPUBS: (1-maxClients),256,(0-1),(0-2),1024
OK

AT#MQPUBSEXT - Publish Extension command

This command publishes data to the specified MQTT topic.

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT#MQPUBSEXT=<instanceNumber>,<topic>,<retain>,<qos>,<dataLen>

After entering AT#MQPUBSEXT=... command, and terminated the command line with <CR>, the module returns the following three characters sequence prompt, and waits for data to send:

<greater_than><greater_than><greater_than> (see IRA character set: 62, 62, 62)

Now, data can be entered from TE, sized <dataLen> bytes. If user does not enters any input for 10 seconds, command is terminated with error.

If sending ends successfully and acknowledgment is received for QoS > 0, the response will be OK, otherwise an error will be reported.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	selects the client instance to activate or deactivate Value: 1÷maxClients : client instance range. To know maxClients value use test command
<topic>	string	-	name of the topic. Maximum length of <topic> is 256

<retain>	integer	N/A	specifies if the broker must retain this message or not Values: 0 : retain 1 : no retain
<qos>	integer	N/A	specifies the Quality of Service of this message Value: 0÷2 : Quality of Service range
<dataLen>	integer	-	Length of message to publish on the topic. Maximum length of <dataLen> can go up to 65536 depending on system memory available.

AT#MQPUBSEXT=?

Test command reports the available range of values for parameters.

Publish 100 byte message

AT#MQPUBSEXT=1,myTopic,0,0,100

>>>

OK

Test command

AT#MQPUBSEXT=?

#MQPUBSEXT: (1-maxClients),256,(0-1),(0-2),(0-65536)

OK

AT#MQREAD - Read Messages Received from the MQTT Broker

This command reads the message payload from the queue slot provided.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQREAD=<instance_number>,<message_id>

After command line is terminated with <CR>, the module responds sending:
#MQREAD: <instanceNumber>,<topic>,<payload_len>,

then the module prompts the following characters sequence: <less_than><less_than><less_than><carriage return><line feed> (IRA 60, 60, 60, 13, 10)

followed by the data

Parameters:

Name	Type	Default	Description
<instance_number>	integer	N/A	Selects the client instance to activate or deactivate Value: 1÷maxClients : client instance range. to know maxClients value use test command

<message_id>	integer	N/A	Message slot Id to be read. The read operation will free the slot resource.

Value:

1÷30	:	message slot Id range

Additional info:

▶▶ UNSOLICITED MESSAGE:

#MQRING - Received data on subscribed topic

When a message is received on the subscribed topic, an URC message is sent to all AT commands interfaces. There are 30 messages slots available for incoming messages, and it is responsibility of the user to keep them empty by reading them with #MQREAD.

- If the message queue is full, and a new message arrives, the following URC #MQRING: 0 is received.

- If enough memory is not available in the system to store the received message, <len> field in URC message is -1. Example: #MQRING:1,0,my_topic,-1

- Otherwise, for normal messages, the URC format is:

#MQRING: <instance_number>,<message_id>,<topic>,<len>

In the Unsolicited fields section are described the URC message parameters not described in the previous sections.

Name	Type	Default	Description
<topic>	string	-	name of the topic from where the message was received

<len>	integer	-	length in bytes of the received payload

AT#MQREAD?

Read command returns the unread messages count for each instance number for all active MQTT clients in the format

#MQREAD: <instanceNumber>,<unread>

AT#MQREAD=?

Test command reports the available range of values for parameters

#MQREAD: (1-maxClients),(1-30)

Set command

AT#MQREAD=1,2

#MQREAD: 1, "toipc",10

<<<

0123456789

OK

Read command

AT#MQREAD?

#MQREAD: 1, 1

#MQREAD: 2, 10

OK

Test command

AT#MQREAD=?

#MQREAD: (1-2),(1-30)

OK

MQTT-SN

AT#MQSNEN - Enable MQTT-SN feature

This command initializes a MQTT-SN client and allocates the necessary resources.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNEN=<instanceNumber>,<enable>

Set command enables/disables the MQTT-SN client for further configuration and usage

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance to activate or deactivate. The list of available clients is obtained with the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<enable>	integer	N/A	Sets if the selected client must be activated or deactivated Values: 0 : Disable 1 : Enable

AT#MQSNEN?

Read command returns the status of the MQTT-SN stack in the format

#MQSNEN: <instanceNumber>,<enabled>

AT#MQSNEN=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNEN=1,1

  OK

- Read example

  AT#MQSNEN?

  #MQSNEN: 1,1

  #MQSNEN: 2,0

  #MQSNEN: 3,0

  #MQSNEN: 4,0

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNEN=?
  #MQSNEN: (1-maxClients),(0-1)

  OK

AT#MQSNCFG2 - Configure additional MQTT-SN parameters

This command sets the optional connection parameters for the selected MQTT-SN client

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNCFG2=<instanceNumber>,<keepalive>,<clean_session>

Set command writes the MQTT-SN parameters for the specified client

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<keepalive>	integer	60	Timeout of periodic packet to keep connection open Value: 60÷3600 : Timeout in seconds
<clean_session>	integer	1	Indicates whether or not a persistent connection is required. Without a persistent connection, when the client is

offline all information and messages that are queued from a previous persistent session are lost.

Values:

0	:	persistent session
1	:	clean session

AT#MQSNCFG2?

Read command returns the configuration all active MQTT-SN clients in the format

#MQSNCFG2: <instanceNumber>,<keepalive>,<clean_session>

AT#MQSNCFG2=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNCFG2=1,120,1

  OK

  AT#MQSNCFG2=2,90,0

  OK

- Read example

  AT#MQSNCFG2?
  #MQSNCFG2: 1,120,1
  #MQSNCFG2: 2,90,0

OK

- Test example (refer to module output for real ranges)

  AT#MQSNCFG2=?
  #MQSNCFG2: (1-maxClients),(60-3600),(0-1)

  OK

AT#MQSNREG - Register to a Topic

Performs the registration to a MQTT-SN topic

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNREG=<instanceNumber>,<topic>

Client sends register message to the Gateway for requesting a topic id value for the included topic name. Command displays topic id received upon success.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of active clients is obtained with AT#MQSNCONN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<topic>	string	-	Name of the topic. Maximum length supported is 256.

Additional info:

In case of success, execution command returns topic id received for the specified topic in the format:

#MQSNREG: <topic_id>

AT#MQSNREG=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNREG=1,topicToRegister
  #MQSNREG: 1

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNREG=?
  #MQSNREG: (1-maxClients),256

  OK

AT#MQSNPUBS - Publish to the specific topic

Publishes an ASCII string to the specified MQTT-SN topic

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNPUBS=<instanceNumber>,<topic_type>,<topic/topicId>,<retain>,<qos>,<message>

Publishes a string to a topic

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of active clients is obtained with AT#MQSNEN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<topic_type>	integer	N/A	Type of topic/topic id Values: 0 : Normal topic id (received from AT#MQSNREG) 1 : Pre-defined topic id 2 : Short topic

<topic/topicId>	string	-	Normal topic id or short topic or pre-defined topic id. Maximum length is 2.
<retain>	integer	N/A	Specifies if the Gateway must retain this message or not

Values:

0	:	Do not retain
1	:	Must retain

<qos>	integer	N/A	Specifies the Quality of Service of this message

Values:

0	:	At most once delivery
1	:	At least once delivery
2	:	Exactly once delivery
3	:	Publish with QoS -1

<message>	string	-	Message to publish on the topic. Maximum 1024 characters, printable ASCII.

In case QoS -1, only predefined topics and short topics are allowed

AT#MQSNPUBS=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNPUBS=1,0,1,0,0,myMessage

  OK

  AT#MQSNPUBS=1,1,ab,0,1,myMessage

  OK

  AT#MQSNPUBS=1,2,1,0,1,myMessage

  OK

  AT#MQSNPUBS=1,1,ab,0,3,myMessage

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNPUBS=?
  #MQSNPUBS: (1-maxClients),(0-2),2,(0-1),(0-3),1024
  OK

AT#MQSNWCFG - Configure MQTT-SN last will and testament

This command sets Last Will and Testament for the selected MQTT-SN client

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNWCFG=<instanceNumber>,<will_flag>[,<will_retain>,<will_qos>,<will_topic>,<will_msg>]

Set command writes the parameters for the specified client

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<will_flag>	integer	0	Selects whether the client needs to specify a Last Will and Testament. If set to 0, this is the last parameter to be set. Values: 0 : The client does not need to specify a Last Will and Testament 1 : The client needs to specify a Last Will and Testament

<will_retain>	integer	0	Selects whether the Last Will message needs to be retained by the server. Values: 0 : The Last Will message does not need to be retained by the server 1 : The Last Will message needs to be retained by the server
<will_qos>	integer	0	Quality of Service of the Last Will message Values: 0 : Default value 0÷2 : Quality of Service
<will_topic>	string	-	Topic to publish the Last Will message to. Maximum size is 256.
<will_msg>	string	-	Last Will message. Maximum size is 1024.

AT#MQSNWCFG?

Read command returns the Last Will and Testament (if any) of all active MQTT-SN clients in the format

#MQSNWCFG:
<instanceNumber>,<will_flag>[,<will_retain>,<will_qos>,<will_topic>,<will_message>]

AT#MQSNWCFG=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNWCFG=1,0

  OK

  AT#MQSNWCFG=1,1,1,2,myLastWillTopic,myLastWillMessage

  OK

- Read example

  AT#MQSNWCFG?
  #MQSNWCFG: 1,0
  #MQSNWCFG: 1,1,1,2,myLastWillTopic,myLastWillMessage

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNWCFG=?
  #MQSNWCFG: (1-maxClients),(0-1),(0-1),(0-2),256,1024

  OK

AT#MQSNSUB - Subscribe to a Topic

Performs the subscription to a MQTT-SN topic.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNSUB=<instanceNumber>,<qos>,<topic_type>,<topic/topic_id>

Subscribes to a topic.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of active clients is obtained with AT#MQSNCONN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<qos>	integer	N/A	Desired Quality of service for the topic to be subscribed. Value: 0÷2 : Quality of service
<topic_type>	integer	0	Type of topic to be subscribed Values:

0	:	Normal topic
1	:	Pre-defined topic
2	:	Short topic

<topic/topic_id>	string	-	Name of the topic or short topic or pre-defined topic id. Maximum length supported is 256.

Additional info:

▶▶ In case of success, execution command returns qos granted and topic id received (in case of normal topic) in the format:

#MQSNSUB: <qos>[,<topic_id>]

AT#MQSNSUB=?

Test command reports the available range of values for parameters

</>

- Set example

```
AT#MQSNSUB=1,1,0,topicToSubscribe
#MQSNSUB: 1,1

OK

AT#MQSNSUB=1,1,1,5
#MQSNSUB: 1

OK

AT#MQSNSUB=1,1,2,ab
#MQSNSUB: 1
```

OK

- Test example (refer to module output for real ranges)

  AT#MQSNSUB=?
  #MQSNSUB: (1-maxClients),(0-2),(0-2),256

  OK

AT#MQSNCFG - Configure MQTT-SN parameters

This command sets the connection parameters for the selected MQTT-SN client

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNCFG=<instanceNumber>,<hostname>,<port>,<cid>

Set command writes the MQTT-SN parameters for the specified client

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the read command. To know maxClients value use test command Value: 1÷maxClients : client instance Number
<hostname>	string	-	URL of the MQTT-SN Gateway. Maximum length of URL is 512.
<port>	integer	N/A	UDP port of the MQTT-SN Gateway Value: 1÷65535 : UDP port

<cid>	integer	N/A	PDP Context ID to be used for the connection

Value:

1÷6	:	PDP Context ID

AT#MQSNCFG?

Read command returns the configuration all active MQTT-SN clients in the format

#MQSNCFG: <instanceNumber>,<hostname>,<port>,<cid>

AT#MQSNCFG=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNCFG=1,api.myGateway.com,11000,3

  OK

- Read example

  AT#MQSNCFG?
  #MQSNCFG: 1,api.myGateway.com,11000,1
  #MQsNCFG: 2, Gateway.com,11000,1

  OK

- Test example (refer to module output for real ranges)

AT#MQSNCFG=?
#MQSNCFG: (1-maxClients),512,(1-65535),(1-6)

OK

AT#MQSNTCFG - Configure timeout parameters for MQTT-SN transmission

This command sets the timeout options for the selected MQTT-SN client.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNTCFG=<instanceNumber>,<pkt_timeout>

Set command writes the timeout options for the specified client.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the test command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<pkt_timeout>	integer	10	Timeout of the packet delivery. Values: 10 : Default timeout 10 seconds 1÷60 : Timeout in seconds

AT#MQSNTCFG?

Read command returns the timeout configuration of all active MQTT-SN clients in the format

#MQSNTCFG: <instanceNumber>,<pkt_timeout>

AT#MQSNTCFG=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNTCFG=1,10

  OK

- Read example

  AT#MQSNTCFG?
  #MQSNTCFG: 1,5
  #MQSNTCFG: 1,20

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNTCFG=?
  #MQSNTCFG: (1-maxClients),(1-60)

  OK

AT#MQSNDISC - Log out and disconnect from the MQTT-SN Gateway

Performs the logout and disconnection from to the MQTT-SN Gateway.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNDISC=<instanceNumber>

Disconnects gracefully from the MQTT-SN Gateway, then closes the network connection and socket.

Parameter:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of active clients is obtained with AT#MQSNEN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number

AT#MQSNDISC=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNDISC=1

OK

- Test example (refer to module output for real ranges)

  AT#MQSNDISC=?
  #MQSNDISC: (1-maxClients)

  OK

AT#MQSNUNS - Unsubscribe from a Topic

Revokes the subscription to a MQTT-SN topic

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNUNS=<instanceNumber>,<topic_type>,<topic/topic_id>

Unsubscribes from a topic

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of active clients is obtained with AT#MQSNCONN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<topic_type>	integer	0	Type of topic Values: 0 : Normal topic 1 : Pre-defined topic 2 : Short topic

<topic/topic_id>	string	-	Name of the topic or short topic or pre-defined topic id. Maximum size is 256.

AT#MQSNUNS=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNUNS=1,0,topicToUnsubscribe

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNUNS=?
  #MQSNUNS: (1-maxClients),(0-2),256

  OK

AT#MQSNREAD - Read messages received from the MQTT-SN Gateway

Read the message payload from the queue slot provided.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNREAD=<instanceNumber>,<mId>

Read the message from the slot and for the provided client. The command will respond with

#MQSNREAD: <instanceNumber><topic_type>,<topic_id>,<payload_len>

Then the device shall prompt a characters sequence

<less_than><less_than><less_than><carriage return><line feed>

(IRA 60, 60, 60, 13, 10)

followed by the data

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Select the client instance. The list of active clients is obtained with AT#MQSNEN? To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<mId>	integer	N/A	The message slot Id to be read. The read operation will free the slot resource

Value:

1÷30	:	message slot Id to be read

Additional info:

- When a message is received on the subscribed topic, an URC message is sent to all AT commands interfaces. There are 30 messages slots available for incoming messages, and it is responsibility of the user to keep them empty by reading them with #MQSNREAD. If the message queue is full, and a new message arrives, an URC

  #MQSNRING: 0

  is received.

  Otherwise, for normal messages, the URC format is

  #MQSNRING: <instanceNumber>,<mid>,<topic_type>,<topic/topicId>,<len>

Unsolicited fields:

Name	Type	Description
<instanceNumber>	integer	Selects the client instance. The list of active clients is obtained with AT#MQSNEN? Value: 1..<maxClients> To know maxClients value use test command.
<mId>	integer	message slot id number, to be used to read the message content with AT#MQSNREAD command. Value:

		1-30 : message slot id number
<topic_type>	integer	Type of topic/topic id. Values: 0 : Normal topic id (received from AT#MQSNREG) 1 : Pre-defined topic id 2 : Short topic
<topic/topicId>	string	Normal topic id or short topic or pre-defined topic id.
<len>	integer	Length in bytes of the received payload

AT#MQSNREAD?

Read command returns the unread messages count for each instance number for all active MQTT-SN clients in the format

#MQSNREAD: <instanceNumber>,<unread>

AT#MQSNREAD=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNREAD=1,2

  #MQSNREAD: 1,1,ab,10

  <<<

0123456789

OK

- Read example

  AT#MQSNREAD?

  #MQSNREAD: 1,0

  #MQSNREAD: 2,3

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNREAD=?

  #MQSNREAD: (1-maxClients),(1-30)

  OK

AT#MQSNWTUP - Update MQTT-SN last will and testament Topic

Set Last Will and Testament for the selected MQTT-SN client

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNWTUP=<instanceNumber>,<will_flag>[,<will_retain>[,<will_qos>[,<will_topic>]]]

Send will topic update packet to the Gateway

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance
<will_flag>	integer	0	Selects whether the client needs to delete/update the Last Will and Testament. If set to 0, this is the last parameter to be set. Values: 0 : The client wants to delete the Last Will and Testament

			1 : The client needs to update a Last Will and Testament topic
<will_retain>	integer	0	Selects whether the Last Will message needs to be retained by the server Values: 0 : The Last Will message does not need to be retained by the server 1 : The Last Will message needs to be retained by the server
<will_qos>	integer	0	Quality of Service of the Last Will message Value: 0÷2 : Quality of Service
<will_topic>	string	-	Topic to publish the Last Will message to

AT#MQSNWTUP=?

Test command reports the available range of values for parameters

</>

- Set example

  AT#MQSNWTUP=1,0

OK

AT#MQSNWTUP=1,1,1,2,myLastWillTopic

OK

- Test example (refer to module output for real ranges)

  AT#MQSNWTUP=?

  #MQSNWTUP: (1-maxClients),(0-1),(0-1),(0-2),

  OK

AT#MQSNWMUP - Update MQTT-SN last will and testament Message

Set Last Will and Testament for the selected MQTT-SN client

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNWMUP=<instanceNumber>,<will_msg>

Send will message update packet to the Gateway

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The list of available clients is obtained with AT#MQSNEN? or the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<will_msg>	string	-	Message of the Last Will message

AT#MQSNWMUP=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNWMUP=1,myLastWillMessage

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNWMUP=?
  #MQSNWMUP: (1-maxClients),

  OK

AT#MQSNSTATE - Set MQTT-SN client state

This command initializes a MQTT-SN client and allocates the necessary resources.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#MQSNSTATE=<instanceNumber>,<state>[,<duration>]

Set command changes the MQTT-SN client state to "asleep", "awake" or "active" state.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance to activate or deactivate. The list of available clients is obtained with the read command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<state>	integer	N/A	Desired state of the MQTT-SN client. Values: 0 : Active state. This is the normal connected state in which all the MQTT-SN operations can be performed. This

option is valid only if client is in asleep state

1 : Asleep State: Client can enter asleep state whenever they are not active, and can become active whenever they have data to send or to receive. In this state, no MQTT-SN operation can be performed except sending keep-alive packets. User has to specify periodic duration of sleep state. Else, the command fails. This option is valid only if client is in active state.

2 : Awake state: Required only to go to asleep state. Sleeping client will send a keep-alive packet to the gateway, receive all the buffered Publish packets sent by the gateway and will again go to asleep state. This option is valid only if client is in asleep state.

<duration>	integer	-	Sets the period of clients sleep in seconds. After expiry of this duration, the client sends a keep-alive packet to the gateway, receives all the buffered Publish packet sent by the gateway and again goes to asleep state. This parameter is mandatory if user is setting value of <state> parameter to 1.

AT#MQSNSTATE?

Read command returns the state of all initialised MQTT-SN clients in the format

#MQSNSTATE: <instanceNumber>,<state>[,<duration>]

AT#MQSNSTATE=?

Test command reports the available range of values for parameters.

- Set example

  AT#MQSNSTATE=1,0

  OK

  AT#MQSNSTATE=1,1,60

  OK

  AT#MQSNSTATE=1,2

  #MQSNRING:1,5,2,ab,10

  OK

- Read example

  AT#MQSNSTATE?

  #MQSNSTATE: 1,1,60

  #MQSNSTATE: 2,0

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNSTATE=?

  #MQSNSTATE: (1-maxClients),(0-2),(60-3600)

  OK

AT#MQSNSOCK - Enable/disable MQTT-SN client socket

Performs the connection and login to the MQTT-SN Gateway

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNSOCK=<instanceNumber>,<create>

Set command creates/closes UDP socket for MQTT-SN client. User can either directly Publish on QoS -1 after creating the socket or can connect to the gateway and then perform other MQTT-SN operations.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The number of available clients is obtained with the test command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<create>	integer	N/A	Sets if the selected client socket must be created or closed Values: 0 : Close socket. To be used when client is in socket connected state

1 : Create socket

AT#MQSNSOCK?

Read command reports the socket state of active MQTT-SN clients in the format:

#MQSNSOCK =<instanceNumber>,<socket_created>

AT#MQSNSOCK=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNSOCK=1,1

  OK

- Read example

  AT#MQSNSOCK?
  #MQSNSOCK: 1,1
  #MQSNSOCK: 2,0

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNSOCK=?
  #MQSNSOCK: (1-maxClients),(0-1)

  OK

AT#MQSNCONN - Connect and log in the MQTT-SN Gateway

Performs the connection and login to the MQTT-SN Gateway

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#MQSNCONN=<instanceNumber>,<clientID>

Set command performs network connection (using parameters set with #MQSNCFG) and sends the CONNECT packet to the MQTT-SN Gateway.

Parameters:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The number of available clients is obtained with the test command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number
<clientID>	string	-	Client identifier. Identifies each MQTT-SN client that connects to the MQTT-SN Gateway. Maximum length is 23.

A URC message in the following format is sent to notify user about asynchronous disconnect:

#MQSNCONN: <instanceNumber>,DISCONNECT

Where, <instanceNumber> is the client instance of the MQTT-SN client disconnected.

If #MQSNCONN URC is received, socket is closed internally and client moves to init state. User can establish the connection again with AT#MQSNSOCK and AT#MQSNCONN commands.

AT#MQSNCONN?

Read command reports the configuration of active MQTT-SN connections in the format:

#MQSNCONN=<instanceNumber>,<state>

Additional info:

Parameter:

Name	Type	Default	Description
<instanceNumber>	integer	N/A	Selects the client instance. The number of available clients is obtained with the test command. To know maxClients value use test command. Value: 1÷maxClients : client instance Number

<state>	integer	N/A	Client status.

Values:

0 : client is in init state

1 : socket is created

2 : client is connected

3 : connection closed by the gateway. Issue AT#MQSNSOCK and AT#MQSNCONN to open connection again

4 : Ping request failed

5 : Connect request timed out

6 : Client is in "asleep" state

7 : Client is in "awake" state

8 : Client is in unknown state. Deinit client and open it again with AT#MQSNEN

AT#MQSNCONN=?

Test command reports the available range of values for parameters

- Set example

  AT#MQSNCONN=1,myClientID

- Read example

  AT#MQSNCONN?
  #MQSNCONN: 1,2
  #MQSNCONN: 2,3

  OK

- Test example (refer to module output for real ranges)

  AT#MQSNCONN=?
  #MQSNCONN: (1-maxClients),23

  OK

GNSS

GNSS Receiver

AT$GPSP - GNSS Controller Power Management

This command controls the GNSS positioning session. It also turns on the CGNSS chip the first time it is executed.

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

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 is a prerequisite for the other GNSS commands to work, since it activates the CGNSS chip.

The current <status> value is stored through $GPSSAV command.

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> in the format:

$GPSP: (0,1)

On ME310G1-W1 and ME310G1-W2, it is also necessary to issue AT+CFUN=4 before AT$GPSP=1 in order to switch to GNSS priority.

Start GNSS positioning session.

AT+CFUN=4 (only on ME310G1-W1 and ME310G1-W2)

AT$GPSP=1

OK

Stop GNSS positioning session.

AT$GPSP=0

OK

AT$GPSRST - Restore Default GNSS Parameters

This command resets the GNSS parameters to "Factory Default" configuration.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT$GPSRST

Execution command resets the GNSS parameters to "Factory Default" configuration and stores them in the NVM of the device.

- The restored parameters are those of:

  $GPSP and $GNSSNMEA 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".

- A reboot is required for the command to take effect.

AT$GPSRST=?

Test command returns the OK result code.

Modules supporting the command
ME310M1- W3

```
AT$GPSRST
OK
```

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
Not required	No	No

AT$GPSSAV

Execution command stores the current GNSS parameters in the NVM of the device.

The saved parameters are those of:

$GPSP and $GNSSNMEA commands.

AT$GPSSAV=?

Test command returns the OK result code.

Modules supporting the command
ME310M1- W3

AT$GPSSAV

OK

GNSS General Management

AT$GPSSW - GNSS Software Version

This command provides the GNSS module software version.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT$GPSSW

Execution command returns the GNSS module software version in the format:

$GPSSW: <swVersion>

The command sends also a system request to retrieve the internal PTW software version.

The reply is printed after the execution of the command (after the OK).

AT$GPSSW requires issuing $GPSP=1 on ME310G1-W3 devices.

AT$GPSSW?

Read command has the same behavior as the execution command.

AT$GPSSW=?

Test command returns the OK result code

AT$GPSR - Reset the GNSS Controller

This command resets the GNSS controller.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT$GPSR=<resetType>

Execution command allows to reset the GNSS controller.

Parameter:

Name	Type	Default	Description
<resetType>	integer	0	set the type of GNSS controller reset

Values:

0 : Deep cold start: delete any assistance data

1 : Cold start: GNSS will be enforced to not use any assistance data, any backed up data is deleted

2 : Warm start: only the almanac is enabled

3 : Hot start: every available assistant data is used, TTFF is prioritized

AT$GPSR?

Read command returns the next scheduled start positioning mode.

AT$GPSR=?

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

Deep cold start reset

AT$GPSR=0

OK

AT$GNSSUPGRADE - GNSS Firmware Update

This command triggers the GNSS firmware update.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT$GNSSUPGRADE=<source>,<base_path>

Parameters:

Name	Type	Default	Description
<source>	integer	0	set source where to find the firmware files Value: 0 : Filesystem: GNSS FW previously stored via AT#M2MWRITE or AT#HTTPRCVF 1 : GNSS FW stored in the module via XFP/FOTA
<base_path>	string	/cxdfw	The base directory where the firmware files are stored (valid only with souce>=0)

Issue #REBOOT after this command to avoid status inconsistencies.

AT$GNSSUPGRADE=?

Test command returns the OK result code.

This command is currently supported only on ME310M1-W3.

AT$GNSSUPGRADE=0,"cxdfw"

or

AT$GNSSUPGRADE=1

$GNSSUPGRADE: Starting CGNSS recovery

$GNSSUPGRADE: Successfully forced FW update state, starting update

$GNSSUPGRADE: FW Erase timeout, FW might already be erased, continue with update

$GNSSUPGRADE: Configuring CGNSS UART to 1Mbps

$GNSSUPGRADE: Disable SHUB UART flow control before fw upgrade starts

$GNSSUPGRADE: Sending cxd5640_updater.efpk file part 1/11

$GNSSUPGRADE: Sending cxd5640_updater.efpk file part 2/11

...

OK

AT#GNSSCMD - GNSS Command

This command configures the module and the GNSS controller for sending native commands to the CGNSS card.

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT#GNSSCMD

The execution command configures the module for sending native commands to the CGNSS card, in the form:

AT#GNSSCMD="<@native command>"

AT#GNSSCMD=?

Test command returns the OK result code

This command is currently supported only on ME310M1-W3.

AT$GNSSCMD - GNSS Passthrough Mode

This command configures the module and the GNSS controller for sending native commands to the CGNSS card.

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

AT$GNSSCMD

The execution command configures the module for sending native commands to the CGNSS card, in the form:

AT$GNSSCMD="<@native command>"

AT$GNSSCMD=?

Test command returns the OK result code

This command is currently supported only on ME310M1-W3.

AT$GPSELV - GNSS Minimum Elevation Level

This command set the GNSS minimum elevation level for SVs used in the position fix.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT$GPSELV=<elevation>

Set command configures the GNSS minimum elevation level for SVs used in the position fix.

Parameter:

Name	Type	Default	Description
<elevation>	integer	5	GNSS minimum elevation level, where 0 is lowest elevation level and 90 is highest elevation level in degrees.

Value:

0÷90	:	GNSS minimum elevation level

It is not recommended setting <elevation> less than 5 degrees.

AT$GPSELV?

Read command is not supported

AT$GPSELV=?

Test command returns the OK result code.

This command is currently supported only on ME310M1-W3.

AT$AGNSSFINJ - AGNSS File Injection

This command handles Assisted GNSS file injection. The file should be uploaded through AT#M2MWRITE command.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT$AGNSSFINJ=<provider>[,<path>]

Parameter:

Name	Type	Default	Description
<provider>	integer	N/A	select the AGNSS provider to be set Value: 1 : use CEP AGNSS provider 2 : use LLE AGNSS provider
<path>	string	N/A	For LLE file, select the filename with its path. CEP injection does not require this field

CEP is currently supported on ME310M1-W1 and ME310M1-W2, while LLE is currently supported on ME310M1-W3 only

AT$AGNSSFINJ=?

Test command returns the supported value range for <provider>, and for ME310M1-W3 the maximum length of the path string.

Example for ME310M1-W1 and ME310M1-W2:

Upload CEP file to MDM card:

AT#M2MWRITE="/ignss/cep_pak.bin",262144

>>>

OK

Now the data can be injected into the GNSS engine:

AT$AGNSSFIN⅃=1

OK

Check the system clock date and time. If they are incorrect, please update them accordingly:

AT+CCLK="25/07/04,07:06:00+08"

OK

It is now possible to display the details about the injected data:

AT$AGNSSVAL?

$AGNSSVAL: 0,0,499

OK

The first two values (0,0) are included for backward compatibility, while the third value (499 in this example) represents the number of hours the data remains valid from now.

Example for ME310M1-W3:

GNSS must be on:

AT$GPSP=1

OK

Check the system clock date and time. If they are incorrect, please update them accordingly:

AT+CCLK="25/07/04,07:06:00+08"

OK

Upload lle file to the module:

AT#M2MWRITE="lle_gps.lle",14388

>>>

OK

Inject lle file:

AT$AGNSSFIN℩=2,"/mod/lle_gps.lle"

OK

It is now possible to display the details about the injected data:

AT$AGNSSVAL?

$AGNSSVAL: 1752219103,1752019200,1752278400,GPS

$AGNSSVAL: 1752219103,0,0,GLO

$AGNSSVAL: 1752219103,0,0,GAL

$AGNSSVAL: 1752219103,0,0,BDS

$AGNSSVAL: 1752219103,0,0,QZSS

OK

AT$AGNSSVAL - AGNSS Validity Data

This command shows information about the validity of AGNSS data.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT$AGNSSVAL

The exec command is not supported and returns ERROR

AT$AGNSSVAL?

The output depends on the AGNSS data format (CEP or LLE). See Additional info section.

Additional info:

- If AGNSS data format is CEP:

  The first two values (0,0) are included for backward compatibility, while the third value represents the number of hours the data remains valid from now.

- If AGNSS data format is LLE:

  Read command returns the validity information for each satellite constellation.

  Each line follows the format:

  $AGNSSVAL: <current_timestamp>,<validity_start>,<validity_end>,<constellation>

  where:

Name	Description
<current_timestamp>	The current UNIX timestamp at the time of the query
<validity_start>	The UNIX timestamp indicating when the AGNSS data becomes valid for the specified constellation
<validity_end>	The UNIX timestamp indicating when the AGNSS data expires for the specified constellation
<constellation>	The GNSS constellation (e.g. GPS, GLO, GAL, BDS, QZSS)

AT$AGNSSVAL=?

Test command returns OK

Example for ME310M1-W1 and ME310M1-W2 (CEP):

After AGNSS data injection, check the system clock date and time. If they are incorrect, please update them accordingly:

AT+CCLK="25/07/04,07:06:00+08"

OK

It is now possible to display the details about the injected data:

AT$AGNSSVAL?

$AGNSSVAL: 0,0,499

OK

Example for ME310M1-W3 (LLE):

After AGNSS data injection, check the system clock date and time. If they are incorrect, please update them accordingly:

AT+CCLK="25/07/04,07:06:00+08"

OK

It is now possible to display the details about the injected data:

AT$AGNSSVAL?

$AGNSSVAL: 1752219103,1752019200,1752278400,GPS

$AGNSSVAL: 1752219103,0,0,GLO

$AGNSSVAL: 1752219103,0,0,GAL

$AGNSSVAL: 1752219103,0,0,BDS

$AGNSSVAL: 1752219103,0,0,QZSS

OK

GNSS Positioning Information

AT$GPSACP - Get Acquired Position

This command returns information about the last GPS position.

[1] NMEA 0183 Standard

SIM Presence	Setting saved	Can be aborted
Not required	No	No

AT$GPSACP

Execution command returns information about the last GPS position in the format:

$GPSACP: <UTC>,<latitude>,<longitude>,<hdop>,<altitude>,<fix>,<cog>,<spkm>,<spkn>,<date>,<nsat>,<hepe>,<vepe>

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.mmmm N/S (referred to GGA sentence)

			where: dd: 00..90, degrees mm.mmmm: 00.0000..59.9999, minutes N/S: North/South
<longitude>	string	-	longitude in the format dddmm.mmmm E/W (referred to GGA sentence) where: ddd: 000..180, degrees mm.mmmm: 00.0000..59.9999, 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 RMC sentence)
<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 satellites in use (referred to GGA sentence)

Value:

0÷12	:	total number of satellites in use

<hepe>	mixed	-	Horizontal estimated position error (meters)
<vepe>	mixed	-	Vertical estimated position error (meters)

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

It is necessary to activate the GNSS module

AT+CFUN=4 (on ME310G1-W1 and ME310G1-W2)

AT$GPSP=1

OK

Until first fix is received the command will display this:

AT$GPSACP

$GPSACP: ,,,,,1,,,,,

Once fix has been received the command will display actual GPS time and position:

OK

AT$GPSACP

$GPSACP:
091635.000,3913.6952N,00904.1505E,0.7,17.9,3,0.0,0.0,0.0,290920,10,3.79,2.50

OK

AT$GNSSNMEA - Unsolicited NMEA Data Configuration

Set command activates an unsolicited GNSS data stream, in the form of 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.

[1] NMEA 0183 Standard

SIM Presence	Setting saved	Can be aborted
Not required	Other	No

AT$GNSSNMEA=<enable>[,<nmea_mask>]

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. See Additional info section to have information on GNSS data stream formats.

Values:

0 : disable GNSS data stream

1 : enable the GNSS data stream format

2 : enable the GNSS data stream format and reserve the AT interface port only for the GNSS data stream

<nmea_mask>	hex	-	The <nmea_mask> value defines which NMEA sentences will be available (see Additional info). The default <nmea_mask> value is 0 (No sentences available). The hexadecimal format of the bit mask does not require the prefix 0x; example : 0, 1F, 3F

Additional info:

▶▶ Bitmap description of the <nmea_mask> parameter

<nmea_mask>	Sentences
Bit 0	RMC
Bit 1	GGA
Bit 2	GSA
Bit 3	GSV
Bit 4	GLL
Bit 5	VTG
Bit 6	ZDA

Bit 7	GNS
Bit 8	GRS
Bit 9 - 30	Not Used
Bit 31	EPE

▶▶ <enable>=1, GNSS data stream format:

<NMEA SENTENCE 1><CR><LF>

...

<NMEA SENTENCE N><CR><LF>

...

▶▶ <enable>=2, 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>

...

The NMEA data stream format is the same as the one selected by <enable>=1.

GRS sentence is not supported on this platform.

AT$GNSSNMEA?

Read command returns whether the unsolicited GNSS data stream is currently enabled or not, along with the current NMEA mask configuration, in the format:

$GNSSNMEA:<enable>,<nmea_mask>

AT$GNSSNMEA=?

Test command returns the supported range of values for parameters:

<enable>, (list of supported <nmea_mask> values).

Parameters are stored through $GPSSAV command.

Activate the CGNSS chip

AT$GPSP=1

OK

Set the GSA as available sentence in the unsolicited message

AT$GNSSNMEA=1,4

OK

Read the current NMEA mask configuration:

AT$GNSSNMEA?

$GNSSNMEA: 1,4

OK

The unsolicited message will be:

$GNSSNMEA:

$GNGSA,A,3,11,13,23,28,33,37,38,42,43,,,,0.9,0.5,0.7,4*38

Turn-off the unsolicited mode

AT$GNSSNMEA=0

OK

PSM (Power Saving Mode)

AT+CPSMS - Power Saving Mode Setting

This command enables/disables Power Saving Mode (PSM) mode.

[1] 3GPP TS 27 007

[2] 3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted
Required	Auto	No

AT+CPSMS=[<mode>[,<ReqPeriodicRAU>[,<ReqGPRSreadyTimer>[,<ReqPeriodicTAU>[,<ReqActiveTime>]]]]]

The set command controls the setting of the UEs power saving mode (PSM) parameters. The command controls whether the UE wants to apply PSM or not, as well as the requested extended periodic RAU value and the requested GPRS READY timer value in GERAN, the requested extended periodic TAU value in E-UTRAN and the requested Active Time value.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	disables or enables the use of PSM in the UE.

Values:

0	:	Disable
1	:	Enable

<ReqPeriodicRAU>	string	-	one byte in an 8 bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN. The requested extended periodic RAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer3 IE in 3GPP TS 24.008
<ReqGPRSreadyTimer>	string	-	one byte in an 8 bit format. Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN. The requested GPRS READY timer value is coded as one byte (octet 2) of the GPRS Timer information element coded as bit format (e.g. "01000011" equals 3 decihours or 18 minutes). For the coding and the value range, see the GPRS Timer IE in 3GPP TS 24.008.
<ReqPeriodicTAU>	string	-	one byte in an 8 bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. The requested extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range,

			see the GPRS Timer 3 IE in 3GPP TS 24.008.
<ReqActiveTime>	string	-	one byte in an 8 bit format. Requested Active Time value (T3324) to be allocated to the UE. The requested Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008.

A special form of the command can be given as AT+CPSMS= (with all parameters omitted). In this form, the parameter <mode> will be set to 0, the use of PSM will be disabled and data for all parameters in command +CPSMS will be removed or, if available, set to the manufacturer specific default values.

Extended PSM configuration (see #PSMCFG) is mandatory before enabling PSM feature.

AT+CPSMS?

Read command returns the current CPSMS configuration, in the format:

+CPSMS:<mode>,[<ReqPeriodicRAU>],[<ReqGPRSreadyTimer>],[<ReqPeriodicTAU>],[<ReqActiveTime>]

AT+CPSMS=?

Test command reports the range for the parameters in the format:

+CPSMS:(list of supported <mode>s),(list of supported <ReqPeriodicRAU>s),(list of supported <ReqGPRSreadyTimer>s),(list of supported <ReqPeriodicTAU>s),(list of supported <ReqActiveTime>s)

How to manage timer values octet.

T3412ext value:

Bits 5 to 1 represent the binary coded timer value.
Bits 6 to 8 defines the timer value unit as follows:

Bits

8 7 6
0 0 0 value is incremented in multiples of 10 minutes
0 0 1 value is incremented in multiples of 1 hour
0 1 0 value is incremented in multiples of 10 hours
0 1 1 value is incremented in multiples of 2 seconds
1 0 0 value is incremented in multiples of 30 seconds
1 0 1 value is incremented in multiples of 1 minute
1 1 0 value is incremented in multiples of 320 hours
1 1 1 value indicates that the timer is deactivated.

Example: 10101100 -> 101 means values is incremented in multiples of 1

minute, 01100 means 12 -> the obtained value is 12 minutes

T3324 value:

Bits 5 to 1 represent the binary coded timer value.
Bits 6 to 8 defines the timer value unit for the GPRS timer as follows:
Bits
8 7 6
0 0 0 value is incremented in multiples of 2 seconds
0 0 1 value is incremented in multiples of 1 minute
0 1 0 value is incremented in multiples of decihours
1 1 1 value indicates that the timer is deactivated.

AT+CPSMS=1,,,"10101100","00100010"
OK

AT+CPSMS?
+CPSMS: 1,,,"10101100","00100010"
OK

It means that module requires to adopt the PSM for reducing its power consumption. If the network supports PSM and accepts that the UE uses PSM with requested timers value, module enters in PSM when the active timer expires (T3324=2 minutes) and stay in this mode for ten minutes (T3412=12 minutes).

AT+CPSMS=0
OK

It means that PSM is set to disable, the module does not go to Power Saving Mode in any case.

AT#CPSMS - Power Saving Mode Setting

This command enables/disables Power Saving Mode (PSM) mode.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#CPSMS=[<mode>[,<ReqPeriodicRAU>[,<ReqGPRSreadyTimer>[,<ReqPeriodicTAU>[,<ReqActiveTime>[,<psmVersion>[,<psmThreshold>]]]]]]]

The set command controls the setting of the UEs power saving mode (PSM) parameters. The command controls whether the UE wants to apply PSM or not, as well as the requested extended periodic RAU value and the requested GPRS READY timer value in GERAN, the requested extended periodic TAU value in E-UTRAN and the requested Active Time value.

This command, unlike the +CPSMS command, accepts the parameters in integer format.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	disables or enables the use of PSM in the UE. Values: 0 : disable 1 : enable
<ReqPeriodicRAU>	integer	-	requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN. Parameter expressed in sec.

<ReqGPRSreadyTimer>	integer	-	requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN. Parameter expressed in sec.
<ReqPeriodicTAU>	integer	-	requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. Parameter expressed in sec.
<ReqActiveTime>	integer	-	requested Active Time value (T3324) to be allocated to the UE. Parameter expressed in sec.
<psmVersion>	integer	N/A	bitmask to indicate PSM modes. Each bit is configured independently. Default value: <psmValue>=4 Values: 0 : PSM without network coordination 1 : Rel 12 PSM without context retention 2 : Rel 12 PSM with context retention 3 : PSM in between eDRX cycles
<psmThreshold>	integer	60	Minimum duration threshold (in sec) to enter

PSM. Minimum value is 60 seconds.

Value:

60	:	Minimum value of duration threshold

A special form of the command can be given as AT#CPSMS= (with all parameters omitted). In this form, the parameter <mode> will be set to 0, the use of PSM will be disabled and data for all parameters in command #CPSMS will be removed or, if available, set to the manufacturer specific default values.

Extended PSM configuration (see #PSMCFG) is mandatory before enabling PSM feature.

AT#CPSMS?

Read command presents the current CPSMS configuration returned by the network, in the format:

#CPSMS: <status>,[<T3324>],[<T3412 or T3412EXT>],<psmVersion>,<psmThreshold>,<mode>

Additional info:

Meaning of the returned parameters.

Name	Type	Default	Description
<status>	integer	0	PSM status in the network
	Values:		

0	:	PSM disabled
1	:	PSM enabled

<T3324>	integer	-	T3324 timer value in the network, in seconds (could be different from the requested one)
<T3412/ T3412EXT>	integer	-	T3412 or T3412Ext timer value in the network, in seconds (could be different from the requested one).

AT#CPSMS=?

Test command returns OK result code.

AT#PSMCFG - Extended Power Saving Mode Setting

This command sets extended Power Saving Mode (PSM) mode.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#PSMCFG=<AutoOn>[,<FWOPD>[,<Unused2>]]

Parameters:

Name	Type	Default	Description
<AutoOn>	integer	0	Set power supply scenario. Value must be set to proper value accordingly the power supply hardware design. Setting of <AutoOn> is mandatory before setting up PSM feature (See +CPSMS and #CPSMS)

Values:

0	:	Normal scenario
1	:	Auto-on scenario

Name	Type	Default	Description
<FWOPD>	integer	0	Flash wears out protection disable (see Additional info section)

Values:

0	:	Flash wear out protection enabled
1	:	Flash wear out protection disabled

<Unused2>	integer	-	unused

Additional info:

- During long PSM cycles, the deepest power saving mode (hibernation) is always used, so data and contexts are saved in flash.

  To prevent flash wear out, when PSM TAU timer is less than 30 minutes (See +CPSMS), chip implements, by default, "flash wear out protection feature": in this scenario chip does not allow hibernation mode, but allows "safe short-time PSM" mode only.

  The "safe short-time PSM" mode has higher consumption than hibernation mode but flash memory will be less stressed.

Name	Type	Default	Description
<FWOPD>	integer	0	Flash wears out protection disable

Values:

0 : Flash wear out protection enabled: PSM power consumption will be higher than hibernation when TAU timer of PSM is shorter than 30 minutes

1 : Flash wear out protection disabled: PSM power consumption will reach the minimum even when TAU timer of PSM is shorter than 30 minutes, but flash life could be shorter than expected

AT#PSMCFG?

Read command returns the current PSM configuration, in the format:

#PSMCFG: <AutoOn>,<FWOPD>,<Unused2>

AT#PSMCFG=?

Test command reports the supported range for the parameters.

Normal Power Supply Scenario:

Stardand PowerSavingMode command used on design which does not include power supply auto-on circuit

AT#PSMCFG=0

OK

AT#PSMCFG?

#PSMCFG: 0,0,0

AT+CPSMS=1..."10101100","00100010"

OK

Telit PowerSavingMode command used on design which does not include power supply auto-on circuit

AT#PSMCFG=0

OK

AT#CPSMS=1

OK

Auto-on Scenario:

Stardand PowerSavingMode command used on design which includes power supply auto-on circuit

AT#PSMCFG=1

OK

AT#PSMCFG?

#PSMCFG: 1,0,0

AT+CPSMS=1..."10101100","00100010"

OK

AT+CPSMS?

+CPSMS: 1..."10101100","00100010"

OK

Telit PowerSavingMode command used on design which includes power supply auto-on circuit

AT#PSMCFG=1

OK

AT#CPSMS=1

OK

AT#PSMURC - Power Saving Mode URC

Set command enables/disables the URC that informs when modem entering in power saving mode.

SIM Presence	Setting saved	Can be aborted
Required	No	No

AT#PSMURC=<en>

The URC format is:

#PSMURC=<ActiveTime>,<PSMTime>

Parameter:

Name	Type	Default	Description
<en>	integer	0	enable/disable URC message

Values:

0 : disable URC message

1 : enable URC message

Unsolicited fields:

Name	Type	Description
<ActiveTime>	integer	requested Active Time value, in seconds (T3324)

<PSMTime>	integer	low power phase duration in seconds (difference between T3412 and T3324 including boot time).

AT#PSMURC?

Read command reports the status (enable/disable):

#PSMURC: <en>

AT#PSMURC=?

Test command reports the supported range of value for parameter <en>.

Debugging

AT#TRACE - Enable/Disable Trace

The command selects which trace outputs you want to display through the debugging tool.

SIM Presence	Setting saved	Can be aborted
Not required	Auto	No

AT#TRACE=[<mode>],[<configurationString>],[<baudrate>]

Parameters:

Name	Type	Default	Description
<mode>	integer	0	switches all trace outputs ON or OFF. If parameter <mode> is not entered in the command, the following <configurationString> will be used. Values: 0 : sets all trace outputs OFF, <configuration String> will be ignored 1 : sets all trace outputs ON, <configurationString> will be ignored
<configurationString>	string	-	enables/disables a set of trace outputs, its syntax is shown in the Additional info section.

<baudrate>	integer	921600	sets the trace baudrate

Values:

9600	:	bit/s
19200	:	bit/s
38400	:	bit/s
57600	:	bit/s
115200	:	bit/s
230400	:	bit/s
256000	:	bit/s
460800	:	bit/s
921600	:	bit/s
3000000	:	bit/s

Additional info:

▶▶ The syntax of the <configurationString> is:

["<unit>=<umode>[,<unit>=<umode>[,...]]"]

Here are the meanings and values of the string parameters.

Name	Type	Default	Description
<unit>	string	N/A	trace class name available to the user to select the trace output. On the right side of each name, in lower case characters, there is the TC_XXX... string (Trace Class name) shown by the debugging tool.

Values:

generic	:	TC_GENERIC
socket	:	TC_SOCKET
clock	:	TC_CLOCK
pdp	:	TC_PDP
gnss	:	TC_GNSS
m2m_user	:	TC_M2M_USER
fota	:	TC_FOTA
fs	:	TC_FS
qmi	:	TC_QMI
sms	:	TC_SMS
info	:	TC_INFO
lwm2m	:	TC_LWM2M

net	:	TC_NET
sim	:	TC_SIM
spi	:	TC_SPI
usb	:	TC_USB,
nv	:	TC_NV
rtc	:	TC_RTC
m2m_uart	:	TC_UART
power	:	TC_POWER
ftpc	:	TC_FTPC
httpc	:	TC_HTTPC
ati	:	TC_ATI
backup	:	TC_BACKUP
nipd	:	TC_NIPD
sys	:	TC_SYS
psm	:	TC_PSM
ssl	:	TC_SSL
tm	:	TC_TM
ico	:	TC_ICO

csurv : TC_CSURV

<umode>	integer	0	enable/disable the trace output selected

Values:

0 : disable

1 : enable

AT#TRACE?

Read command reports the currently selected parameter values in the format:

#TRACE: "<unit>=<umode>,...,<unit>=<umode>",<baudrate>

AT#TRACE=?

Test command returns OK.

Here are some examples:

Set all trace outputs OFF

AT#TRACE=0

OK

Set all trace outputs ON

AT#TRACE=1

OK

Enable/disable trace outputs selected

AT#TRACE=,"generic=1,clock=0,lwm2m=1,pdp=0,gnss=0,ati=0",921600

OK

Acronyms and Abbreviations

Table 8: Acronyms and Abbreviations

Acronym	Definition
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 NAvigation Satellite System - Russia's satellite-based navigation system
GMT	Greenwich Mean Time
GNSS	Global Navigation Satellite System - collective term for all satellite-based positioning systems, including GPS, GLONASS, Galileo, and BeiDou
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	either Mobile Terminated or 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

Related Documents

Refer to

https://dz.telit.com/

for current documentation and downloads.

Document History

Table 9: Document History

Revision	Date	Changes
4	2026-03-23	Updated Storage chapter New commands: AT#COAPCFG, AT#COAPCLOSE, AT#COAPCMD, AT#COAPSCFG, AT#FTPGETOTA, AT#NTPCFG, AT$GPSRST, AT$GPSSAV, AT+CGACT, AT+CGCMOD, AT+CGLA, AT+CGTFT, AT+CGTFTRDP, AT+CMGC, AT+CPINR, AT+CPNER, AT+CRSM, AT+CSDF, AT+CUSATE, AT+CUSATT Updated commands: AT#CFLO, AT#E2SLRI, AT#MQREAD, AT#PSMCFG, AT#PSMURC, AT#SECMODE, AT#SH, AT#SKIPESC, AT#TRACE, AT$GNSSNMEA, AT$GNSSUPGRADE, AT$GPSRST, AT$GPSSAV, AT$GPSSW, AT&D, AT+CEREG, AT+CFUN, AT+CGAUTH, AT+CGEREP, AT+CMEE, AT+CMGF, AT+COPS, AT+CPBS, AT+CREG, AT+CSCS, AT+CSDF, AT+CSDH, AT+CTZR, AT+CTZU, AT+IFC, AT+IPR, ATE, ATQ, ATS2, ATV
3	2025-08-26	Updated Applicability Table New commands: AT#GNSSCMD, AT#HTTPSETHEADER, AT#NTP, AT#PPPCID, AT#SECMODE, AT$AGNSSFINJ, AT$AGNSSVAL, AT$GNSSCMD, AT$GNSSNMEA, AT$GNSSUPGRADE, AT$GPSACP, AT$GPSELV, AT$GPSP, AT$GPSR, AT$GPSSW, AT+CNMPSD Updated commands: AT#MONI, AT#PING, AT#SSEND, AT#SSENDEXT, AT#SSENDUDP, AT#SSENDUDPEXT, AT#SSLSECCFG, AT#SSLSECDATA, AT#TESTMODE, AT+CEREG, AT+CMGS
2	2025-04-02	New commands: AT#E2SLRI, AT#E2SMSRI, AT#HTTPRCVF, AT#HTTPSETRESOURCE, AT#HTTPSNDF, AT#M2MCHDIR, AT#M2MDEL, AT#M2MLIST, AT#M2MMKDIR, AT#M2MREAD, AT#M2MREADEXT, AT#M2MRMDIR, AT#M2MWRITE, AT#NITZ,

		AT#PADCMD, AT#PADFWD, AT#PSMRI, AT#SLED, AT#SLEDSAV, AT+CGAPNRC, AT+CIPCA Updated commands: AT#CSURVNLF, AT#FASTSHDN, AT#GPIO, AT#OTAUPW, AT#SCFG, AT#SL, AT#SSEND, AT#SSENDEXT, AT#SSENDUDP, AT#SSENDUDPEXT, AT#SSLSECCFG, AT#SSLSECCFG2, AT#SSLSECDATA, AT&F, AT+CEMODE, AT+CNMI
1	2024-08-04	Updated document template Updated Applicability Table Added Chapters: ME Error Result Code for MQTT - +CME ERROR: <err> Module Reboot New commands: AT#ADC, AT#CCID, AT#CEDRXS, AT#CPSMS, AT#CSURVC, AT#CSURVEXT, AT#CSURVNLF, AT#FASTSHDN, AT#FTPAPP, AT#FTPAPPEXT, AT#FTPCFG, AT#FTPCLOSE, AT#FTPCMD, AT#FTPCWD, AT#FTPDELE, AT#FTPFSIZE, AT#FTPGETPKT, AT#FTPLIST, AT#FTPMSG, AT#FTPOPEN, AT#FTPPUT, AT#FTPPWD, AT#FTPRECV, AT#FTPREST, AT#FTPTO, AT#FTPTYPE, AT#HTTPCFG, AT#HTTPQRY, AT#HTTPRCV, AT#HTTPSND, AT#HWREV, AT#I2CRD, AT#I2CWR, AT#IOTBND, AT#MQCFG, AT#MQCFG2, AT#MQCONN, AT#MQDISC, AT#MQEN, AT#MQPUBS, AT#MQPUBSEXT, AT#MQREAD, AT#MQSNCFG, AT#MQSNCFG2, AT#MQSNCONN, AT#MQSNDISC, AT#MQSNEN, AT#MQSNPUBS, AT#MQSNREAD, AT#MQSNREG, AT#MQSNSOCK, AT#MQSNSTATE, AT#MQSNSUB, AT#MQSNTCFG, AT#MQSNUNS, AT#MQSNWCFG, AT#MQSNWMUP, AT#MQSNWTUP, AT#MQSUB, AT#MQTCFG, AT#MQUNS, AT#MQWCFG, AT#OTAUP, AT#OTAUPW, AT#PING, AT#PORTCFG, AT#PSMCFG, AT#PSMURC, AT#SHDN, AT#SSLCFG, AT#SSLD, AT#SSLEN, AT#SSLH, AT#SSLI, AT#SSLO, AT#SSLRECV, AT#SSLS, AT#SSLSECCFG, AT#SSLSECCFG2, AT#SSLSECCS, AT#SSLSECDATA, AT#SSLSEND, AT#SSLSENDEXT, AT#TESTMODE, AT#WS46, AT&C, AT&D, AT+CEINFO, AT+CGEQOS, AT+CGEQOSRDP, AT+CGSCONTRDP, AT+ICCID, AT+WS46, ATH Updated commands:

		AT#BND, AT#CSURV, AT#GPIO, AT#SCFGEXT, AT#SCFGEXT3, AT#SD, AT#SS, AT#TRACE, AT&K, AT+CCIOTOPT, AT+CEDRXS, AT+CEREG, AT+CFUN, AT+CGCONTRDP, AT+CMGR, AT+CNMI, AT+COPS, AT+CRCES, AT+CREG, AT+IPR, ATQ
0	2023-12-13	Initial release