LWM2M AT Commands Reference Guide (ME910C1/ML865C1)

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APPLICABILITY TABLE

- ME910C1-NA
- ME910C1-E1
- ME910C1-AU
- ME910C1-J1
- ME910C1-K1
- ME910C1-E2
- ME910C1-WW
- ML865C1-NA
- ML865C1-EA
- ME910C1-P1

30.00.xx9 / M0B.xx0005

CONTENTS

1. INTRODUCTION

1.1. Scope

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

1.2. Audience

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

1.3. Contact Information, Support

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

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

Alternatively, use:

http://www.telit.com/support

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

http://www.telit.com

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

Telit appreciates feedback from the users of our information.

1.4. Icons and Text Conventions

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

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

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

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

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

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

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

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

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

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

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

2. AT COMMANDS

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

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

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

2.1. Definitions

The following syntactical definitions apply:

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

<LF> **Linefeed character**, is the character recognized as line feed character. Its value, in decimal ASCII between 0 and 255, is specified within parameter **S4**. The default value is 10. The line feed character is output after carriage return character if verbose result codes are used (**V1** option used) otherwise, if numeric format result codes are used (**V0** option used) it will not appear in the result codes.

<...> Name enclosed in angle brackets is a syntactical element. They do not appear in the command line.

[...] Optional sub parameter of a command or an optional part of TA information response is enclosed in square brackets. Brackets themselves do not appear in the command line. When sub parameter is not given in AT commands which have a Read command, new value equals to its previous value. In AT commands which do not store the values of any of their sub parameters, and so have not a Read command, which are called *action type* commands, action should be done based on the recommended default setting of the sub parameter.

2.2. AT Command Syntax

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

There are two types of extended command:

- **Parameter type commands**. This type of commands may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine ranges of values supported). Each of them has a test command (trailing **=?**) to give information about the type of its sub parameters; they also have a Read command (trailing?) to check the current values of sub parameters.

- **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 parameters values that are supported; if the command has no sub parameters, issuing the correspondent Test command (trailing **=?**) raises the result code "**ERROR**".
      Note: issuing the Read command (trailing?) causes the command to be executed.

    - whether or not the equipment implements the Action Command (in this case issuing the correspondent Test command - trailing **=?** - returns the **OK** result code), and, if sub

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

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

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

Moreover:

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

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

2.2.1. String Type Parameters

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

A string is always case sensitive.

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

2.2.2. Command Lines

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

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

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

The basic structures of the command line are:

- **ATCMD1<CR>** where **AT** is the command line prefix, **CMD1** is the body of a **basic command** (nb: the name of the command never begins with the character "**+**") and **<CR>** is the command line terminator character
- **ATCMD2=10<CR>** where 10 is a sub parameter
- **AT+CMD1;+CMD2=, ,10<CR>** These are two examples of **extended commands** (nb: the name of the command always begins with the character "**+**"[2]). They are delimited with 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.2.2.3. 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" ⚠ 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" ⚠ missing <CR>
<CR><LF>
<CR><LF>
OK
<CR><LF>

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

2.2.3. Information Responses and Result Codes

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

- 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 other two types of result codes:

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

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

Numeric form	Verbose form
0	OK
1	CONNECT or CONNECT <text>3F3F5
2	RING
3	NO CARRIER
4	ERROR
6	NO DIALTONE
7	BUSY
8	NO ANSWER

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

10	CONNECT 24004
11	CONNECT 48004
12	CONNECT 96004
15	CONNECT 144004
23	CONNECT 1200/754

2.2.4. Command Response Time-Out

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

2.2.5. Command Issuing Timing

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

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

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

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

2.3. Storage

2.3.1. Factory Profile and User Profiles

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

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

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

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

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

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

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

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

This chapter focus on the values that **Setting saved** field can assume and their meaning. The meaning of the other fields will be described in the next chapter. **Setting saved** field can have one of the value listed below

(to have information on the AT instance introduced hereafter, see the reference section of the **#PORTCFG** command):

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

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

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

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

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

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

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

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

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

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

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

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

2.4. AT Command Short Overview Table

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

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

Here are the table fields meanings:

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

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

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

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

3. AT COMMANDS REFERENCES

3.1. IoT Portal

3.1.1. AT#LWM2MSTAT - Telit LwM2M Client Current Status

This command sends a query about the status to the Telit LwM2M client.

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

AT#LWM2MSTAT

If executed, the command returns the current Telit LwM2M client status. The status is returned through the string:

#LWM2MGETSTAT: <enabledStatus>,<status>

Additional info:

▶▶ Here are described the string parameters.

Name	Type	Default	Description
<enabledStatus>	integer	N/A	the current Telit LwM2M client enabling status Values: 0 : the client is disabled 1 : the client is enabled
<status>	string	N/A	the current internal status Values: DIS : the client is disabled WAIT : waiting for the user's ACK ACTIVE : after the ACK, the session is currently active IDLE : there is not an active session currently DEREG : the client is deregistering

In case the LwM2M client is enabled with the **<mode>** active, the **<enabledStatus>** parameter in **#LWM2MSTS** command reports the LwM2M as active just after the command insertion and while waiting for the **#LWM2MACK** confirmation.

In case the LwM2M client is enabled with the **<mode>** active, after the **#LWM2MENA** command insertion to disable it, the **<enabledStatus>** parameter returned by **#LWM2MSTS** command reports the LwM2M as active since the disabling message towards the server needs the **#LWM2MACK** confirmation; this happens only when the disabling command is typed out of the LwM2M client active time window (i.e.: outside the <**guardReleaseTime**> inserted in **#LWM2MENA** command).

In case the LwM2M client is enabled with the **<mode>** not active, after the **#LWM2MENA** command insertion to disable it, for a short period of time, the

<enabledStatus> parameter in **#LWM2MSTS** command could report some intermediate states between the "ACTIVE" and the disabled one.

AT#LWM2MSTAT?

Not supported

AT#LWM2MSTAT=?

Test command returns **OK**.

#LWM2MSTS command examples:

- Enabling and disabling the LwM2M client when activated in "ack" mode (when outside the LwM2M activity time window)

AT#LWM2MENA=1,1,1,5,20
OK

#LWM2MRING: "REG"

AT#LWM2MSTAT
#LWM2MGETSTAT: 1,"WAIT"
OK

AT#LWM2MACK=1
OK

LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io"
LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs-engr.telit.io"
#LWM2MEND: 0

AT#LWM2MSTAT
#LWM2MGETSTAT: 1,"ACTIVE"
OK

#LWM2MEND: 0

AT#LWM2MSTAT
#LWM2MGETSTAT: 1,"IDLE"
OK

AT#LWM2MENA=0
OK

#LWM2MRING: "DRG"

AT#LWM2MSTAT
#LWM2MGETSTAT: 1,"WAIT"
OK

AT#LWM2MACK=1
OK

AT#LWM2MSTAT
#LWM2MGETSTAT: "DIS"
OK

AT#LWM2MENA?
#LWM2MENA: 0
OK

3.1.2. AT#LWM2MMON - Activate/Deactivate the LwM2M Resource

This command can be used to activate/deactivate the resource changes monitoring. Resource change could be performed by the server's write and by the **#LWM2MW** or **#LWM2MSET** commands.

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

AT#LWM2MMON=<action>,<objectID>

By inserting an <**objectID**> in the monitoring list with <**action**> in active mode, each time a resource belonging to the object under monitoring changes, the user - according to the setting performed with **#LWM2MMON** - receives an URC reporting the complete URI path of the resource changed in the format:

#LWM2MMON: UPD,"/<objectID>/<objectInstanceID>/<resourceID>/ <resourceInstanceID>"

Parameters:

Name	Type	Default	Description
<action>	integer Values: 0 : deactivate 1 : activate	0	activate/deactivate the resource monitoring
<objectID>	integer Value: 1÷65535 : object identifier range	N/A	object identifier. This command is not applicable to: • object 0 "Security"

The list of monitorable <**objectID**> is limited to 6. After that number, it is not possible to monitor any further object unless another object already present in list is removed.

It is possible that the overall list of monitorable <**objectID**> is lower than 6, due to the use by other non-LwM2M entities. It is recommended to verify whether the list is empty by using the read command

The object list under monitoring is not persistent to a power-cycle.

AT#LWM2MMON?

Read command reports the list of currently supported objects, in the format:

#LWM2MMON: "<objectID$_1$>"

#LWM2MMON: "<objectID$_2$>"

...

The <**objectID**$_i$> are listed according to their insertion order in the list.

AT#LWM2MMON=?

Test command reports the supported range of values for the parameters.

3.1.3. AT#LWM2MENA - Enable/Disable Telit LwM2M Agent

This command enables/disables the Telit LwM2M Client feature.

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

AT#LWM2MENA=<en>[,<pdpId>[,<mode>[,<guardRequestTime>[,<guardReleaseTime>]]]]

Execution command enables/disables the Telit LwM2M Client feature. Enabling the client with **<mode>** set to 1 will produce the following URCs:

#LWM2MRING: <ring>

#LWM2MEND: <endResultCode>

Parameters:

Name	Type	Default	Description
<en>	integer	0	enable/disable the Telit LwM2M Client feature
	Values:		
	0 : disable		
	1 : enable		
<pdpId>	integer	1	PDP context identifier the Telit LwM2M client should use on the module
	Value:		
	1÷6 : PDP context identifier		
<mode>	integer	0	ACK modality
	Values:		
	0 : no ACK required		
	1 : ACK required		
<guardRequestTime>	integer	5	in case of update registration and Notify events, it is the time of advance for the ACK notification
	Value:		
	1÷100 : time of advance for the ACK notification, in seconds		
<guardReleaseTime>	integer	5	the client waits this time to manage further LwM2M server request before releasing the network data resource (emitting **#LWM2MEND:** URC)
	Value:		
	1÷100 : time to wait to release the network resource, in seconds		

Additional info:

- The Telit LwM2M client show also an URC according to some events, in the form:
  #LWM2MINFO: <infoType>,<infoEvent>

▶▶ The Telit LwM2M client show also URCs according to the server registration status, in the form:

#LWM2M-TLT: <event>,<SSID>,<URL>

Unsolicited fields:

Name	Type	Description
<ring>	string	the ring code enabled by the **<mode>** parameter set to 1 Values: REG : the client needs to register UPD : registration update to be sent NOT : a value under observation has changed and it should be notified to the server SMS : wake up SMS received from the server DRG : deregistration
<endResultCode>	integer	the result code transmitted by the **#LWM2MEND** URC Value: 0 : success
<infoType>	string	the type of information communicated by the client Value: GEN : general info
<infoEvent>	string	the event communicated with the **#LWM2MINFO** URC Values: FOTA REBOOT : a reboot occurring during FW upgrade DEVICE REBOOT : a reboot issued by LwM2M server. Case: EXEC 3/0/4 and EXEC 3/0/5.
<event>	string	event name Values: BOOTSTRAPPING : the client is starting the bootstrap to the specified server BOOTSTRAPPED : the client finished successfully the bootstrap to the specified server REGISTERING : the client is starting the DM connection to the specified server REGISTERED : the client finished successfully the DM connection to the specified server

		SUSPENDED :	the client suspended successfully the DM connection to the specified server, as requested via /1/x/4 execution resource
		CLIENT_DISABLED :	the client has been disabled by AT command or by internal failures (i.e.: handshake failure)
		FORCE_EXIT :	the client failed the server connection and after the proper retries, it is stopped. This action is only manageable by a module reboot.
<SSID>	integer	the short server ID code	
<URL>	string	the server URL	

- The service registration URC service is not active by default: it is in charge of the user to activate it. Nevertheless, the bootstrap is always notified once the context has been activated.
- "CLIENT_DISABLED" and "FORCE_EXIT" <**event**> do not report <**SSID**> and <**URL**>
- Please notice that the URC reporting "FORCE_EXIT" <**event**> are always displayed, even in case of inactive service or in case of non-Telit clients.
- During the PDP activation or deactivation triggered by the **#LWM2MENA** command, the client shall not manage any other **#LWM2M** commands for a short period of time.
- If the client LwM2M is already enabled, a further enabling attempt will return an error.

AT#LWM2MENA?

If the client is enabled, read command reports the current values of parameters in the format:

#LWM2MENA: <en>,<pdpId>,<mode>,<guardRequestTime>,<guardReleaseTime>, <enabledStatus>

If the client is not enabled, read command reports the current values of parameters in the format:

#LWM2MENA: 0

- The **<enabledStatus>** parameter reports the same values reported by the **#LWM2MSTAT**. Therefore, for a list of the **<enabledStatus>** values, please refer to **#LWM2MSTAT** command.
- In case the LwM2M client is enabled with the **<mode>** active, the **<enabledStatus>** parameter in read command reports the LwM2M as active just after the command insertion and while waiting for the **#LWM2MACK** confirmation.
- In case the LwM2M client is enabled with the **<mode>** active, after the **#LWM2MENA** command to disable it, the **<enabledStatus>** parameter in read command reports the LwM2M as active since the disabling message towards the server needs the **#LWM2MACK** confirmation; this happens only when the disabling command is typed out of the LwM2M client active time window (i.e.: outside the <**guardReleaseTime**> inserted in **#LWM2MENA** command).

In case the LwM2M client is enabled with the **<mode>** not active, after the **#LWM2MENA** command to disable it, for a short period of time, the **<enabledStatus>** parameter in read command could report some intermediate states between the "ACTIVE" and the disabled one.

AT#LWM2MENA=?

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

Server URC and read command examples:

- Bootstrap session successful

  AT#LWM2MENA=1
  OK

  LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io:5684"
  LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs-engr.telit.io:5684"

- Bootstrap session failure

  AT#LWM2MENA=1
  OK

  LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io:5684"
  LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io:5684"
  LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io:5684"
  LWM2M-TLT:"FORCE_EXIT"

- the registration/deregistration to each server is shown only if the service is enabled:

  AT#LWM2MENA=1
  OK

  LWM2M-TLT:"REGISTERING",SSID=99,"coaps://engr-api.devicewise.com"
  LWM2M-TLT:"REGISTERING",SSID=102,"coap://217.114.209.230:5683"
  LWM2M-TLT:"REGISTERED",SSID=102,"coap://217.114.209.230:5683"
  LWM2M-TLT:"REGISTERED",SSID=99,"coaps://engr-api.devicewise.com"

  AT#LWM2MENA=0
  OK

  LWM2M-TLT:"DEREGISTERED",SSID=99,"coaps://engr-api.devicewise.com"
  LWM2M-TLT:"DEREGISTERED",SSID=102,"coap://217.114.209.230:5683"
  LWM2M-TLT:"CLIENT_DISABLED"

- DM failure (i.e.: for handshake problems), the status is shown only if the service is enabled:

  LWM2M-TLT:"REGISTERING",SSID=99,"coaps://engr-api.devicewise.com"
  LWM2M-TLT:"FORCE_EXIT"
  LWM2M-TLT:"CLIENT_DISABLED"

- client suspending:

  LWM2M-TLT:"REGISTERING",SSID=99,"coaps://engr-api.devicewise.com"
  LWM2M-TLT:"REGISTERED",SSID=99,"coaps://engr-api.devicewise.com"
  ... execution of resource /1/x/4
  LWM2M-TLT:"SUSPENDED",SSID=99,"coaps://engr-api.devicewise.com"
  ... after timeout as in resource /1/x/5
  LWM2M-TLT:"REGISTERING",SSID=99,"coaps://engr-api.devicewise.com"
  LWM2M-TLT:"REGISTERED",SSID=99,"coaps://engr-api.devicewise.com"

- Read command example:

  Disabling the LwM2M client when activated in "ack" mode (when outside the LwM2M activity time window)
  AT#LWM2MENA=1,1,1,5,20
  OK

#LWM2MRING: "REG"

AT#LWM2MENA?
#LWM2MENA: 1,1,1,5,20,"WAIT"
OK

AT#LWM2MACK=1
OK

LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs-engr.telit.io"
LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs-engr.telit.io"
#LWM2MEND: 0

AT#LWM2MENA?
#LWM2MENA: 1,1,1,5,20,"IDLE"
OK

AT#LWM2MENA=0
OK

#LWM2MRING: "DRG"

AT#LWM2MENA?
#LWM2MENA: 1,1,1,5,20,"WAIT"
OK

AT#LWM2MACK=1
OK

AT#LWM2MENA?
#LWM2MENA: 1,1,1,5,20,"DEREG"
OK

AT#LWM2MENA?
#LWM2MENA: 0
OK

- Read command example:
  Disabling the LwM2M client when activated in "no ack" mode
  AT#LWM2MENA=1
  OK

  AT#LWM2MENA=0
  OK

  AT#LWM2MENA?
  #LWM2MENA: 1,1,0,5,5,"DEREG"
  OK

  AT#LWM2MENA?
  #LWM2MENA: 0
  OK

3.1.4. AT#LWM2MACK - Ack for Telit LwM2M Agent

This command sends an ACK to the Telit LwM2M Client.

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

AT#LWM2MACK=<action>

if the **<mode>** in **#LWM2MENA** is not 0, the Telit LwM2M client requires an ACK to performs its operations on the dedicated data context.

Parameter:

Name	Type	Default	Description
<action>	integer	1	Acknowledge: the **<cid>** context indicated in **#LWM2MENA** command is active and the user allows the client to send data through this. Value: 1 : action is required

AT#LWM2MACK?

Not supported

AT#LWM2MACK=?

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

3.1.5. AT#LWM2MR - LWM2M Client Resource Reading

This set command selects the parameters for the read operation on the lwm2m agent, it requires the correspondent lwm2m agent enabled and working.

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

AT#LWM2MR=<agentInstance>,<objectID>,<objectInstanceID>,<resourceID>, <resourceInstanceID>

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below Values: 0 : Telit agent 1÷4 : reserved for future use
<objectID>	integer	N/A	select object identifier. The following objects could not be accessed by the command: • '0', Security object • '1', Server object • '2', Access Control object • '5', Firmware Update object Value: 0÷65535 : object identifier range
<objectInstanceID>	integer	N/A	select object instance identifier for the query Value: 0÷65535 : object instance identifier range
<resourceID>	integer	N/A	select resource identifier Value: 0÷65535 : resource identifier range
<resourceInstanceID>	integer	N/A	select resource instance identifier Value: 0÷65535 : resource instance identifier range

The command returns an **ERROR** if the selected resource is not readable.

AT#LWM2MR?

Read command return **OK** code

AT#LWM2MR=?

Test command reports the range for parameters

3.1.6. AT#LWM2ME - LWM2M Client Resource Executing

This set command selects the parameters to execute operations on the lwm2m agent, it requires the correspondent lwm2m agent enabled and working.

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

AT#LWM2ME=<agentInstance>,<objectID>,<objectInstanceID>,<resourceID>, <resourceInstanceID>

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below Values: 0 : Telit agent 1÷4 : reserved for future use
<objectID>	integer	N/A	select object identifier. The following objects could not be accessed by the command: • '0', Security object • '1', Server object • '2', Access Control object • '5', Firmware Update object Value: 0÷65535 : select object range
<objectInstanceID>	integer	N/A	select object Instance identifier for the query Value: 0÷65535 : object Instance identifier range
<resourceID>	integer	N/A	select resource identifier Value: 0÷65535 : resource identifier range
<resourceInstanceID>	integer	N/A	selects the resource instance identifier Value: 0÷65535 : resource instance identifier range

The command returns an **ERROR** if the selected resource is not executable.

AT#LWM2ME?

Read command return **OK** code

AT#LWM2ME=?
Test command reports the range for parameters

#LWM2ME command URCs examples:

- Execution of /3303/0/5605 on server side:
  #LWM2MINFO: "GEN","EXEC: /3303/0/5605/0"

- Execution of /3303/0/5605 on client side:
  AT#LWM2ME=0,3303,0,5605,0
  OK

  #LWM2MINFO: "GEN","EXEC: /3303/0/5605/0"

- Execution of /3/0/4 (module reboot) on server side:
  #LWM2MINFO: "GEN","DEVICE REBOOT"

3.1.7. AT#LWM2MREG - Registration to a LwM2M Server

This command allows the user to request a full registration, a deregistration or a registration update to a LwM2M server. It also allows to query the registration state of one or all the LwM2M servers related to a LwM2M agent

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

AT#LWM2MREG=<agentInstanceID>,<actionID>[,<shortServerID>]

Parameters:

Name	Type	Default	Description
<agentInstanceID>	integer	N/A	identifier of the LwM2M agent related to the request Values: 0 : Telit agent 1÷3 : reserved for future use
<actionID>	integer	N/A	identifier of the required action Values: 0 : deregister 1 : full registration 2 : registration update 3 : retrieve registration info
<shortServerID>	integer	N/A	identifier of the server related to the request. It is optional in case <**actionID**> is equal to 3 Value: 1÷65534 : Short server ID of the addressed server

Expected result <**actionID**> 0 - deregister

The deregister operation will fail in the following conditions:

- The state of the <**shortServerID**> is not registered or the client is already deregistering for the addressed server
- The state of the <**shortServerID**> is disabled (a disable timeout has been requested for the addressed server)

Expected result <**actionID**> 1 - full registration

The register operation will fail in the following conditions:

- The state of the <**shortServerID**> is alredy registered or the client is already registering to the addressed server
- The state of the <**shortServerID**> is disabled (a disable timeout has been requested for the addressed server)

Expected result <**actionID**> 2 - registration update

The register operation will fail in the following conditions:

- The state of the <**shortServerID**> is not registered
- The state of the <**shortServerID**> is disabled (a disable timeout has been requested for the addressed server)

Expected result <**actionID**> 3 - retrieve registration info

The command will respond listing the registration details for the server <**shortServerID**>, or for all servers related to the <**agentInstanceID**> in case parameter <**shortServerID**> is not provided.

The answer will be in the following form:

#LWM2MREG: <shortServerID>,
<regState>,<lastRegistration>,<nextUpdate>,<lastActivity>

Parameter	*Description*
<**shortServerID**>	Identifier of the server
<**regState**>	Identifier of the registration state: • 0, not registered • 1, disabled • 2, registered
<**lastRegistration**>	Timestamp related to the last successful registration or registration updated. The timestamp is expressed in Unix local time. In case there is not a valid timestamp, 0 is reported
<**nextUpdate**>	Timestamp related to the next scheduled registration update.The timestamp is expressed in Unix local time. In case there is not a valid timestamp, 0 is reported
<**lastActivity**>	Timestamp related to the last succeeded data exchange between the LwM2M client and the server.The timestamp is expressed in Unix local time. In case there is not a valid timestamp, 0 is reported

AT#LWM2MREG?

Read command returns

OK

AT#LWM2MREG=?

Test command reports the supported range of values for the parameters.

3.1.8. AT#LWM2MW - LWM2M Client Resource Writing

This set command selects the parameters for the write operation on the lwm2m agent, it requires the correspondent lwm2m agent enabled and working.

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

AT#LWM2MW=<agentInstance>,<objectID>,<objectInstanceID>,<resourceID>, <resourceInstanceID>,<value>

Parameters:

Name	Type	Default	Description
<agentInstance>	integer Values: 0 : Telit agent 1÷4 : reserved for future use	0	selects the lwm2m instance shown below
<objectID>	integer Value: 0÷65535 : object identifier range	N/A	selects the object identifier to be selected. The following objects could not be accessed by the command: • '0', Security object • '1', Server object • '2', Access Control object • '5', Firmware Update object
<objectInstanceID>	integer Value: 0÷65535 : object Instance identifier range	N/A	selects the object Instance identifier for the query
<resourceID>	integer Value: 0÷65535 : resource identifier range	N/A	selects the resource identifier
<resourceInstanceID>	integer Value: 0÷65535 : resource instance identifier range	N/A	selects the resource instance identifier
<value>	mixed	-	data to be written in the selected node. Data type should be chosen according to the resource data type.

The command returns an **ERROR** if the selected resource is not writable.

AT#LWM2MW?
Read command return **OK** code

AT#LWM2MW=?
Test command reports the range for parameters.

3.1.9. AT#LWM2MSTS - LWM2STS Bootstrap Server

This command selects the server that will be used at the next module's reboot. It could be used to restore the module to default or new configuration (i.e. in case of mismatch between client and server info like PSK key or identity). Currently, only protected mode is supported.

The command requires the correspondent lwm2m agent existing.

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

AT#LWM2MSTS=<agentId>[,<serverIndex>[,<URI>[,<isBootstrapServer>]]]

Parameters:

Name	Type	Default	Description
<agentId>	integer	0	selects the lwm2m instance shown below. Issuing the command with only the <**agentId**> parameter will reset a formerly set server, restoring the condition to the factory default. Values: 0 : Telit agent 1÷3 : reserved for future use
<serverIndex>	integer	-	the server that will be used by the module at the next client reboot. Entries from: • 0 to 9 reserved for Telit's agent • 10 to 19 reserved for future use The correspondence table between <**serverIndex**> parameter and preconfigured server URI is shown in Additional info.
<URI>	string	-	URI
<isBootstrapServer>	integer	0	selects if the requested server is a bootstrap. Values: 0 : the specified server is not a bootstrap server 1 : the specified server is a bootstrap server

Additional info:

▶▶ Correspondence table between <**serverIndex**> parameter and server URI.

<serverIndex>	server URI	Note
0	reserved	for internal use
10	"coaps://ddocdpboot.do.motive.com:5684"	Bootstrap server
11	"coaps://ddocdp.do.motive.com:5684"	DM server
20	"coaps://xattmpct.xdev.motive.com:5684"	Bootstrap server
999	customized server URI entry	/

<serverIndex> special value '999' allows the user to insert a customized server string; this string should start with "coaps://" sub-string and may or not contain the indicated port. In case the port is not indicated, the coaps required service selects the proper default port.

▶▶ The bootstrap credentials are computed automatically inside the module for all lwm2m agent instances. In order to change default credentials, it is mandatory to set the new credential configuration with **#LWM2MINJKEYS**.

#LWM2MINJKEYS is mandatory for all new configuration set by **#LWM2MSTS** that involves a non-bootstrap server (< **isBootstrapServer**> =0). In this case, **#LWM2MINJKEYS** command should be executed before **#LWM2MSTS** command.

ℹ The servers list is not constrained in any way to any customizations; therefore, each entry is available to every agent.

ℹ The module is rebooted automatically at the successful command execution.

AT#LWM2MSTS?

Read command returns **OK** result code.

AT#LWM2MSTS=?

Test command returns **OK** result code.

3.1.10. AT#LWM2MSET - Set LwM2M Whitelisted Resource

This set command sets a user defined value to the specified resource, if whitelisted.

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

AT#LWM2MSET=<type>,<objectID>,<objectInstanceID>,<resourceID>,<resourceInstanceID>,<value>

Parameters:

Name	Type	Default	Description
<type>	integer	N/A	the data type to be inserted Values: 0 : Integer type 1 : Float type 2 : String type 3 : Opaque (inserted in HEX format)
<objectID>	integer	N/A	select object identifier Value: 0÷65535 : object identifier range
<objectInstanceID>	integer	N/A	select object instance identifier Value: 0÷65535 : object instance identifier range
<resourceID>	integer	N/A	select resource identifier Value: 0÷65535 : resource identifier range
<resourceInstanceID>	integer	N/A	select resource instance identifier Value: 0÷65535 : resource instance identifier range
<value>	mixed	-	the value to be associated to the specified resource, see Additional info section.

Additional info:

▶▶ <**value**> data could assume the following values, according to the specified <**type**>

Name	Type	Default	Description
<value>	integer	N/A	integer values Values:

	-2147483648÷2147483647	:	values range for integers
	0,1	:	values range for booleans
<value>	mixed	-	float values are accepted in positive and negative format, according to the proper float notation
<value>	string	-	string values
<value>	hex	-	opaque values, introduced by the hexadecimal representation

This command only works on whitelisted resources and objects. Currently, the whitelist is:

URI	Name	Data Type
3,0,6,0	Device Object, Available Power Sources	Integer
3,0,7,0	Device Object, Power Source Voltage	Integer
3,0,8,0	Device Object, Power Source Current	Integer
3,0,9,0	Device Object, Battery level	Integer
3,0,17,0	Device Object, Device Type	String
3,0,20,0	Device Object, Battery Status	Integer

In addition, all the "read-only" resources dynamically created by **#LWM2MNEWINST** command will be automatically whitelisted.

The command **#LWM2MSET** provides to the user the full control of the resource, aside from the resource type, therefore the command allows writing values outside the specified range.

AT#LWM2MSET?

Read command returns **OK** code.

AT#LWM2MSET=?

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

3.1.11. AT#LWM2MNEWINST - Create a New Object Instance

This command can be used to create dynamically the new <**objectInstanceID**> of the specified <**objectID**>.

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

AT#LWM2MNEWINST=<agentInstance>,<objectID>,<objectInstanceID>

Execution command allows the user to create dynamically the <**objectInstanceID**> of the specified <**objectID**>. When succeed, the newly created <**objectInstanceID**> will have all the resources filled with default values. The user shall populate them properly, by using the **#LWM2MW** command for writable resources, or by the **#LWM2MSET** command for non-writable resources.

Parameters:

Name	Type	Default	Description
<agentInstance>	integer Value: 0 : Telit client	0	selects the lwm2m instance shown below.
<objectID>	integer Value: 7÷65534 : object identifier range	N/A	object identifier • <**objectID**> value 65535 is reserved • only <**objectID**> starting from value 7 can be used to dynamically create objects
<objectInstanceID>	integer Value: 0÷65534 : object instance identifier range.	N/A	object instance identifier to be created. • <**objectInstanceID**> value 65535 is reserved

AT#LWM2MNEWINST?

Read command returns **OK** code.

AT#LWM2MNEWINST=?

Test command reports the supported range of values for the parameters.

3.1.12. AT#LWM2MGET - Get LwM2M Whitelisted Resource

This command can be used to get a user defined value from a "whitelisted" resource.

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

AT#LWM2MGET=<type>,<objectID>,<objectInstanceID>,<resourceID>,<resourceInstanceID>

Execution command gets a user defined value to the specified resource, if URI is whitelisted; error otherwise.

Parameters:

Name	Type	Default	Description
<type>	integer	N/A	data type to be inserted
	Values:		
	0 : Integer type		
	1 : Float type		
	2 : String type		
	3 : Opaque (inserted in HEX format)		
<objectID>	integer	N/A	object identifier
	Value:		
	0÷65535 : object identifier range		
<objectInstanceID>	integer	N/A	object instance identifier
	Value:		
	0÷65535 : object instance identifier range		
<resourceID>	integer	N/A	resource identifier
	Value:		
	0÷65535 : resource identifier range		
<resourceInstanceID>	integer	N/A	resource instance identifier
	Value:		
	0÷65535 : resource instance identifier range		

This command only works on whitelisted resources and objects. For the object whitelist, please refer to **#LWM2MSET** command.

AT#LWM2MGET?

Read command returns **OK** code.

AT#LWM2MGET=?

Test command reports the supported range of values for the parameters.

3.1.13. AT#LWM2MFOTACFG - LWM2M Client Fota Management

This set command selects the FOTA mode that will be applied to the specified agent. The user will be able to enable the ACK request for any of the FOTA operations (delta download, delta apply for the software update, both and none of them).

After the FOTA mode has been configured, an URC is issued each time the client needs the ACK to continue with the required operation. Every URC emitted should be acknowledged (and authorized) with **#LWM2MFOTAACK** command.

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

AT#LWM2MFOTACFG=<agentInstance>,<mode>[,<timeoutAction>]

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below Values: 0 : Telit agent 1÷3 : reserved for future use
<mode>	integer	0	select the FOTA mode Values: 0 : Normal mode, no ACK required 1 : ACK required for delta file downloading 2 : ACK required for delta application for the software upgrade 3 : ACK required for both delta download and delta update application 4 : FOTA should be rejected
<timeoutAction>	integer	0	select the action to be performed after the FOTA timeout for ACK expiration Values: 0 : After the FOTA timeout for ACK expiration, the operation waiting for user confirmation is rejected and FOTA entire operation is reset 1 : After the FOTA timeout for ACK expiration, the operation waiting for user confirmation is automatically applied

The FOTA timeout for ACK confirmation lasts 1 week (in case of ACK not sent) for each ACK confirmation request.

FOTA configuration <**mode**> and <**timeoutAction**> are persistent to the module power cycle.

FOTA configuration <**mode**> and <**timeoutAction**> are persistent to the factory reset and to the **#LWM2MSTS** command.

- URC are emitted, according to the FOTA mode set, to allow the user to identify the operation that has triggered it. URC are issued in the format:
  #LWM2MFOTARING: <agentInstance>,"DOWNLOAD"
  #LWM2MFOTARING: <agentInstance>,"UPDATE"
  #LWM2MFOTARING: <agentInstance>,"FOTA REJECTED"
- The action that should be performed (either download or update) will be applied in a time ranging from a few seconds up to a couple of minutes.
- If the <**mode**> is set to 4 (FOTA rejection), the client returns an error at every FOTA request generated by the server.
- In case of FOTA operation rejected due to ACK timeout expiring without an ACK confirmation (i.e.: <**timeoutAction**> set to 0), an URC is issued:
  #OTAEV: "FOTA REQUEST DROPPED"
- **#LWM2MFOTACFG** should be given only in FOTA idle status to avoid uncertain scenarios; as soon as the delta firmware is being downloaded,every attempt to change the FOTA configuration during a FOTA operation cycle will result in an error.

AT#LWM2MFOTACFG?

Read command returns the current FOTA configuration for all the LwM2M clients currently active in the module, in the format:

#LWM2MFOTACFG: <agentInstance$_1$>,<mode$_1$>,<timeoutAction$_1$>
...
#LWM2MFOTACFG: < agentInstance$_n$>,<mode$_n$>,<timeoutAction$_n$>

AT#LWM2MFOTACFG=?

Test command reports the range for parameters

#LWM2MFOTACFG/#LWM2MFOTAACK use case example:

// Telit LwM2M client first activation

AT#LWM2MENA=1

OK

LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs.telit.io"

LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs.telit.io"

// setting Telit LwM2M client to require ACK for any FOTA operation

AT#LWM2MFOTACFG=0,3

OK

// FOTA campaign is triggered on server side: delta package download ACK is sent

#LWM2MFOTARING: 0,"DOWNLOAD"
AT#LWM2MFOTAACK=0,1
OK

// LwM2M Telit client is downloading the delta package

…

// Download is finished, and the delta package integrity is confirmed: delta application ACK request is sent

#LWM2MFOTARING: 0,"UPDATE"
AT#LWM2MFOTAACK=0,1
OK

// Delta is applied, LwM2M Telit client is rebooted and FOTA ends with a new bootstrap

#LWM2MINFO: "GEN","FOTA REBOOT"

#OTAEV: Module Upgraded To New Fw
LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs.telit.io"
LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs.telit.io"

3.1.14. AT#LWM2MFOTAACK - Ack for Telit LwM2M Agent FOTA Operation Confirmation

This command sends an ACK to the LwM2M Client to authorize the FOTA operation required to the specified client.

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

AT#LWM2MFOTAACK=<agentInstance>,<action>

if the **<mode>** set with **#LWM2MFOTACFG** command is not 0 (default), the Telit LwM2M client requires an ACK to performs its operations on the dedicated data context.

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below
	Values:		
	0 :	Telit agent	
	1÷4 :	reserved for future use	
<action>	integer	1	acknowledge to the FOTA required operation
	Value:		
	1 :	action is required	

The action that should be performed (either download or update) will be applied in a time ranging from a few seconds up to a couple of minutes.

AT#LWM2MFOTAACK?

Not supported

AT#LWM2MFOTAACK=?

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

#LWM2MFOTACFG/#LWM2MFOTAACK use case example:

// Telit LwM2M client first activation

AT#LWM2MENA=1
OK
LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs.telit.io"
LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs.telit.io"

// setting Telit LwM2M client to require ACK for any FOTA operation
AT#LWM2MFOTACFG=0,3
OK
// FOTA campaign is triggered on server side: delta package download ACK is sent
#LWM2MFOTARING: 0,"DOWNLOAD"
AT#LWM2MFOTAACK=0,1
OK

// LwM2M Telit client is downloading the delta package
…

// Download is finished, and the delta package integrity is confirmed: delta application ACK request is sent
#LWM2MFOTARING: 0,"UPDATE"
AT#LWM2MFOTAACK=0,1
OK

// Delta is applied, LwM2M Telit client is rebooted and FOTA ends with a new bootstrap
#LWM2MINFO: "GEN","FOTA REBOOT"

#OTAEV: Module Upgraded To New Fw
LWM2M-TLT:"BOOTSTRAPPING",SSID=0,"coaps://bs.telit.io"
LWM2M-TLT:"BOOTSTRAPPED",SSID=0,"coaps://bs.telit.io"

3.1.15. AT#LWM2MINJKEYS - LWM2M Store or Delete Credentials

This command stores or deletes security credentials: ep name, identity and secret key. The new credentials will take effect after next reboot leading to a new server connection with the new credentials.

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

AT#LWM2MINJKEYS=<agentInstance>,<mode>,<epName>,<identity>,<secretKey>

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below Values: 0 : Telit agent 1÷4 : reserved for future use
<mode>	integer	N/A	defines the operation to be done Values: 0 : delete ep name, identity, secret key files. 1 : create the key files specified 2 : delete ep name file 3 : delete identity & secret key files
<epName>	string	-	ep name injected. String length range: 0...64
<identity>	string	-	Identity injected. String length range: 0...64
<secretKey>	string	-	secret key injected. String length range: 0...64

The command returns an **ERROR** if **<identity>, <secretKey>** are not both present.
The strings **<epName>**, **<identity>** and **<secretKey>** could be used in the AT command with or without the quotation marks.

AT#LWM2MINJKEYS?

Read command return **OK** code.

AT#LWM2MINJKEYS=?

Test command return **OK** code.

Here are some Telit Agent examples

- Deletes ep name, identity and secret key.
  AT#LWM2MINJKEYS=0,0

  Injects the keys endpoint name, identity and secret key.
  AT#LWM2MINJKEYS=0,1,"aa","bb","cc"

  Injects the key endpoint name.
  AT#LWM2MINJKEYS=0,1,"aa"

  Injects the keys identity and secret key.
  AT#LWM2MINJKEYS=0,1,,"bb","cc"

  Deletes the key endpoint name.
  AT#LWM2MINJKEYS=0,2

  Deletes the keys identity and secret key.
  AT#LWM2MINJKEYS=0,3

3.1.16. AT#LWM2MEXIST - Command for Detecting an Agent/Specific URI Existence

This command allows the end-user to query the module in order to discover if a given agent or a given agent and URI path combination exist. URI should not be filled entirely; in this case the command returns the existence or not of the URI inserted.

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

AT#LWM2MEXIST=<agentInstance>[,<objectNumber>[,<objectInstanceNumber>[,<resourceNumber>[,<resourceInstanceNumber>]]]]

Parameters:

Name	Type	Default	Description
<agentInstance>	integer	0	selects the lwm2m instance shown below (other values for future purposes).
	Values:		
	0 :	Telit agent	
	1÷3 :	reserved for future use	
<objectNumber>	integer	-	selects the object number to be selected.
<objectInstanceNumber>	integer	-	selects the object Instance for the query
<resourceNumber>	integer	-	selects the resource number
<resourceInstanceNumber>	integer	-	selects the resource instance number

The **#LWM2MEXIST** command returns **OK** if the given agent and URI exist. It returns an error in case it does not. The user should use **+CMEE=2** command to know exactly what is not existent. List of possible errors:

+CME ERROR:	Meaning
"Invalid agent"	the given agent does not exist
"Invalid URI"	the given agent exists, but the URI does not exist
"Invalid args"	the given parameters are invalid
"Internal Error"	LwM2M client internal error

In case an object is defined but it has no valid instances declared (such as in case of dynamic objects without any explicitly declared instance), the object is present.

AT#LWM2MEXIST?

Read command return **OK** code

AT#LWM2MEXIST=?

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

#LWM2MEXIST command examples:

- The URI exists

  AT#LWM2MEXIST=0,33211,0,0,0
  OK

  AT#LWM2MEXIST=0,11,1
  OK

- The URI does not exist

  AT#LWM2MEXIST=0,33211,10,0,0
  ERROR

  AT+CMEE=2
  OK

  AT#LWM2MEXIST=0,33211,10,0,0
  +CME ERROR: Invalid URI

- the agent does not exist

  AT#LWM2MEXIST=3
  +CME ERROR: Invalid agent

3.1.17. AT#LWM2MNFYACKENA - Control URC Reporting

This command can be used to disable/enable/read the status of the URC reporting at reception of an Ack sent from a server that receives a LWM2M Notify, for a resource whose URI has been added to the list managed by the **#LWM2MNFYACKURI** command. If the ACK fails to be properly received, it will be reported on the URC.

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

AT#LWM2MNFYACKENA=<agentInstanceID>,<action>

By enabling the issuing of the URCs, each time a LWM2M Notify Ack is received for a resource, the user - if the URI of that resource has been added with **#LWM2MNFYACKURI** - receives an URC reporting the URI path of the resource in the format:

#LWM2MNFYACK: <agentInstanceID>,<ShortServerID>,"/<objectID>/<objectInstanceID>/<resourceID>","ACK" ("NACK")

(Whether the ACK has been properly received or not received at all)

Parameters:

Name	Type	Default	Description
<agentInstanceID>	integer	N/A	selects the lwm2m instance shown below Values: 0 : Telit agent 1÷4 : reserved for future use
<action>	integer	N/A	remove/add/list the URI Values: 0 : disable URC reporting 1 : enable URC reporting 2 : read URC reporting status, see Additional info section

Additional info:

▶▶ **AT#LWM2MFYACKENA=<agentInstanceID>,2**

reports the current status for the selected <**agentInstanceID**> in the following format:

LWM2MNFYACKENA: <agentInstanceID>,<status>

Precondition to receive the **#LWM2MNFYACK** URCs is to have an observation running on the lwm2m client.

The list for Notify Ack is limited to 6 entries for each <**agentInstanceID**>. After that number, it is not possible to add any further URI unless another URI already present in list is removed.

The list and the enabling status are not persistent to a power-cycle.

AT#LWM2MNFYACKENA?
Read command returns **OK**

AT#LWM2MNFYACKENA=?
Test command reports the supported range of values for the parameters.

Start observation to 3/0/9 on server side
enable NFYACK URC:
AT#LWM2MNFYACKURI=0,1,3,0,9
OK
AT#LWM2MNFYACKENA=0,1
OK
change the value of 3/0/9 to cause a notify sent to the server:
AT#LWM2MSET=0,3,0,9,0,50
OK
#LWM2MNFYACK: 0,99,"/3/0/9", "ACK"

3.1.18. AT#LWM2MLIST - Reports Objects and Object Instances

This command allows the end-user to query the module to retrieve the list of the objects and object instances supported for a given agent.

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

AT#LWM2MLIST=<agentInstance>

After the command is issued the answer returned is in the format:

#LWM2MLIST: </objectID$_1$/objectInstanceID$_1$>,</objectID$_2$/objectInstanceID$_2$>,..., </objectID$_n$/objectInstanceID$_n$>

In case the list is longer than the internally reserved buffer, the string is truncated to the last data that can be displayed but a special character "~" is issued at the end of the string, to alert the user that the data displayed is not complete, in the format:

#LWM2MLIST: </objectID$_1$/objectInstanceID$_1$>,...,</objectID$_n$/objectInstanceID$_n$>~

Parameter:

Name	Type	Default	Description
<agentInstance>	string	0	selects the lwm2m instance shown below (other values for future purposes).
	Values:		
	0 :		Telit agent
	1÷2 :		reserved for future use

In case an object is defined but it has no valid instances declared (such as in case of dynamic objects without any explicitly declared instance), the returned information reports uniquely the object number, in the format:

#LWM2MLIST: ...,<objectID$_n$>,...

AT#LWM2MLIST?

Read command return **OK** code

AT#LWM2MLIST=?

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

3.1.19. AT#LWM2MNFYACKURI - Manage URIs for URC Reporting

This command can be used to remove/add/list the URIs of the resources for issuing an URC at reception of an Ack sent from a server that receives a LWM2M Notify for that resource.
The issuing of an URC for the resources added to this list is enabled by the **#LWM2MNFYACKENA** command.
If the ACK fails to be properly received, it will be reported on the URC.

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

AT#LWM2MNFYACKURI=<agentInstanceID>,<operation>,<objectID>,<objectInstanceID>, <resourceID>

By inserting an **<objectID>**,**<objectInstanceID>**,**<resourceID>** URI in the list with **<operation>** in add mode, each time a LWM2M Notify Ack is received for that resource, the user - if the issuing of the URCs has been enabled with **#LWM2MNFYACKENA** - receives an URC reporting the URI path of the resource in the format:

#LWM2MNFYACK: <agentInstanceID>,<ShortServerID>,"/<objectID>/<objectInstanceID>/ <resourceID>", "ACK" (NACK)

(Whether the ACK has been properly received or not received at all).

Parameters:

Name	Type	Default	Description
<agentInstanceID>	integer	0	selects the lwm2m instance shown below
	Values:		
	0 : Telit agent		
	1÷4 : reserved for future use		
<operation>	integer	N/A	remove/add/list the URI
	Values:		
	0 : remove URI		
	1 : add URI		
	2 : list URIs, see Additional info section		
<objectID>	integer	N/A	selects the object identifier of the URI
	Value:		
	0÷65535 : object Instance identifier range		
<objectInstanceID>	integer	N/A	selects the object Instance identifier of the URI
	Value:		
	0÷65535 : object Instance identifier range		
<resourceID>	integer	N/A	selects the resource identifier of the URI
	Value:		
	0÷65535 : resource identifier range		

Additional info:

▶▶ **AT#LWM2MNFYACKURI=<agentInstanceID>,2**

reports the list of currently supported URIs, in the format:

#LWM2MNFYACKURI: "/<objectID$_1$>/<objectInstanceID$_1$>/<resourceID$_1$>"
#LWM2MNFYACKURI: "/<objectID$_2$>/<objectInstanceID$_2$>/<resourceID$_2$>"
...

The URI are listed according to their insertion in the list.

Precondition to receive the **#LWM2MNFYACK** URCs is to have an observation running on the lwm2m client.

The list for Notify Ack is limited to 6 entries for each <**agentInstanceID**>. After that number, it is not possible to add any further URI unless another URI already present in list is removed.

The list and the enabling status are not persistent to a power-cycle.

AT#LWM2MNFYACKURI?

Read command returns **OK**

AT#LWM2MNFYACKURI=?

Test command reports the supported range of values for the parameters.

Start observation to 3/0/9 on server side
enable NFYACK URC:
AT#LWM2MNFYACKURI=0,1,3,0,9
OK
AT#LWM2MNFYACKENA=0,1
OK
change the value of 3/0/9 to cause a notify sent to the server:
AT#LWM2MSET=0,3,0,9,0,50
OK
#LWM2MNFYACK: 0,99,"/3/0/9", "ACK"

3.1.20. AT#LWM2MCUST - Sets LwM2M General Customization Parameters

This command allows the end-user to set LwM2M customization parameters related to the module. Those settings are generally neither related nor manageable with other LwM2M agent commands.

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

AT#LWM2MCUST=<paramId>,<data>

Parameters:

Name	Type	Default	Description
<paramId>	integer	0	identifier of the parameter to be set Value: 0 : sets a LwM2M customization to the module. The change has no effect if there is a specific LwM2M carrier agent that is automatically activated (i.e.: VZW, ATT).
<data>	mixed	-	data to be set for the selected **<paramId>**. <**data**> type depends on the **<paramId>**. See the table in the Additional info section.

Additional info:

▶▶

<paramId>	<data> type	<data> value	note
0	string	"VZW"	customizes the LwM2M to run the Verizon agent instance
		"ATT"	customizes the LwM2M to run the AT&T agent instance
		"DCM"	customizes the LwM2M to run the Docomo agent instance

String values shall be upper case.

The customization settings are stored in the module and have effect after a power-cycle.

AT#LWM2MCUST?

Read command return **OK** code

AT#LWM2MCUST=?

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

Enabling the DOCOMO customization

AT#LWM2MCUST=0,"DCM"
OK

4. LIST OF ACRONYMS

Acronym	Meaning
ARFCN	Absolute Radio Frequency Channel Number
AT	Attention command
BA	BCCH Allocation
BCCH	Broadcast Control Channel
CA	Cell Allocation
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CCM	Current Call Meter
CLIR	Calling Line Identification Restriction
CTS	Clear To Send
CUG	Closed User Group
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DGPS	Differential GPS, the use of GPS measurements, which are differentially corrected
DNS	Domain Name System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
GGA	GPS Fix data
GLL	Geographic Position – Latitude/Longitude
GLONASS	Global positioning system maintained by the Russian Space Forces
GMT	Greenwich Mean Time
GNSS	Any single or combined satellite navigation system (GPS, GLONASS and combined GPS/GLONASS)
GPRS	Global Packet Radio Service
GPS	Global Positioning System
GSA	GPS DOP and Active satellites
GSM	Global System Mobile
GSV	GPS satellites in view
HDLC	High Level Data Link Control
HDOP	Horizontal Dilution of Precision
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IRA	International Reference Alphabet
IWF	Interworking Function
ME	Mobile Equipment
MO	Mobile Originated
MT	*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

5. DOCUMENT HISTORY

Revision	Date	Changes
0	2019-02-12	First emission
1	2019-04-01	Updated overall document Added AT#LWM2MACK, AT#LWM2MMON, AT#LWM2MNEWINST
2	2019-10-14	Changed document title from "LwM2M AT Commands Reference Guide" to "LWM2M AT Commands Reference Guide (ME910C1/ NE910C1/ML865C1)" Updated: Applicability Table and commands descriptions. Added: new chapters.
3	2020-04-21	The Applicability Table has been updated to 30.00.xx8 / M0B.xx0004 Added Commands descriptions: #LWM2MNFYACKENA, #LWM2MNFYACKURI, #LWM2MFOTACFG, #LWM2MFOTAACK, #LWM2MINJKEYS, #LWM2MEXIST Updated Command descriptions: #LWM2MENA, #LWM2MMON, #LWM2MNEWINST, #LWM2MSTAT, #LWM2MSTS
4	2020-11-26	The Applicability Table has been updated to 30.00.xx9 / M0B.xx0005 and removing EoL modules Added Commands descriptions: #LWM2MREG, #LWM2MLIST, #LWM2MCUST Updated Command descriptions: #LWM2MSTS, #LWM2MMON, #LWM2MNFYACKENA, #LWM2MNFYACKURI, #LWM2MFOTACFG, #LWM2MFOTAACK, #LWM2MEXIST, #LWM2ME

SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

www.telit.com

Telit Communications S.p.A.
Via Stazione di Prosecco, 5/B
I-34010 Sgonico (Trieste), Italy

Telit IoT Platforms LLC
5300 Broken Sound Blvd, Suite 150
Boca Raton, FL 33487, USA

Telit Wireless Solutions Inc.
3131 RDU Center Drive, Suite 135
Morrisville, NC 27560, USA

Telit Wireless Solutions Co., Ltd.
8th Fl., Shinyoung Securities Bld.
6, Gukjegeumyung-ro8-gil, Yeongdeungpo-gu
Seoul, 150-884, Korea

Telit Wireless Solutions Ltd.
10 Habarzel St.
Tel Aviv 69710, Israel

Telit Wireless Solutions
Technologia e Servicos Ltda
Avenida Paulista, 1776, Room 10.C
01310-921 São Paulo, Brazil

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