ST87MXX UM AT commands description

Purpose and scope

This document provides details of the AT Command Set supported by the ST87MXX NB-IoT module.

Document status
Official

1 General information

1.1 Acronyms and terms

Table 1. Definitions of terms

Term	Definition
ADC	Analog to Digital Converter
DNS	Domain Name System
EPS	Evolved Packet Switch
ESM	EPS Session Management
GBR	Guaranteed Bit rate
GPIO	General Purpose Input / Output
GW	Gateway
IP	Internet Protocol
JTAG	Joint Test Action Group
MBR	Maximum Bit Rate
NCP	Network Control Protocol
NVM	Non-Volatile Memory
P-CSCF	Proxy - Call Session Control Function
PDP	Packet Data Protocol
PPP	Point-to-Point Protocol
QCI	QoS Class Identifier
QoS	Quality of service
SDK	Software Development Kit
SNDCP	Sub Network Dependent Convergence Protocol
SPI	Serial Peripheral Interface
SV	Space Vehicle
TA	Terminal Adaptor, e.g. a GSM data card (equal to DCE; Data Circuit terminating Equipment)
TE	Terminal Equipment, e.g. a computer (equal to DTE; Data Terminal Equipment)
TFT	Traffic Flow Template
TRNG	True Random Number Generator
UART	Universal Asynchronous Receiver Transmitter
UE	User Equipment
URC	Unsolicited Result Code
URI	Universal Resource Identifier

1.2 Reference documents

The documents listed in Table 2 provide further information.

Table 2. Document references

Reference	Document
[1]	3GPP TS 24.301 V15.8.0
[2]	3GPP TS 24.008 V15.9.0
[3]	3GPP TS 23.682 V15.10.0
[4]	3GPP TS 23.401 V15.12.0
[5]	3GPP TS 23.682 V15.10.0
[6]	3GPP TS 36.133 V15.15.0
[7]	3GPP TS 31.101 V15.3.0
[8]	3GPP TS 36.106 V12.1.0
[9]	3GPP TS 27.060 V15.0.0
[10]	3GPP TS 29.061 V15.7.0
[11]	3GPP TS 23.203 V15.4.0
[12]	3GPP TS 27.007 V15.3.0
[13]	3GPP TS 23.060 V15.4.0
[14]	3GPP TC 27.005 V10.0.0

1.3 Application examples

The table below lists available application examples.

Table 3. Application examples

Reference	Document
[A1]	ST87MXX_FW_Update_Application_Note
[A2]	ST87MXX_MQTT_Application_Note
[A3]	ST87MXX_RF_Tests_Application_Note
[A4]	ST87MXX_Startup_Application_Note
[A5]	ST87MXX_GNSS_Application_Note
[A6]	ST87MXX_ST_ENG_TRACE_Application_Note
[A7]	ST87MXX_Network_Search_Optim_Application_Note
[A8]	ST87M01_GNSS_Wi-Fi_Postionning_with_external_LNA_Application_Note
[A9]	ST87MXX_TLS_Application_Note
[A10]	ST87MXX_SPI_Flash_Application_Note
[A11]	ST87MXX_COAP_Application_Note
[A12]	ST87MXX_WiFi_Scan_Application_Note
[A13]	ST87MXX_HTTP_Application_Note
[A14]	ST87MXX_EC_Lib_Application_Note
[A15]	ST87MXX_TCP_UDP_IP_Application_Note
[A16]	ST87MXX_LwM2M_Application_Note
[A17]	ST87MXX_FOTA_Application_Note
[A18]	ST87MXX_GPIO_Application_Note
[A19]	ST87MXX_ADC_Application_Note

1.4 Revision history

Table 4. Document revision history

Date	Version	Changes
2025-09-01	V3.0	- Official release
2025-10-06	V3.1	- Add timeout and retransmission parameters to the AT#LWPARAMS command - Remove unsupported binding mode from the AT#LWPARAMS command

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2 Introduction

2.1 AT command syntax

All the commands start with the "AT" prefix and ends with a carriage return character <CR>.

Responses start with a carriage return and a line feedback character and end with a carriage return and a line feedback character <CR><LF><response><CR><LF>

Throughout the document the <CR> and <LF> characters are omitted for the sake of readability.

The AT Command set implemented in the ST87MXX is a combination of 3GPP TS 27.005, 3GPP TS 27.007 and ITU-T recommendation V.25ter and the AT proprietary commands developed by ST. The proprietary ST commands are formatted as follow: AT#CMD.

Each AT command is described using the following format:

Table 5. AT command format

Command type	Syntax	Description
Test command	AT+CMD=?	Gives information about the type, value, or range of its parameter.
Read command	AT+CMD?	Checks the current parameter value
Set Command	AT+CMD=<param1>[,<param2>,[...]]]	Sets parameter value.
Execution command	AT+CMD	Performs a specific action.

For a given AT command, if a command type is not described in the document this means that it doesn't exist.

2.2 AT command errors

The AT command may return an error. This is the case for example if the number of parameters or the parameters values are incorrect.

In such cases, the AT command will return either ERROR or +CME ERROR:<err>.
The verbosity of the returned error can be controlled using the AT+CMEE command.

Refer to the error code list to get the detailed error cause.

2.3 Easy Connect Driver vs AT commands

ST87Mxx Easy Connect Library is a library provided as Driver source code example to customer.
The library offers access to ST87Mxx module via C functions to:

- Simplify access to ST87Mxx NB-IoT, GNSS and WMBUS resources
- Give guidance for customer via pre-coded sequences
- Set default settings to provide best performances
- Make configuration as simple and convenient as possible for users

These C functions are developed to avoid the usage of AT commands at low level layers to drive the ST87Mxx and to simplify the complexity of AT sequences management. It is up to user to integrate it or not depending on his own use case.

3 Generic System commands

3.1 ATE – Set Command Echo Mode

This setting determines whether the TA echoes characters received from TE during command state.

ATE – Set Command Echo Mode	
Execution Command	**ATE<value>** OK
Parameters	
<value>	Integer type 0: Echo mode off 1: Echo mode on
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately.
Reference	ITU-T V.250

Note:
If parameter is omitted, the ATE command behaves the same way as ATE1.

3.2 ATI – Display product identification information

This Execution Command returns product information including hardware and software versions.

ATI – Display product identification information	
Execution Command	**ATI** STMICROELECTRONICS ST87M01 <software_version> OK
Parameters	
<software_version>	String type The format is "A:maj.min.rc-M:maj.min.rc-S:maj.min.rc-G:maj.min.rc", where “maj” characters indicate major version, “min” characters indicate minor version, “rc” characters indicate Release Candidate version
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	ITU-T V.250

3.3 AT+CCLK – Set and get current date and time

The write command sets the real-time clock. RTC is automatically synchronized once UE has received EMM INFORMATION signalling. The read command returns the current setting of the clock.

AT+CCLK – Set and get current date and time	
Test Command	**AT+CCLK=?** +CCLK: "yy/mm/dd,hh:mm:ss+zz" OK
Read Command	**AT+CCLK?** +CCLK: <date_and_time> OK
Set Command	**AT+CCLK=<date_and_time>** OK
Parameters	
<date_and_time>	String type The format is "YY/MM/DD,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minute, second and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; the range is -96 to +96). For instance, “6th of May 2014, 22:10:00 GMT+2” equals "14/05/06,22:10:00+08"
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately.
Reference	3GPP TS 27.007

Informative example:
To get the current date and time:

```
AT+CCLK?
+CCLK: "25/08/14,07:23:12+08"
OK
```

To set the current date and time:

```
AT+CCLK="25/08/14,07:23:12+08"
OK
```

3.4 AT+CFUN – Set modem functionality

The set command selects the level of functionality in the UE.

AT+CFUN – Set modem functionality	
Test Command	**AT+CFUN=?** +CFUN: (list of supported <fun>),(list of supported <rst>) OK
Read Command	**AT+CFUN?** +CFUN: <fun> OK
Set Command	**AT+CFUN=<fun>** OK
Parameters	
<fun>	Integer type When <fun> is '0', "minimum functionality" is selected. Transmit and receive RF circuits are disabled. When <fun> is '1', "full functionality" is selected. Transmit and receive RF circuits are enabled for all the supported radio access technologies.
<rst>	<rst> defines the functionality level at reset. The functionality level at reset cannot be modified and is set as "full functionality" by default. This explains why the list of supported values for <rst> that is returned by the test command "AT+CFUN=?" is empty.
Max Response Time Parameter Saving Mode	5 min NA
Reference	3GPP TS 27.007

Informative example:
To disable NB-IOT modem functionality.

```
AT+CFUN=0
+CGEV: ME PDN DEACT 5
#IPCFG: 5,0,0
+CGEV: ME DETACH
OK
```

To enable the NB-IOT modem functionality.

```
AT+CFUN=1
OK
#SIMST: 1
+CGEV: ME PDN ACT 5
```

3.5 AT+CGMI – Request manufacturer identification

AT+CGMI command execution causes the UE to return the manufacturer identification of the UE it is connected to.

AT+CGMI – Request manufacturer identification	
Test Command	**AT+CGMI=?** +CGMI: <manufacturer_id> OK
Execution Command	**AT+CGMI** <manufacturer_id> OK
Parameters	
<manufacturer_id>	String without double quote that is manufacturer id of the UE
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative example:
To get the manufacturer id of the UE:

```
AT+CGMI
001010123456063
OK
```

3.6 AT+CGMM – Request model identification

AT+CGMM command execution causes the UE to return the model identification of the UE it is connected to (e.g. name of the product).

AT+CGMM – Request model identification	
Test Command	**AT+CGMM=?** +CGMM: <model_id> OK
Execution Command	**AT+CGMM** <model_id> OK
Parameters	
<model_id>	String without double quote that is model id of the UE
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative example:
To get the model id of the UE:

```
AT+CGMM
ST87M01
OK
```

3.7 AT+CGMR – Request revision identification

AT+CGMR command execution causes the UE to return the revision identification of the UE it is connected to.

AT+CGMR – Request revision identification	
Test Command	**AT+CGMR=?** +CGMR: <revision_id> OK
Execution Command	**AT+CGMR** <revision_id> OK
Parameters	
<revision_id>	String without double quote that is revision id of the UE
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative example:
To get the revision id of the UE:

```
AT+CGMR
A:1.1.4-M:1.0-S:1.1.4
OK
```

3.8 AT+CGSN – Request product serial number identification

This command returns one of the User Equipment identifiers.

AT+CGSN – Request product serial number identification	
Test Command	**AT+CGSN=?** +CGSN: (list of supported <snt>) OK
Execution Command	**AT+CGSN[=<snt>]** +CGSN: [<sn>] OK
Parameters	
<snt>	Integer type Serial Number Type: 0-3
<sn>	When <snt> is omitted or is '0', <sn> is equal to <imei>. When <snt> is '1', <sn> is equal to <imei> When <snt> is '2', <sn> is equal to <imeisv> When <snt> is '3', <sn> is equal to <svn>
<imei>	String with 14 digits, in decimal format, composed of the Type Allocation Code (TAC - 8 digits), Serial Number (SNR – 6 digits) and Check Digit (CD – 1 digit).
<imeisv>	String with 16 digits, in decimal format, indicating the IMEISV that is the concatenation of the Type Allocation Code (TAC - 8 digits), Serial Number (SNR – 6 digits) and the Software Version Number (SVN - 2 digits).
<svn>	String with 2 digits, in decimal format, indicating the Software Version Number (SVN - 2 digits).
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative examples:

To get <sn> which returns IMEI of the UE:

```
AT+CGSN
"455201033543990"
OK
```

To get <imei> which returns IMEI of the UE:

```
AT+CGSN=1
+CGSN: "455201033543990"
OK
```

To get <imeisv> which returns IMEI without DC and SVN of the UE:

```
AT+CGSN=2
+CGSN: "4552010335439970"
OK
```

3.9 AT+CIMI – Request international mobile subscriber identity

AT+CIMI command execution causes the UE to return the International Mobile Subscriber Identity that is intended to identify the individual SIM card or active application in the UICC which is attached to UE.

AT+CIMI – Request international mobile subscriber identity	
Test Command	**AT+CIMI=?** +CIMI: <imsi> OK
Execution Command	**AT+CIMI** [<imsi>] OK
Parameters	
<imsi>	String without double quote that is International Mobile Subscriber Identity
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative example:
To get <imsi> of the UE:

```
AT+CIMI
001010123456063
OK
```

3.10 AT+CMEE – Report Mobile Termination Error

This command disables or enables the use of the final result code +CME ERROR: <err> as an indication of an error relating to the functionality of MT.

AT+CMEE – Report Mobile Termination Error	
Test Command	**AT+CMEE=?** +CMEE: (0-2) OK
Read Command	**AT+CMEE?** +CMEE: <n> OK
Set Command	**AT+CMEE=<n>** OK
Parameters	
<n>	Integer type Enable/disable the use of result code +CME ERROR: <err>. 0: disables result code 1: enables result code and use numeric values 2: enables result code and use verbose values
Max Response Time	1 sec
Parameter Saving Mode	SAVED in NVM using AT#RESET=1 Takes effect immediately.
Reference	3GPP TS 27.005 / 3GPP TS 27.007

3.11 AT+CMUX – Multiplexing mode

In mobile networks, in a user equipment (UE), the terminal adapter (TA) is used by the terminal equipment (TE) to access the mobile termination (MT) using AT commands. The +CMUX AT command helps configure the link between the TE and the TA.

This command is used to enable/disable the 3GPP TS 27.010 multiplexing protocol control channel. The AT command sets parameters for the Control Channel. If the parameters are left out, the default value is used.

Read command returns the current settings.

Test command returns the supported parameter values.

It is recommended that the MT/TA/TE should autobaud to the +CMUX command up to and including an interface speed of 9600 bits/s.

The OK or +CME ERROR: <err> response is returned at the speed of the +CMUX command prior to entering <transparency>.

It is recommended that whenever the multiplexer control channel is released the MT/TA/TE should assume an interface rate of up to and including 9600 bits/s for auto-baud purposes irrespective of any previous higher speed having been selected.

If a +CMUX command is issued whilst in any multiplexer mode, then that +CMUX command is ignored, and the MT/TA shall return a +CME ERROR: <err> response.

AT+CMUX – Multiplexing mode	
Test Command	**AT+CMUX=?** +CMUX: (list of supported <transparency>),(list of supported <subset>),(list of supported <port_speed>),(list of supported <N1>),(list of supported <T1>),(list of supported <N2>),(list of supported <T2>),(list of supported <T3>),(list of supported <k>) OK
Read Command	**AT+CMUX?** +CMUX: <transparency>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>,<k> OK
Set Command	**AT+CMUX=<transparency>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>,[,<T2>[,<T3>[,<k>]]]]]]]]** OK
Parameters	
<transparency>	Integer type Multiplexer Transparency Mechanism When <transparency> is ‘0’, basic option is selected. When <transparency> is ‘1’, advanced option is selected.
<subset>	Integer type Defines the way in which the multiplexer control channel is set up. A virtual channel may subsequently be set up differently but in the absence of any negotiation for the settings of a virtual channel, the virtual channel shall be set up according to the control channel <subset> setting. When ‘0’, UIH frames used only

	When ‘1’, UI frames used only When ‘2’, I frames used only
<port_speed>	Integer type Transmission rate 1: 9 600 bit/s 2: 19 200 bit/s 3: 38 400 bit/s 4: 57 600 bit/s 5: 115 200 bit/s 6: 230 400 bits/s
<N1>	Integer type Maximum frame size (1-32768): where 31 is the default value for Basic option and 64 is the default value for Advanced option (see <transparency>)
<T1>	Integer type Acknowledgement timer in units of ten milliseconds (1-255): where 10 is the default value (100 ms)
<N2>	Integer type Maximum number of re-transmissions (0-100): where 3 is the default value
<T2>	Integer type Response timer for the multiplexer control channel in units of ten milliseconds (2-255): where 30 is the default value (300 ms) Note:T2 must be longer than T1
<T3>	Integer type Wake up response timer in seconds (1-255): where 10 is the default value
<k>	Integer type Window size, for Advanced option with Error-Recovery Mode (1-7): where 2 is the default value
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

3.12 AT+CRC – Cellular result codes

Sets command controls whether the extended format of network request for PDP context activation is used or not.

AT+CRC – Cellular result codes	
Test Command	**AT+CRC=?** +CRC: (list of supported <mode>) OK
Read Command	**AT+CRC?** +CRC: <mode> OK
Set Command	**AT+CRC=<mode>** OK
Parameters	
<mode>	Integer type 0: extended format is disabled 1: extended format is enabled
<type>	ASYNC [,<priority>[,<subaddr>,<satype>]]: asynchronous transparent SYNC [,<priority>[,<subaddr>,<satype>]]: synchronous transparent REL ASYNC [,<priority>[,<subaddr>,<satype>]]: asynchronous non-transparent REL SYNC [,<priority>[,<subaddr>,<satype>]]: synchronous non-transparent
<priority>	Indicates the eMLPP priority level of the notification or setup message. The priority level values are as defined in eMLPP specification 3GPP TS 22.067.
<subaddr>	String type sub-address of format specified by <satype>
<satype>	Type of <subaddr> octet in integer format (refer 3GPP TS 24.008 subclause 10.5.4.8) or RFC 4715 appendix A.
Max Response Time	1 sec
Parameter Saving Mode	NA.
Reference	3GPP TS 27.007, 3GPP TS 24.008, 3GPP TS 22.067, TIA IS-99 and TIA IS-135

3.13 AT+IPR – Set device UART baudrate

AT+IPR – Set device UART baudrate	
Test Command	**AT+IPR=?** +IPR: (list of supported <rate>) OK
Read Command	**AT+IPR?** +IPR: <rate> OK
Set Command	**AT+IPR=<rate>** OK
Parameters	
<rate>	Integer type Baudrate: 9600, 19200, 38400, 57600, 115200, 230400, 460800. Default value is 115200.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately.
Reference	ITU-T V.250

Note:
When set command is used, the 'OK' response is sent using the original baudrate.

3.14 AT#SIMST – Report SIM status

This Read Command reports the current SIM status.

AT#SIMST – SIM status	
Read Command	**AT#SIMST?** #SIMST: <status> OK
Parameters	
<status>	0: SIM invalid 1: SIM valid
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Informative example:
To read the SIM Status

```
AT#SIMST?
#SIMST: 1
OK
```

4 Custom System commands

4.1 AT#ADCGETUSER – Read the user ADC channel in ADC steps or in mV

AT#ADCGETUSER – Read the ADC user channels in ADC steps or in mV	
Test Command	**AT#ADCGETUSER=?** #ADCGETUSER: <channel>,<divider>,<format> OK
Set Command	**AT#ADCGETUSER=<channel>,<divider>,<format>** #ADCGETUSER: <channel>,<adc_value> OK
Parameters	
<channel>	Integer type 1: User1 2: User2
<divider>	Integer type 0: No Divider 1: Divider enabled with ratio 3.3V/1.1V 2: Divider enabled with ratio 1.8V/1.1V
<format>	Integer type 0: Data in ADC steps 1: Data in mV
<adc_value>	ADC value
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.2 AT#ASSERT – Gives the assert information for the different cores

AT#ASSERT command gives or resets the different core's assert information.

AT#ASSERT – Gives the assert information for the different cores.	
Test Command	**AT#ASSERT=?** #ASSERT: <core> OK
Set Command	**AT#ASSERT=<core>** Assert information for core <core> if any OK
Parameters	
<core>	Integer type 0: gives the assert information related to APP core 1: gives the assert information related to Modem core 2: gives the assert information related to Secure core 3: reset information for all cores
Max Response Time Parameter Saving Mode	1 sec NA

Informative example:
To get assert information from Secure core
If no assert occurred, the answer will be this one

```
AT#ASSERT=2
No APP assert logged

OK
```

If assert occurred, the answer will be like this one

```
AT#ASSERT=2
Assert in file /handler_interrupt_controller.c on line 422 Address 001DD09E

OK
```

4.3 AT#BANDSEL – Enable or Disable RF bands

AT#BANDSEL – Enable or disable RF Bands	
Test Command	**AT#BANDSEL=?** #BANDSEL: <supported_bands> OK
Read Command	**AT#BANDSEL?** #BANDSEL: <active_bands> OK
Set Command	**AT#BANDSEL=<band>[,<band>[,…]]** OK
Parameters	
<supported_bands>	List of integers List of band number(s), separated by commas, that are supported by the module.
<active_bands>	List of integers List of band number(s), separated by commas, for the band(s) that is(are) enabled. Active band(s) is(are) part of supported band(s).
<band>	Integer type Band number(s) for the band(s) to enable or disable
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.4 AT#BANDCFG – Supported RF bands

AT#BANDCFG set command configures the band usage and the band split among the network mobile operators (NMO).

AT#BANDCFG – Configure band usage	
Test Command	**AT#BANDCFG=?** #BANDCFG: <id>,<0>,<band>,<option>,<start100k> #BANDCFG: <id>,<nmo>,<pref>,<guard>,<in>,<bw100k>,<offset100k> OK

Read Command	**AT#BANDCFG?**
	
	#BANDCFG0:
	Band=0, Option=0, StartFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	…
	#BANDCFG4:
	Band=0, Option=0, StartFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	Pref=0, Guard=0, In=0, BW=0, OffsetFreq=0
	
	OK

Set Command	**AT#BANDCFG=<id>,<0>,<band>,<option>,<start100k>** OK or **AT#BANDCFG=<id>,<nmo>,<pref>,<guard>,<in>,<bw100k>,<offset100k>** OK
Parameters	
<id>	Integer type BAND_NMO_CONFIG entry identifier in NVM Valid values are from 0 to 4.
<band>	Integer type Band number for the band to configure.
<option>	Integer type Bitmap to select option.
<start100k>	Integer type Start Frequency of the band to configure (left edge of the band). Unit is 100kHz.
<nmo>	Integer type NMO id. Valid values are from 1 to 5.
<pref>	Boolean type Indicates that the corresponding NMO is the preferred NMO
<guard>	Integer type Indicates that NBIOT is deployed in the NMO band using guard band and provides its

	priority for the initial cell search. Valid values are from 0 to 2.
<in>	Integer type Indicates that NBIOT is deployed in the NMO band using in band and provides its priority for the initial cell search. Valid values are from 0 to 2.
<bw100k>	Integer type This is the NMO bandwidth. Unit is 100 kHz
<offset100k>	Integer type This is the frequency offset versus band left edge. Unit is 100 kHz
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.5 AT#CANDFREQ – Candidate Cells

The SET command controls the list of candidate cells. A candidate cell is a cell on which the UE attempts to attach before performing a frequency scan. There are two lists of candidate cells: a dynamic one and a static one.
The dynamic list is automatically updated with the last EARFCN on which the UE succeeds to attach. There are up to 24 cells in the dynamic candidate cell list. Index 0 is for the newest, and index 23 for the oldest cell.
The static list is only updated by the SET AT#CANDFREQ command. A static candidate cell will remain used as long as it is not removed by another AT#CANDFREQ command or by a reset to factory settings. There are up to 8 cells in the static candidate cell list.

AT#CANDFREQ – Candidate Cells	
Test Command	**AT#CANDFREQ=?** #CANDFREQ: <earfcn>,<operation>,<memory> OK
Read Command	**AT#CANDFREQ?** #CANDFREQ number of candidate frequencies: <nb_dyn_cand_earfcn> [,#CANDFREQ earfcn[0]: <dyn_cand_earfcn_#0>] [,#CANDFREQ earfcn[1]: < dyn_cand_earfcn_#1>] … [,#CANDFREQ earfcn[23]: < dyn_cand_earfcn_#23>] [,#CANDFREQ static earfcn[24]: <sta_cand_earfcn_#0>] [,#CANDFREQ static earfcn[25]: <sta_cand_earfcn_#1>] … [,#CANDFREQ static earfcn[31]: <sta_cand_earfcn_#7>] OK
Set Command	**AT#CANDFREQ=<earfcn>,<operation>,<memory>** OK
Parameters	
<earfcn>	Integer type EARFCN of the candidate cell
<operation>	Integer type 1: add the specified EARFCN to the dynamic candidate cell list and save list to memory 2: add the specified EARFCN to the static candidate cell list and save list to memory -1: remove the specified EARFCN from the dynamic candidate cell list and save list to memory -2: remove the specified EARFCN from the static candidate cell list and save list to memory 0: save current dynamic cell lists to memory (<earfcn> field is ignored)
<memory>	Integer type 0: save to RAM 1: save to RAM and NVM
<nb_dyn_cand_earfcn>	Integer type Number of candidate cells in the dynamic EARFCNs list
<dyn_cand_earfcn_#x>	Integer type EARFCN number #x of the dynamic EARFCNs list
<sta_cand_earfcn_#x>]	Integer type EARFCN number #x of the static EARFCNs list

Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.6 AT#GETTEMP – Read the internal temperature

AT#GETTEMP – Get the internal temperature of the module	
Test Command	**AT#GETTEMP=?** #GETTEMP OK
Read Command	**AT#GETTEMP?** #GETTEMP: <temp> OK
Parameter	
<temp>	Value of Temperature in Celsius degrees
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.7 AT#GETVBAT – Read the voltage battery supply

AT#GETVBAT – Read the voltage battery supply	
Test Command	**AT#GETVBAT=?** #GETVBAT OK
Read Command	**AT#GETVBAT?** #GETVBAT: <vbat> OK
Parameters	
<vbat>	Voltage of battery supply in mV
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.8 AT#GPIOADCCFG – Configure the GPIO in ADC mode

AT#GPIOADCCFG – Configure the GPIOs in ADC mode	
Test Command	**AT#GPIOADCCFG=?** #GPIOADCCFG: <adc_number>,<state> OK
Set Command	**AT#GPIOADCCFG=<adc_number>[,<state>]** OK
Parameters	
<adc_number>	Integer type 1: ADC1 channel 2: ADC2 channel
<state>	Integer type 0: The ADC configuration is not set, the GPIO is input mode 1: The ADC configuration is set When the <state> is not present, the command returns the state of the ADC channel
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.9 AT#GPIOCFG – Set or Get the GPIO Mode of a GPIO

AT#GPIOCFG command is used to set the GPIO Mode or to get the GPIO mode when GPIO Id is provided as unique parameter.

AT#GPIOCFG – Set or Get the GPIO Mode of a GPIO	
Test Command	**AT#GPIOCFG=?** #GPIOCFG: <gpio_id>[,<gpio_mode>[,<format>]] OK
Set Command	**AT#GPIOCFG=<gpio_id>[,<gpio_mode>[,<format>]]** #GPIOCFG: <gpio_id>,<gpio_mode>,<format> OK
Parameters	
<gpio_id>	Integer type ID (between 8 and 31)
<gpio_mode>	Integer type 0: GPIO Input Mode 1: GPIO Output Mode, Push-Pull Mode 2: GPIO Input Mode, Pull-Up enable 3: GPIO Input Mode, Pull-Down enable 4: GPIO Output Mode, Open Drain Mode 5: GPIO Output Mode, Open Drain Mode, Pull-up enable 6: GPIO Output Mode, Open Drain Mode, Pull-down enable 7: GPIO ALT0 Alternate Mode 8: GPIO ALT1 Alternate Mode 9: GPIO ALT2 Alternate Mode
<format>	Integer type If GPIO in input mode, <format> selects the interrupt configuration: 0: IT Disable (default) 1: IT triggered on falling edge 2: IT triggered on raising edge 3: IT triggered on both edges If GPIO in output mode, <format> selects the initialization level: 0: low level (default) 1: high level
Max Response Time	1 sec
Parameter Saving Mode	SAVED in NVM after AT#RESET=1 Takes effect immediately

Note:
The interrupt (falling, rising or both edges) are only available for ID between 16 and 31.
The Alternate mode is used for the GPIO RF configuration.

Informative example:
To find examples, refer to the GPIO application note (see table 3).

4.10 AT#GPIORD – Read the level of a GPIO

AT#GPIORD – Read the level of a GPIO	
Test Command	**AT#GPIORD=?** #GPIORD: <gpio_id> OK
Set Command	**AT#GPIORD=<gpio_id>** #GPIORD: <gpio_id>,<gpio_level> OK
Parameters	
<gpio_id>	Integer type ID between 16 and 31
<gpio_level>	Integer type 0: Low level 1: high level
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GPIO application note (see table 3).

4.11 AT#GPIOWR – Writes the level of a GPIO

AT#GPIOWR command is used to write a low level or a high level on a GPIO.

AT#GPIOWR – Writes the level of a GPIO	
Test Command	**AT#GPIOWR=?** #GPIOWR: <gpio_id>,<gpio_level> OK
Set Command	**AT#GPIOWR=<gpio_id>,<gpio_level>** OK
Parameters	
<gpio_id>	Integer type ID between 16 and 31
<gpio_level>	Integer type 0: Low level 1: High level.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GPIO application note (see table 3).

4.12 AT#LEDCFG – Enable or disable LED status

AT#LEDCFG is used to configure the LED status (enable or disable)

AT#LEDCFG – Enable or disable LED status	
Test Command	**AT#LEDCFG=?** #LEDCFG: <led_cfg> OK
Read Command	**AT#LEDCFG?** #LEDCFG: <led_cfg> OK
Set Command	**AT#LEDCFG=<led_cfg>** OK
Parameters	
<led_cfg>	0: LED0 and LED1 are disabled 1: LED0 is enabled and LED1 is disabled 2: LED0 is disabled and LED1 is enabled 3: LED0 and LED1 are enabled
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the GPIO application note (see table 3).

4.13 AT#LOCKFREQ – Lock to a specific frequency

AT#LOCKFREQ – Lock the Modem to a specific frequency	
Test Command	**AT#LOCKFREQ=?** #LOCKFREQ: <enable>,<earfcn> OK
Read Command	**AT#LOCKFREQ?** #LOCKFREQ: <enable>[,<earfcn>] OK
Set Command	**AT#LOCKFREQ=<enable>[,<earfcn>]** OK
Parameters	
<enable>	Integer type 0: disable frequency locking 1: enable frequency locking, need to provide <earfcn> parameter
<earfcn>	Integer type EARCN as defined in ETSI TS 136 521-1
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 36.106, ETSI TS 136 521-1, Custom

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.14 AT#MANIFEST – Display manifest information of images

AT#MANIFEST – Display manifest information of images	
Execution Command	**AT#MANIFEST** A:XXXXXXX,XXX,XXXX Information about Application core Image M:XXXXXXX,XXX,XXXX Information about Modem core Image S:XXXXXXX,XXX,XXXX Information about Secure core Image G:XXXXXXX,XXX,XXXX Information about GNSS core Image OK
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To get Images information installed inside the module.

```
AT#MANIFEST

A:5FFFFF60,2060,0000
M:5FFFFF60,2060,0000
S:5FFFFF60,2060,0000
G:5FFFFF60,2060,0000

OK
```

4.15 AT#MODEMSTART – Start NBIOT MODEM

AT#MODEMSTART – Start the NBIOT Modem	
Test Command	**AT#MODEMSTART=?** #MODEMSTART OK
Set Command	**AT#MODEMSTART** OK
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To start the modem core after an AT#MODEMSTOP command.

```
AT#MODEMSTART

OK

NBIOT SW version XXXXX
#SIMST: 1
#IPCFG: 5,0,2
```

4.16 AT#MODEMSTOP – Stop NBIOT MODEM

AT#MODEMSTOP – Stop the NBIOT Modem	
Test Command	**AT#MODEMSTOP=?** #MODEMSTOP OK
Execution Command	**AT#MODEMSTOP** OK
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To stop totally the modem core

```
AT#MODEMSTOP

OK
#IPCFG: 5,0,0
```

4.17 AT#PWMINIT – Initialize GPIO for PWM mode

AT#PWMINIT – Initialize GPIO for PWM mode	
Test Command	**AT#PWMINIT=?** #PWMINIT: <pwm_gpio_id> OK
Set Command	**AT#PWMINIT=<pwm_gpio_id>** OK
Parameters	
<pwm_gpio_id>	Integer type 0: PWM0 on GPIO8 1: PWM1 on GPIO9 2: PWM0 on GPIO10 Note: PWM0 connection is exclusive (either GPIO8 or GPIO10)
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To initialize the PWM 0 output to GPIO10

```
AT#PWMINIT=2

OK
```

4.18 AT#PWMSET – Enable PWM with given period and duty cycle

AT#PWMSET command enables PWM signal with user period and duty cycle on selected PWM peripheral (initially configured to output on a given GPIO using PWMINIT AT command). This AT command can be used each time a new period and/or duty cycle is set for PWM signal (“on-the-fly” update).

AT#PWMSET – Enable PWM signal with given period and duty cycle	
Test Command	**AT#PWMSET=?** #PWMSET: <pwm_id>,<period>,<duty_cycle> OK
Set Command	**AT#PWMSET=<pwm_id>,<period>,<duty_cycle>** OK
Parameters	
<pwm_id>	Integer type PWM peripheral number: 0: PWM0 (connected to GPIO8 or 10) 1: PWM1 (connected to GPIO9)
<period>	Integer type PWM signal period value in microsecond. Minimum value is 2µs, maximum is 10s.
<duty_cycle>	Integer type PWM signal duty cycle value in tenth of percent (e.g 489 for 48.9%). Minimum value is 10 (1.0%), maximum is 990 (99.0%).
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
Set PWM0 output to 1KHz square signal with duty cycle at 50%

```
AT#PWMSET=0,1000,500

OK
```

4.19 AT#PWMSTOP – Stop PWM with given period and duty cycle

AT#PWMSTOP command disables PWM signal on selected PWM peripheral (initially configured to output on a given GPIO using PWMINIT AT command).

AT#PWMSTOP – Stop PWM with given period and duty cycle	
Test Command	**AT#PWMSTOP=?** #PWMSTOP: <pwm_id> OK
Set Command	**AT#PWMSTOP=<pwm_id>** OK
Parameters	
<pwm_id>	Integer type PWM peripheral number: 0: PWM0 (connected to GPIO8 or GPIO10) 1: PWM1 (connected to GPIO9)
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
Stop the PWM0 output

```
AT#PWMSTOP=0

OK
```

4.20 AT#PWROFF – Powers module off

AT#PWROFF sets the module in “power off” mode. The only way to power the module back on is to wake it up by using power on key or UART character. At module power off, the NVM parameters are saved.

AT#PWROFF – Powers module off	
Test Command	**AT#PWROFF=?** #PWROFF : [<timeout>] OK
Execution Command	**AT#PWROFF** OK #SHUTDOWN
Set Command	**AT#PWROFF=<timeout>** OK
Parameters	
<timeout>	Integer type Time in seconds to force to enter in power off (min: 10s, max: 300s) The POWER OFF command properly detaches from the network during the timeout period set by the user with this parameter. If the detach process is not completed before the timer expires, the module will go to the Power Off state anyway. If no parameter is provided, the maximum timeout is set implicitly at 300 seconds
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
Power OFF the module without timeout parameter (Timeout set implicitly at the max value: 300s)

```
AT#PWROFF

OK
+CGEV: ME PDN DEACT 5

+CGEV: ME DETACH
#SHUTDOWN
```

Power OFF the module with 10s timeout

```
AT#PWROFF=10

OK
+CGEV: ME PDN DEACT 5

+CGEV: ME DETACH
#SHUTDOWN
```

4.21 AT#REGVEXT – Configuration of the regulator VEXT

AT#REGVEXT – Configuration of the regulator VEXT	
Test Command	**AT#REGVEXT=?** #REGVEXT: <enable>,<voltage_sel> OK
Read Command	**AT#REGVEXT?** #REGVEXT: <enable>,<voltage_sel> OK
Set Command	**AT#REGVEXT=<enable>,<voltage_sel>** OK
Parameters	
<enable>	Integer type 0: disable the regulator 1: enable the regulator
<voltage_sel>	Integer type 0: select the output to 1.8V 1: select the output to the maximum voltage (VBAT PMU)
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
Set PMU_VEXT Voltage Regulator Output pin to the maximum voltage (Supply Voltage connected to the VPMU input)

```
AT#REGVEXT=1,1

OK
```

4.22 AT#RESET – Module reset

AT#RESET – Module reset	
Test Command	**AT#RESET=?** #RESET: [<type>] OK
Set Command	**AT#RESET=[<type>]** OK
Execution Command	**AT#RESET** OK
Parameters	
<type>	Integer type 0: Reset without saving the latest custom command updates 1: Reset and saves the latest custom command updates 3: Reset and make a FOTA roll back
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
Save all modifications before to reset

```
AT#RESET=1

OK
```

4.23 AT#RFACTORY – Reboot with a factory configuration

AT#RFACTORY sets the user parameters with their default values and saves them to NVM. The module reboots with these default parameters.

AT#RFACTORY – Reboot with a factory configuration	
Test Command	**AT#RFACTORY=?** #RFACTORY: [<app_filter>,<modem_filter>,<secure_filter>] OK
Set Command	**AT#RFACTORY=[<app_filter>,<modem_filter>,<secure_filter>]** OK
Parameters	
<app_filter>	Integer type Reset factory filter for the application core: 0: no action 1: user parameters reset to default values
<modem_filter>	Integer type. Bitmap value: Bit 0: reset list of candidate frequencies in NVM to none. Bit 1: reset SIM parameters in NVM. Bit 2: reset list of candidate PLMNs in NVM to none. Bit 4: reset list of static candidate frequencies in NVM to none. Bit 15 & 16: reset PS customer parameters to default values. When <modem_filter> == 0x0: no action is performed When <modem_filter> == 0x18000: PS parameters in NVM are reset to default values. This is exclusive to any other action: setting bits 0, 1, 2 or 4 together with bit 15 would have no effect except resetting PS parameters in NVM to default values.
<secure_filter>	Integer type Reset factory filter for the secure core: 0: no action 1: user parameters reset to default values
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
This command must be executed in test mode, i.e., after AT+CFUN=0.

Informative example:
Sets the default parameters for all features

```
AT#RFACTORY

OK
#REBOOT_HOST

#SIMST: 1

+CGEV: ME PDN ACT 5

#IPCFG: 5,0,1
```

Sets the default parameters for PS (Protocol Stack)

```
AT#RFACTORY=0,0x18000,0

OK
#REBOOT_HOST

#SIMST: 1

+CGEV: ME PDN ACT 5

#IPCFG: 5,0,1
```

4.24 AT#RFRSSI – RF RSSI measurement

This command is used in test mode to control the RF TX window.

AT#RFRSSI – RF RSSI measurement	
Test Command	**AT#RFRSSI=?** #RFRSSI:<rf_freq100k>,<rf_level>[,<rf_lna>] OK
Set Command	**AT#RFRSSI=<rf_freq100k>,<rf_level>[,<rf_lna>]** RFRSSI: <value> dBm OK
Parameters	
<rf_freq100k>	Integer type RF RX frequency in 100kHz unit
<rf_level>	Integer type RF RX expected level in dBm
<rf_lna>	Integer type 0 NBIOT LB/MB LNAs (LB or MB depends on RF frequency) 1 GNSS LNA
<value>	Integer type RSSI measurement in dBm
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
This command must be executed in test mode, i.e., after AT+CFUN=0.
Note that when rf_lna is set, the NBIOT main antenna is switched to Aux output.

Informative example:
To find examples, refer to the RF tests application note (see table 3).

4.25 AT#RFTXCW – RF TX Continuous Wave

This command is used in test mode to generate a CW in TX.

AT#RFTXCW – RF TX Continuous Wave	
Test Command	**AT#RFTXCW=?** #RFTXCW:<rf_freq100k>[,<rf_power>[,<on_time>,<off_time>[,<tone_freq>,<tone_gain>]]] start_stop CW on TX OK
Set Command	To start a CW **AT#RFTXCW=<rf_freq100k>[,<rf_power>[,<on_time>,<off_time>[,<tone_freq>,<tone_gain>]]]** OK To stop a CW **AT#RFTXCW=0** OK
Parameters	
<rf_freq100k>	Integer type RF TX frequency in 100 kHz unit
<rf_power>	Integer type RF TW power in dBm
<on_time>	Integer type TX ON time duration in ms Default value is 60000 when not set
<off_time>	Integer type TX OFF time duration in ms Default value is 3 when not set
<tone_freq>	Integer type CW frequency in Hz Default value is 0 when not set
<tone_gain>	Integer type CW linear gain from 0 to 63 Default value is 20 when not set
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
This command must be executed in test mode, i.e., after AT+CFUN=0

Informative example:
To find examples, refer to the RF tests application note (see table 3).

4.26 AT#RINGPIN – Configure the Ring pin

AT#RINGPIN command configure the ring pin used to wakeup an external host before sending any URC message.

AT#RINGPIN – Configure the Ring pin	
Test Command	**AT#RINGPIN=?** #RINGPIN: <enable>,<gpio>,<level>,<delay> OK
Read Command	**AT#RINGPIN?** #RINGPIN: <enable>,<gpio>,<level>,<delay> OK
Set Command	**AT#RINGPIN=<enable>,<gpio>,<level>,<delay>** OK
Parameters	
<enable>	Integer type 0: disable the ring pin 1: enable the ring pin to toggle
<gpio>	Integer type The GPIO number between 8 and 31
<level>	Integer type 0: active low level 1: active high level
<delay>	Integer type The <delay> is the time in ms when the ring pin is active. The min value is 10ms and the max is 300ms by 10ms steps
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the GPIO application note (see table 3).

4.27 AT#RPM – Radio Policy Manager

AT#RPM – Radio Policy Manager	
Test Command	**AT#RPM=?** #RPM: (range of supported <rpm_flag>s), (range of supported <N1>s), (range of supported <T1>s), (range of supported <T1_ext>s), (range of supported <F1>s), (range of supported <F2>s), (range of supported <F3>s), (range of supported <F4>s) OK
Read Command	**AT#RPM?** #RPM: <rpm_flag>,<N1><T1>,<T1_ext>,<F1>,<F2>,<F3>,<F4> OK
Set Command	**AT#RPM=<rpm_flag>,<N1><T1>,<T1_ext>,<F1>,<F2>,<F3>,<F4>** OK
Parameters	
<rpm_flag >	Integer type 0: Disable RPM 1: Enable RPM
<N1>	Integer type Max number of SW resets per hour allowed by RPM following “permanent” EMM reject
<T1>	Integer type 0: RPM reset via T1 timer is disabled 1-254: value of RPM T1 timer (average time before RPM resets modem following EMM reject). Unit is decihour 255: RPM reset is handled via T1_ext
<T1_ext >	Integer type 0: RPM reset via T1_ext timer is disabled 1-255: value of RPM T1_ext timer (average time before RPM resets modem following EMM reject). Unit is hour
<F1>	Integer type Max number of PDP activation request or PDN connectivity requests per hour allowed by RPM following a PDP Activation Ignore scenario
<F2>]	Integer type Max number of PDP activation requests, PDN connectivity requests per hour allowed by RPM following a “Permanent” PDP Activation Reject
<F3>]	Integer type Max number of PDP activation requests, PDN connectivity requests per hour allowed by RPM following a “Temporary” PDP Activation Reject
<F4>]	Integer type Max number of PDP context or PDN Connectivity Activation/Deactivation Requests per Hour allowed by RPM
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.28 AT#SCAN – Cells scan parameters

The set command controls the cells scan parameters. Parameter <enable> defines if extended coverage (EC) scan is enabled.
If it is set to 0, EC scan is disabled and only cells with a level greater than <level_dbm> are scanned.
If it is set to 1, cells with a level greater than <level_dbm> are scanned first then in a second time, cells below this threshold are scanned.
Once all scans have been performed and if no PLMN is found, the UE enters in OOS mode (Out of Service) where it sleeps for <oos_timer_min_in_10s> if EC scan is disabled, or for <oos_ec_timer_min_in_10s> if it is enabled.
At wakeup, a new scan is performed. Once again, if no PLMN is found, the UE enters sleep for twice the previous time. The sequence is repeated.
The sleep time is clamped to a maximum value which is <oos_timer_max_in_10s> for EC scan disabled or <oos_ec_timer_max_in_10s> if enabled.

AT#SCAN – Cell scan parameters	
Test Command	**AT#SCAN=?** #SCAN: <enable:0-1>,[<level_dbm>],[<oos_timer_min_in_10s>,<oos_timer_max_in_10s>,<oos_ec_timer_min_in_10s>,<oos_ec_timer_max_in_10s>] OK
Read Command	**AT#SCAN?** #SCAN: <enable>,<level_dbm>,<oos_timer_min_in_10s>,<oos_timer_max_in_10s>,<oos_ec_timer_min_in_10s>,<oos_ec_timer_max_in_10s> OK
Set Command	**AT#SCAN=<enable>,[<level_dbm>],[<oos_timer_min_in_10s>,<oos_timer_max_in_10s>,<oos_ec_timer_min_in_10s>,<oos_ec_timer_max_in_10s>]** OK
Parameters	
<enable>	Integer type 0: disable EC scan 1: enable EC scan
<level_dbm>	Integer type Threshold in dBm of the EC scan
<oos_timer_min_in_10s>	Integer type Minimum sleep time in EC scan mode disabled. Unit is 10s
<oos_timer_max_in_10s>	Integer type Maximum sleep time in EC scan mode disabled. Unit is 10s
<oos_ec_timer_min_in_10s>	Integer type Minimum sleep time in EC scan mode enabled. Unit is 10s
<oos_ec_timer_max_in_10s>	Maximum sleep time in EC scan mode enabled. Unit is 10s
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the “Network Search Optim” application note (see table 3).

4.29 AT#SLEEPIND – Enable or disable the URC messages related to sleep mode

AT#SLEEPIND – Enable or disable the URC messages related to sleep mode	
Test Command	**AT#SLEEPIND=?** #SLEEPIND: <msg_ind> OK
Read Command	**AT#SLEEPIND?** #SLEEPIND: <msg_ind> OK
Set Command	**AT#SLEEPIND=<msg_ind>** OK
Parameters	
<msg_ind>	Bitmap when bit set, the event display a #WAKEUP and a #SLEEP URC b0: DRX event is displayed b1: EDRX event is displayed b2: PSM event is displayed b3: OOS event is displayed b4: Verbosity is set (event type and duration of the sleep period). This is displayed only if one of the previous fields is set b5: Lib information from Modem NBIOT at BOOT b6: Energy value display since latest display
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
Enable all indications information regarding the sleep states, values and energy consumption.
Save and reboot to set this new configuration.
Now just before to go in sleep mode, all information of low power are displayed with energy consumption

```
AT#SLEEPIND=0x7F

OK
AT#RESET=1

OK

#REBOOT_HOST
NBIOT  SW version 17:35:12 2025-08-13 BLN_2025_06_27_SPRINT_56_b-18-gbafa3_RC

#SIMST: 1

+CGEV: ME PDN ACT 5

#IPCFG: 5,0,1

#ENERGY: 414.7
#SLEEP PSM 3599.9s
```

4.30 AT#SLEEPMODE – Enable, disable the sleep mode

AT#SLEEPMODE disables or enables the sleep mode. It also sets the minimum time between the last AT command and the sleep mode entry.

AT#SLEEPMODE – Enable, disable the sleep mode	
Test Command	**AT#SLEEPMODE=?** #SLEEPMODE: <enable>,<hold_time>,<awake_time> OK
Read Command	**AT#SLEEPMODE?** #SLEEPMODE: <enable>,<hold_time>,<awake_time> OK
Set Command Execution Command	**AT#SLEEPMODE=<enable>[,<hold_time>[,<awake_time>]]** OK **AT#SLEEPMODE** OK
Parameters	
<enable>	Integer type 0: Disable the sleep mode 1: Enable the sleep mode
<hold_time>	Integer type Time in seconds between the last AT command and the sleep mode entry
<awake_time>	Integer type Define the timeout in seconds that the module is awake at each wake up (telecom activity, AT command activity..). If the <awake_time> is reached, the module is reset. The value 0 disabled the feature (default value). Over values upper than 600 (600s) enable the feature
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Note:
AT#SLEEPMODE without parameter cancels the hold time and the module enters in sleep mode.
If the sleep mode is disabled, the awake timeout is also disabled

Informative example:
Go in sleep mode as soon as possible

```
AT#SLEEPMODE

OK

#ENERGY: 43.6
#SLEEP PSM 3187.8s
```

4.31 AT#STENG – Engineering measurements display

AT#STENG – Engineering measurements display	
Test Command	**AT#STENG=?** #STENG: <bitmaps_urc>,<bitmaps_poll> OK
Set Command	**AT#STENG=<bitmaps_urc>,<bitmaps_poll>** #STENG:<bitmaps_urc>,<bitmaps_poll> OK
Parameters	
<bitmaps_urc>	Filter use in case of URC output sent at each sleep period It is organized in bitmap
<bitmaps_poll>	Filter use in case of polling output sent by at command AT#STENG=1
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the STENG application note (see table 3).

4.32 AT#TEMPLIMIT – Temperature thresholds low and high

AT#TEMPLIMIT sets the low and high temperature thresholds.
In case the temperature level reaches one of these thresholds, a message can be sent to the user and a shutdown can be triggered.

AT#TEMPLIMIT – Temperature thresholds low and high	
Test Command	**AT#TEMPLIMIT=?** #TEMPLIMIT: <low_temp>,<high_temp>,<low_temp_shutdown>, <high_temp_shutdown>,<shutdown>,<display> OK
Read Command	**AT#TEMPLIMIT?** #TEMPLIMIT: <low_temp>,<high_temp>,<low_temp_shutdown>, <high_temp_shutdown>,<shutdown>,<display> OK
Set Command	**AT#TEMPLIMIT=<low_temp>,<high_temp>,<low_temp_shutdown>, <high_temp_shutdown>,<shutdown>,<display>** OK
Parameters	
<low_temp>	Signed integer type Temperature low threshold in Celsius degree for warning display Value must be lower than 0°C
<high_temp>	Signed integer type Temperature high threshold in Celsius degree for warning display Value must be higher than 55°C
<low_temp_shutdown>	Signed integer type Temperature low threshold in Celsius degree for shutdown display and shutdown Value must be lower than 0°C
<high_temp_shutdown>	Signed integer type Temperature high threshold in Celsius degree for shutdown display and shutdown Value must be higher than 55°C
<shutdown>	Integer type 0: Disable shutdown if the shutdown threshold is reached 1: Enable shutdown if the shutdown threshold is reached
<display>	Integer type 0: Disable the display if the threshold is reached 1: Enable the display if the threshold is reached
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.33 AT#VBATLIMIT – Handling of battery level thresholds

AT#VBATLIMIT sets the low and high battery level thresholds.
In case the battery level reaches one of these thresholds, a message can be sent to the user and a shutdown can be triggered.

AT#VBATLIMIT – Handling of battery level thresholds	
Test Command	**AT#VBATLIMIT=?** #VBATLIMIT: <low_vbat>,<high_vbat>,<low_vbat_shutdown>, <high_vbat_shutdown>,<shutdown>,<display>,<bor_lp> OK
Read Command	**AT#VBATLIMIT?** #VBATLIMIT: <low_vbat>,<high_vbat>,<low_vbat_shutdown>, <high_vbat_shutdown>,<shutdown>,<display>,<bor_lp> OK
Set Command	**AT#VBATLIMIT=<low_vbat>,<high_vbat>,<low_vbat_shutdown>, <high_vbat_shutdown>,<shutdown>,<display>,<bor_lp>** OK
Parameters	
<low_vbat>	Integer type Low battery threshold in mV for display warning The value must be lower than 2300mV
<high_vbat>	Integer type High battery threshold in mV for display warning The value must be higher than 2800mV
<low_vbat_shutdown>	Integer type Low battery threshold in mV for shutdown display and shutdown The value must be lower than 2300mV
<high_vbat_shutdown>	Integer type High battery threshold in mV for shutdown display and shutdown The value must be higher than 2800mV
<shutdown>	Integer type 0: Disable shutdown if the shutdown threshold is reached 1: Enable shutdown if the shutdown threshold is reached
<display>	Integer type 0: Disable the display if the threshold is reached 1: Enable the display if the threshold is reached
<bor_lp>	Integer type 0: Disable the BOR in Low power 1: Enable the BOR in Low power
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Informative example:
To find examples, refer to the ADC application note (see table 3).

4.34 AT#WAKEUPEVENT – Handling of the wake up event and associated pins

AT#WAKEUPEVENT enables the wake up of the module through a UART command or the wake up pin. This command also configures the polarity and pull up capabilities of the associated pins.

AT#WAKEUPEVENT – Handling of the wake up event and associated pins	
Test Command	**AT#WAKEUPEVENT=?** #WAKEUPEVENT: <pwrkey_evt>,<uart_evt> OK
Read Command	**AT#WAKEUPEVENT?** #WAKEUPEVENT: <pwrkey_evt>,<uart_evt> OK
Set Command	**AT#WAKEUPEVENT=<pwrkey_evt>,<uart_evt>** OK
Parameters	
<pwrkey_evt>	Integer type See note below
<uart_evt>	Integer type See note below
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot

Note:
<pwrkey_evt> and <uart_evt> are bit maps with following bit definitions:

bit3 (Pull type)	bit2 (Pull)	bit1(Polarity)	bit0 (Enable)
0: Pull-down logic is selected 1: Pull-up logic is selected	0: Disable 1: Enable	0: Logic HIGH level is selected 1: Logic LOW level is selected	0: Disable 1: Enable

Informative example:
Setup the wakeup event for Power on Key (wake up Pin) in Logic Low, with Pull up logic enabled.
Setup the wakeup event for UART in Logic Low, with Pull disable.

```
AT#WAKEUPEVENT=15,3
OK
```

4.35 AT#WDGMODE – Configure the watchdog

AT#WDGMODE – Configure the watchdog	
Test Command	**AT#WDGMODE=?** #WDGMODE: <wdg_mode> OK
Read Command	**AT#WDGMODE?** #WDGMODE: <wdg_mode> OK
Set Command	**AT#WDGMODE=<wdg_mode>** OK
Parameters	
<wdg_mode>	Integer type 0: The watchdog is disabled 1: The watchdog is enabled and when it occurs, it triggers a reboot 2: The watchdog is enabled and when it occurs, it triggers a power off then power on sequence
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately

Note:
By default, the Watchdog is enabled with the <wdgmode> sets to 1

Informative example:
Enable the watchdog in reboot mode

```
AT#WDGMODE=1
OK
```

Disable the watchdog

```
AT#WDGMODE=0
OK
```

5 PS commands

5.1 AT+CGACT – PDP context activate or deactivate

The execution command is used to activate or deactivate the specified PDP context. After the command has completed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If the attach fails then the MT responds with an error message.
For EPS, if an attempt is made to disconnect the last PDN connection, then the MT responds with an error.
For EPS, the activation request for an EPS bearer resource will be answered by the network by either an EPS dedicated bearer activation or EPS bearer modification request. The request must be accepted by the MT before the PDP context can be set in to established state.
If no <cid>s are specified the activation form of the command activates all defined non-emergency contexts.
If no <cid>s are specified the deactivation form of the command deactivates all active contexts.
The read command returns the current activation states for all the defined PDP contexts.
The test command is used for requesting information on the supported PDP context activation states.

AT+CGACT – PDP context activate or deactivate	
Test Command	**AT+CGACT=?** +CGACT: (list of supported <state>s) OK
Read Command	**AT+CGACT?** [+CGACT: <cid>,<state>] [<CR><LF>+CGACT: <cid>,<state> [...]] OK
Set Command	**AT+CGACT=[<state>[,<cid>[,<cid>[,...]]]]** OK
Parameters	
<state>	Integer type Indicates the state of PDP context activation. The default value is manufacturer specific. 0: deactivated 1: activated
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
Max Response Time Parameter Saving Mode	5 sec NA
Reference	3GPP TS 27.007

Note:
If the initial PDP context is supported, the context with <cid>=5 is automatically defined at startup.

5.2 AT+CGAPNRC – APN rate control

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

AT+CGAPNRC – APN rate control	
Test Command	**AT+CGAPNRC=?** +CGAPNRC: (list of <cid>s associated with active contexts) OK
Set Command	**AT+CGAPNRC=<cid>** [+CGAPNRC: <cid>[,<additional_exception_reports>[,<uplink_time_unit>[,<maximum_uplink_rate>]]] [<CR><LF>+CGAPNRC: <cid>[,<additional_exception_reports>[,<uplink_time_unit>[,<maximum_uplink_rate>]]] [...]]] OK
Execution Command	**AT+CGAPNRC** [+CGAPNRC: <cid>[,<additional_exception_reports>[,<uplink_time_unit>[,<maximum_uplink_rate>]]] [<CR><LF>+CGAPNRC: <cid>[,<additional_exception_reports>[,<uplink_time_unit>[,<maximum_uplink_rate>]]] [...]]] OK
Parameters	
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
<additional_exception_reports>	Integer type 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 subclause 10.5.6.3.2. 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 type 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 subclause 10.5.6.3.2. 0: unrestricted 1: minute 2: hour 3: day 4: week
<maximum_uplink_rate>	Integer type

	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 subclause 10.5.6.3.2.
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

5.3 AT+CGATT – PS attach or detach

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an error is reported.

AT+CGATT – PS attach or detach	
Test Command	**AT+CGATT=?** +CGATT: (list of supported <state>) OK
Read Command	**AT+CGATT?** +CGATT:<state> OK
Set Command	**AT+CGATT=<state>** OK
Parameters	
<state>	Integer type Indicates the state of PS attachment. 0: detached 1: attached
Max Response Time	5 min
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.
The read command returns the current Packet Domain service state.
The test command is used for requesting information on the supported PacketDomain service states.

Note2:
This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

5.4 AT+CGCMOD – PDP context modify

The execution command is used to modify the specified PDP context (s) with respect to QoS profiles and TFTs. After the 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 is returned.
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 is effectively changed.
If no <cid>s are specified, the activation form of the command modifies all active contexts.
The test command returns a list of <cid>s associated with active contexts.

AT+CGCMOD – PDP context modify	
Test Command	**AT+CGCMOD=?** +CGCMOD: (list of <cid>s associated with active contexts) OK
Set Command	**AT+CGCMOD[=<cid>[,<cid>[,...]]]** OK
Execution Command	**AT+CGCMOD** OK
Parameters	
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note:
The syntax of the AT Set Command is corrected to be according to ITU T Recommendation V.250. Older versions of the specification specify incorrect syntax +CGCMOD=[<cid>[,<cid>[,...]]].

5.5 AT+CGCONTRDP – Read PDP context dynamic parameters

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

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

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

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

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

AT+CGCONTRDP – Read PDP context dynamic parameters	
Test Command	**AT+CGCONTRDP=?** +CGCONTRDP: (list of <cid>s associated with active contexts) OK
Set Command	**AT+CGCONTRDP=<cid>** [+CGCONTRDP: <cid>,<bearer_id>,<apn> [,<local_addr_and_subnet_mask>[,<gw_addr>[,<DNS_prim_addr> [,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr> [,<IM_CN_Signalling_Flag>[,<LIPA_indication>[,<IPv4_MTU> [,<WLAN_Offload>[,<Local_Addr_Ind>[,<Non-IP_MTU> [,<Serving_PLMN_rate_control_value>]]]]]]]]]]]]] [<CR><LF>+CGCONTRDP: <cid>,<bearer_id>,<apn> [,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr> [,<DNS_sec_addr>[,<P_CSCF_prim_addr> [,<P_CSCF_sec_addr>[,<IM_CN_Signalling_Flag> [,<LIPA_indication>[,<IPv4_MTU>[,<WLAN_Offload> [,<Local_Addr_Ind>[,<Non-IP_MTU> [,<Serving_PLMN_rate_control_value>]]]]]]]]]]]][...]] OK
Execution Command	**AT+CGCONTRDP** [+CGCONTRDP: <cid>,<bearer_id>,<apn> [,<local_addr_and_subnet_mask>[,<gw_addr>[,<DNS_prim_addr> [,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr> [,<IM_CN_Signalling_Flag>[,<LIPA_indication>[,<IPv4_MTU> [,<WLAN_Offload>[,<Local_Addr_Ind>[,<NonIP_MTU> [,<Serving_PLMN_rate_control_value>]]]]]]]]]]]]] [<CR><LF>+CGCONTRDP: <cid>,<bearer_id>,<apn> [,<local_addr_and_subnet_mask>[,<gw_addr>[,<DNS_prim_addr> [,<DNS_sec_addr>[,<P-CSCF_prim_addr> [,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag> [,<LIPA_indication>[,<IPv4_MTU>[,<WLAN_Offload> [,<Local_Addr_Ind>[,<Non-IP_MTU> [,<Serving_PLMN_rate_control_value>]]]]]]]]]]]][...]]

	OK
Parameters	
<cid>	Integer type Specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the +CGDCONT and +CGDSCONT commands).
<bearer_id>	Integer type Identifies the bearer, e.g., the EPS bearer in EPS and the NSAPI in UMTS/GPRS.
<apn>	String type Logical name that was used to select the GGSN or the external packet data network.
<local_addr_and_subnet_mask>	String type Shows the IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
<gw_addr>	String type Shows the Gateway Address of the MT. The string is given as dot-separated numeric (0-255) parameters. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
<DNS_prim_addr>	String type Shows the IP address of the primary DNS server. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
< DNS_sec_addr>	String type Shows the IP address of the secondary DNS server. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
<P-CSCF_prim_addr>	String type Shows the IP address of the secondary P-CSCF server. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
<P-CSCF_sec_addr>	String type Shows the IP address of the secondary P-CSCF server. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.
<IM_CN_Signalling_Flag>	Integer type Shows whether the PDP context is for IM CN subsystem-related signalling only or not. 0: PDP context is not for IM CN subsystem-related signalling only 1: PDP context is for IM CN subsystem-related signalling only
<LIPA_indication>	Integer type Indicates that the PDP context provides connectivity using a LIPA PDN connection. This parameter cannot be set by the TE. 0: indication not received that the PDP context provides connectivity using a LIPA PDN connection 1: indication received that the PDP context provides connectivity using a LIPA PDN connection
<IPv4_MTU>	Integer type

	Shows the IPv4 MTU size in octets.
<WLAN_Offload>	Integer type Indicates whether traffic can be offloaded using the specified PDN connection via a WLAN or not. This refers to bits 1 and 2 of the WLAN offload acceptability IE as specified in 3GPP TS 24.008 subclause 10.5.6.20. 0: offloading the traffic of the PDN connection via a WLAN when in S1 mode or when in Iu mode is not acceptable. 1: offloading the traffic of the PDN connection via a WLAN when in S1 mode is acceptable, but not acceptable in Iu mode. 2: offloading the traffic of the PDN connection via a WLAN when in Iu mode is acceptable, but not acceptable in S1 mode. 3: offloading the traffic of the PDN connection via a WLAN when in S1 mode or when in Iu mode is acceptable.
<Local_Addr_Ind>	Integer type Indicates whether or not the MS and the network support local IP address in TFTs (see 3GPP TS 24.301 and 3GPP TS 24.008 subclause 10.5.6.3). 0: indicates that the MS or the network or both do not support local IP address in TFTs 1: indicates that the MS and the network support local IP address in TFTs
<Non-IP_MTU>	Integer type Shows the Non-IP MTU size in octets.
<Serving_PLMN_rate_control_value>	Integer type Indicates the maximum number of uplink messages the UE is allowed to send in a 6-minute interval. This refers to octet 3 to 4 of the Serving PLMN rate control IE as specified in 3GPP TS 24.301 subclause 9.9.4.28.
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

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

5.6 AT+CGDATA – Enter data state

The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types. This may include performing a PS attach and one or more PDP context activations. If the <L2P> parameter value is unacceptable to the MT, the MT shall return an error. Otherwise, the MT issues the intermediate result code CONNECT and enters V.250 online data state.

Commands following +CGDATA command in the AT command line shall not be processed by the MT.
The detailed behaviour after the online data state has been entered is dependent on the PDP type. It is described briefly in 3GPP TS 27.060 and in more detail in 3GPP TS 29.061 and the specifications for the relevant PDPs. PS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands.
If context activation takes place during the PDP startup, one or more <cid>s may be specified in order to provide the information needed for the context activation request(s).
During each PDP startup procedure the MT may have access to some or all of the following information.
The MT may have a priori knowledge, for example, it may implement only one PDP type.
The command may have provided an <L2P> parameter value.
The TE may provide a PDP type and/or PDP address to the MT during in the PDP startup procedure.

If any of this information is in conflict, the command will fail.
Any PDP type and/or PDP address present in the above information shall be compared with the PDP type and/or PDP address in any context definitions specified in the command in the order in which their <cid>s appear. For a context definition to match:
The PDP type must match exactly.
The PDP addresses are considered to match if they are identical or if either or both addresses are unspecified. For example, a PPP NCP request specifying PDP type = IP and no PDP address would cause the MT to search through the specified context definitions for one with PDP type = IP and any PDP address.

The context shall be activated using the matched value for PDP type and a static PDP address if available, together with the other information found in the PDP context definition. If a static PDP address is not available then a dynamic address is requested.
If no <cid> is given or if there is no matching context definition, the MT shall attempt to activate the context with whatever information is available to the MT. The other context parameters shall be set to their default values.
If the activation is successful, data transfer may proceed.
After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the V.250 command state is re-entered and the MT returns the final result code OK.
In the event of an erroneous termination or a failure to start up, the V.250 command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, +CME ERROR.
The test command is used for requesting information on the supported layer 2 protocols.
This command may be used in both normal and modem compatibility modes.

AT+CGDATA – Enter data state	
Test Command	**AT+CGDATA=?** +CGDATA: (list of supported <L2P>s) OK
Set Command	**AT+CGDATA=<l2P>[,<cid>[,<cid>[,...]]]** CONNECT

Execution Command	**AT+CGDATA** CONNECT
Parameters	
<l2P>	String type Indicates the layer 2 protocol to be used between the TE and MT NULL: none, for PDP type OSP:IHOSS (Obsolete) PPP: Point-to-point protocol for a PDP such as IP PAD: character stream for X.25 character (triple X PAD) mode (Obsolete) X25: X.25 L2 (LAPB) for X.25 packet mode (Obsolete) M-xxxx: manufacturer-specific protocol (xxxx is an alphanumeric string) If the value is omitted, the layer 2 protocol is unspecified. Other values are reserved and will result in an ERROR response.
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
Max Response Time	5 min
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
If the initial PDP context is supported, the context with <cid>=5 is automatically defined at startup.

Note2:
The syntax of the AT Set Command is corrected to be according to ITU T Recommendation V.250. Older versions of the specification specify incorrect syntax +CGDATA=[<l2P>[,<cid>[,<cid>[,...]]]].

5.7 AT+CGDCONT – Define PDP context

The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid> and also allows the TE to specify whether security protected transmission of ESM information is requested, because the PCO can include information that requires ciphering. There can be other reasons for the UE to use security protected transmission of ESM information, e.g. if the UE needs to transfer an APN. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

For EPS the PDN connection and its associated EPS default bearer is identified herewith.
A special form of the set command, +CGDCONT=<cid> causes the values for context number <cid> to become undefined.

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup. As all other contexts, the parameters for <cid>=0 can be modified with +CGDCONT. If the initial PDP context is supported, +CGDCONT=0 resets context number 0 to its particular default settings.

The read command returns the current settings for each defined context.

The test command returns values supported as compound values. If the MT supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

AT+CGDCONT – Define PDP context	
Test Command	**AT+CGDCONT=?** +CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IPMTUdiscovery>s) [<CR><LF>+CGDCONT: (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported <Non-IPMTUdiscovery>s)[...]] OK
Read Command	**AT+CGDCONT?** [+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp> [,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery> [,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>]]]]]]]]] [<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp> [,<IM_CN_Signalling_Flag_Ind>[,<NSLPI> [,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind> [,<Non-IP_MTU_discovery>]]]]]]]] [...]] OK
Set Command	**AT+CGDCONT=[<cid>[,<pdp_type>[,<apn>[,<pdp_addr>[,<d_comp>[,<h_comp> [,<IPv4AddrAlloc>[,<request_type> [,<PCSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>][,<Local_Addr_Ind>][,<Non-P_MTU_discovery>]]]]]]]]]]]]** OK

Parameters	
<cid>	Integer type Specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1 or if the initial PDP context is supported (see subclause 10.1.0), minimum value = 0) is returned by the test form of the command. Note1:The <cid>s for network-initiated PDP contexts will have values outside the ranges indicated for the <cid> in the test form of the commands +CGDCONT and +CGDSCONT.
<pdp_type>	String type Specifies the type of packet data protocol. The default value is manufacturer specific. • X.25: ITU-T/CCITT X.25 layer 3 (Obsolete) • IP: Internet Protocol (IETF STD 5) • IPV6 : Internet Protocol, version 6 (see RFC 2460) • IPV4V6 : Virtual <PDP_type> introduced to handle dual IP stack UE capability. (See 3GPP TS 24.301) • OSPIH: Internet Hosted Octect Stream Protocol (Obsolete) • PPP: Point to Point Protocol (IETF STD 51) • Non-IP: Transfer of Non-IP data to external packet data network (see 3GPP TS 23.401) Note2: Only IP, IPV6, IPV4V6 and Non-IP values are supported for EPS services.
<apn>	String type Logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.
<pdp_addr>	String type Identifies the MT in the address space applicable to the PDP. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGDCONT. Note3:The value of this parameter is ignored with the set command. The parameter is included in the set command for backwards compatibility reasons only.
<d_comp>	Integer type Controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065) • 0: off • 1: on (manufacturer preferred compression) • 2: V.42bis • 3: V.44
<h_comp>	Integer type Controls PDP header compression (refer 3GPP TS 44.065 and 3GPP TS 25.323) • 0: off • 1: on (manufacturer preferred compression) • 2: RFC 1144 (applicable for SNDCP only) • 3: RFC 2507 • 4: RFC 3095 (applicable for PDCP only)
<IPv4AddrAlloc>	Integer type Controls how the MT/TA requests to get the IPv4 address information • 0: IPv4 address allocation through NAS signalling • 1: IPv4 address allocated through DHCP
<request_type>	Integer type Indicates the type of PDP context activation request for the PDP context, see 3GPP TS 24.301 (subclause 6.5.1.2) and 3GPP TS 24.008 (subclause 10.5.6.17). If the initial PDP context is supported (see subclause 10.1.0) it is not allowed to assign <cid>=0 for emergency bearer services. According to 3GPP TS 24.008 (subclause 4.2.4.2.2 and subclause 4.2.5.1.4) and 3GPP TS 24.301 (subclause 5.2.2.3.3 and subclause 5.2.3.2.2), a separate PDP context must be established for emergency bearer services. Note4: If the PDP context for emergency bearer services is the only activated context,

	only emergency calls are allowed, see 3GPP TS 23.401 subclause 4.3.12.9. • 0: PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific) • 1: PDP context is for emergency bearer services • 2: PDP context is for new PDP context establishment • 3: PDP context is for handover from a non-3GPP access network • 4: PDP context is for handover of emergency bearer services from a non-3GPP access network Note5: A PDP context established for handover of emergency bearer services from a non-3GPP access network has the same status as a PDP context for emergency bearer services.
<P-CSCF_discovery>	Integer type Influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 annex B and annex L. • 0: Preference of P-CSCF address discovery not influenced by +CGDCONT • 1: Preference of P-CSCF address discovery through NAS signalling • 2: Preference of P-CSCF address discovery through DHCP
<IM_CN_Signalling_Flag_Ind>	Integer type Indicates to the network whether the PDP context is for IM CN subsystem-related signalling only or not. • 0: UE indicates that the PDP context is not for IM CN subsystem-related signalling only • 1: UE indicates that the PDP context is for IM CN subsystem-related signalling only
<NSLPI>	Integer type Indicates the NAS signalling priority requested for this PDP context: • 0: indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT. • 1: indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority". Note6: The MT utilises the provide NSLPI information as specified in 3GPP TS 24.301 and 3GPP TS 24.008.
<securePCO>	Integer type Specifies if security protected transmission of PCO is requested or not (applicable for EPS only, see 3GPP TS 23.401 subclause 6.5.1.2). • 0: Security protected transmission of PCO is not requested • 1: Security protected transmission of PCO is requested
<IPv4_MTU_discovery>	Integer type Influences how the MT/TA requests to get the IPv4 MTU size, see 3GPP TS 24.008 subclause 10.5.6.3. • 0: Preference of IPv4 MTU size discovery not influenced by +CGDCONT • 1: Preference of IPv4 MTU size discovery through NAS signalling
<Local_Addr_Ind>	Integer type Indicates to the network whether or not the MS supports local IP address in TFTs (see 3GPP TS 24.301 and 3GPP TS 24.008 subclause 10.5.6.3). • 0: indicates that the MS does not support local IP address in TFTs • 1: indicates that the MS supports local IP address in TFTs
<Non-IP_MTU_discovery>	Integer type Influences how the MT/TA requests to get the Non-IP MTU size, see 3GPP TS 24.008 subclause 10.5.6.3. • 0: Preference of Non-IP MTU size discovery not influenced by +CGDCONT • 1: Preference of Non-IP MTU size discovery through NAS signalling

Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note:
<cid> values of 0-10 are supported

5.8 AT+CGDSCONT – Define secondary PDP context

The set command specifies PDP context parameter values for a secondary PDP context identified by the (local) context identification parameter, <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.
In EPS the command is used to define traffic flows.
A special form of the set command, +CGDSCONT=<cid> causes the values for context number <cid> to become undefined.
The read command returns the current settings for each defined context.
The test command returns values supported as compound values.

AT+CGDSCONT – Define secondary PDP context	
Test Command	**AT+CGDSCONT=?** +CGDSCONT: (range of supported <cid>),(list of <p_cid> for active primary contexts),(list of supported <d_comp>),(list of supported <h_comp>), (list of supported <IM_CN_Signalling_Flag_Ind>) OK
Read Command	**AT+CGDSCONT?** [+CGDSCONT: <cid>,<p_cid>,<d_comp>,<h_comp>,<IM_CN_Signalling_Flag_Ind>] [<CR><LF>+CGDSCONT: <cid>,<p_cid>,<d_comp>,<h_comp>,<IM_CN_Signalling_Flag_Ind> [...]] OK
Set Command	**+CGDSCONT=[<cid>,<p_cid>[,<d_comp>[,<h_comp>[,<IM_CN_Signalling_Flag_Ind>]]]]** OK
Parameters	
<cid>	Integer type Specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command.
<p_cid>	Integer type Specifies a particular PDP context definition which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test form of the command.
<d_comp>	Integer type Controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065) 0: off 1: on (manufacturer preferred compression) 2: V.42bis 3: V.44
<h_comp>	Integer type Controls PDP header compression (refer 3GPP TS 44.065 and 3GPP TS 25.323) 0: off 1: on (manufacturer preferred compression) 2: RFC 1144 (applicable for SNDCP only)

	3: RFC 2507 4: RFC 3095 (applicable for PDCP only)
<IM_CN_Signalling_Flag_Ind>	Integer type Indicates to the network whether the PDP context is for IM CN subsystem-related signalling only or not. 0: UE indicates that the PDP context is not for IM CN subsystem-related signalling only 1: UE indicates that the PDP context is for IM CN subsystem-related signalling only
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.

Note2:
The <cid> for network-initiated PDP contexts will have values outside the ranges indicated for the <cid> in the test form of the commands +CGDCONT and +CGDSCONT.

5.9 AT+CGEQOS – Defines EPS Quality of Service

The set command allows the TE to specify the EPS Quality of Service parameters <cid>, <QCI>, [<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>] for a PDP context or Traffic Flows (see 3GPP TS 24.301 and 3GPP TS 23.203).
A special form of the set command, +CGEQOS=<cid> causes the values for context number <cid> to become undefined.
The read command returns the current settings for each defined QoS.
The test command returns the ranges of the supported parameters as compound values.

AT+CGEQOS – Defines EPS Quality of Service	
Test Command	**AT+CGEQOS=?** +CGEQOS: (range of supported <cid>),(ranges of supported <QCI>), (range of supported <DL_GBR>),(range of supported <UL_GBR>), (range of supported <DL_MBR>),(range of supported <UL_MBR>) OK
Read Command	**AT+CGEQOS?** [+CGEQOS: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>]] [<CR><LF>+CGEQOS: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [...]] OK
Set Command	**AT+CGEQOS=[<cid>[,<QCI>[,<DL_GBR>,<UL_GBR>[,<DL_MBR>,<UL_MBR>]]]]** OK
Parameters	
<cid>	Integer type Specifies a particular EPS Traffic Flows definition in EPS (see the +CGDCONT and +CGDSCONT commands).
<QCI>	Integer type Specifies a class of EPS QoS (see 3GPP TS 23.203 and 3GPP TS 24.301): 0: QCI is selected by network [1 – 4]: value range for guaranteed bit rate Traffic Flows 75: value for guaranteed bit rate Traffic Flows [5 – 9]: value range for non-guaranteed bit rate Traffic Flows 79: value for non-guaranteed bit rate Traffic Flows [128 – 254]: value range for Operator-specific QCIs The QCI values 65, 66, 69 and 70 are not allowed to be requested by the UE. If the TE requests a QCI parameter 65, 66, 69 or 70, the MT responds with result code +CME ERROR: 181 (unsupported QCI value).
<DL_GBR>	Integer type Indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<UL_GBR>	Integer type Indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<DL_MBR>	Integer type Indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<UL_MBR>	Integer type

	Indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

5.10 AT+CGEQOSRDP – EPS quality of service read dynamic parameters

The execution command returns the Quality of Service parameters <QCI>, [<DL_GBR>and <UL_GBR>]and [<DL_MBR>and <UL_MBR>] of the active secondary or non secondary PDP context associated to the provided context identifier <cid>.

If the parameter <cid>is omitted, the Quality of Service parameters for all secondary and non secondary active PDP contexts are returned.

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

Parameters of both network and MT/TA initiated PDP contexts will be returned.

AT+CGEQOSRDP – EPS quality of service read dynamic parameters	
Test Command	**AT+CGEQOSRDP=?** +CGEQOSRDP: (list of <cid>s associated with active contexts) OK
Set Command	**AT+CGEQOSRDP[=<cid>]** [+CGEQOSRDP: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>] ,[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>]] [<CR><LF>+CGEQOSRDP: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>] ,[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>][...]] OK
Execution Command	**AT+CGEQOSRDP** [+CGEQOSRDP: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>] ,[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>]] [<CR><LF>+CGEQOSRDP: <cid>,<QCI>,[<DL_GBR>,<UL_GBR>] ,[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>][...]] OK
Parameters	
<cid>	Integer type Specifies a particular Traffic Flows definition in EPS (see the +CGDCONT and +CGDSCONT commands).
<QCI>	Integer type Specifies a class of EPS QoS (see 3GPP TS 23.203 and 3GPP TS 24.301). 0 QCI is selected by network [1 – 4] value range for guaranteed bit rate Traffic Flows 65, 66, 75 values for guaranteed bit rate Traffic Flows [5 – 9] value range for non-guaranteed bit rate Traffic Flows 69, 70, 79 values for non-guaranteed bit rate Traffic Flows [128 – 254] value range for Operator-specific QCIs
<DL_GBR>	Integer type Indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<UL_GBR>	Integer type Indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<DL_MBR>	Integer type Indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).

<UL_MBR>	Integer type Indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301).
<DL_AMBR>	Integer type Indicates DL APN aggregate MBR (see 3GPP TS 24.301). The value is in kbit/s.
<UL_AMBR>	Integer type Indicates UL APN aggregate MBR (see 3GPP TS 24.301). The value is in kbit/s.
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
The syntax of the AT Set Command is corrected to be according to ITU-T Recommendation V.250. Older versions of the specification specify incorrect syntax +CGEQOSRDP=[<cid>]

Note2:
If multiple lines in a response belong to the same PDN connection they contain the same <dl_ambr><ul_ambr>values.

5.11 AT+CGEREP – Packet domain event reporting

Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of certain events occurring in the Packet Domain MT or the network. Parameter <mode> controls the processing of unsolicited result codes specified within this command. If a setting is not supported by the MT, an error is returned.
Read command returns the current mode.
Test command returns the modes by the MT as compound values.

AT+CGEREP – Packet domain event reporting	
Test Command	**AT+CGEREP=?** +CGEREP: (list of supported <mode>s) OK
Read Command	**AT+CGEREP?** +CGEREP: <mode> OK
Set Command	**AT+CGEREP=[<mode>]** OK
Parameters	
<mode>	Integer type 0: disables sending of unsolicited result codes 1: discards unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE
Max Response Time	5 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

Note1:
The defined events are valid for GPRS/UMTS and LTE unless explicitly mentioned.
For network attachment, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW DETACH
The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

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

For PDP context activation, the following unsolicited result codes and the corresponding events are defined:

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

<reason>: integer type; indicates the reason why the context activation request for PDP type IPv4v6 was not granted. This parameter is only included if the requested PDP type

associated with <cid> is IPv4v6, and the PDP type assigned by the network for <cid> is either IPv4 or IPv6.

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

<cid_other>: integer type; indicates the context identifier allocated by MT for an MT initiated context of a second address type. MT shall only include this parameter if <reason> parameter indicates single address bearers only allowed, and MT supports MT initiated context activation of a second address type without additional commands from TE, and MT has activated the PDN connection or PDP context associated with <cid_other>.

Note2:
For legacy TEs supporting MT initiated context activation without TE requests, there is also a subsequent event +CGEV: ME PDN ACT <cid_other>returned to TE.

+CGEV: NW ACT <p_cid>, <cid>, <event_type>
The network has activated a context. The <cid>for this context is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid>and <cid>are found in command +CGDSCONT.

<event_type>: integer type; indicates whether this is an informational event or whether the TE has to acknowledge it.

- 0: Informational event
- 1: Information request: Acknowledgement required. The acknowledgement can be accept or reject, see +CGANS.

+CGEV: ME ACT <p_cid>, <cid>, <event_type>
The network has responded to an ME initiated context activation. The <cid>for this context is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid>and <cid>are found in command +CGDSCONT. The format of the parameters <event_type> are defined above.

For PDP context deactivation, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW PDN DEACT <cid>
The network has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS. The associated <cid> for this context is provided to the TE. The format of the parameter <cid>is found in command +CGDCONT.

+CGEV: ME PDN DEACT <cid>
The mobile termination has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS. The <cid>for this context is provided to the TE. The format of the parameter <cid>is found in command +CGDCONT.

Note3:
Occurrence of this event replaces usage of the event +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>].

+CGEV: NW DEACT <p_cid>, <cid>, <event_type>
The network has deactivated a context. The <cid>for this context is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid>and <cid>are found in command +CGDSCONT. The format of the parameters <event_type> are defined above.

Note4:
Occurrence of this event replaces usage of the event +CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>].

+CGEV: ME DEACT <p_cid>, <cid>, <event_type>
The network has responded to an ME initiated context deactivation request. The associated <cid>is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid>and <cid> are found in command +CGDSCONT. The format of the parameter <event_type>is defined above.

For PDP context modification, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW MODIFY <cid>, <change_reason>, <event_type>
The network has modified a context. The associated <cid>is provided to the TE in addition to the <change_reason>and <event_type>. The format of the parameter <cid>is found in command +CGDCONTor +CGDSCONT. The format of the parameters <change_reason>, <event_type>, and <WLAN_Offload>are defined above.

<change_reason>: integer type; a bitmap that indicates what kind of change occurred. The <change_reason>value is determined by summing all the applicable bits.

- Bit 1: TFT changed
- Bit 2: Qos changed

+CGEV: ME MODIFY <cid>, <change_reason>, <event_type>
The mobile termination has modified a context. The associated <cid>is provided to the TE in addition to the <change_reason>and <event_type>. The format of the parameter <cid>is found in command +CGDCONTor +CGDSCONT. The format of the parameters <change_reason>and<event_type> are defined above.

+CGEV: NW IP ADDR CHG <cid>
The network has provided the TE with a new IPv6 address for the specified <cid> context. The format of the parameter <cid>is found in command +CGDCONT or +CGDSCONT.

5.12 AT+CGPADDR – Show PDP address(es)

The execution command returns a list of PDP addresses for the specified context identifiers. If no <cid> is specified, the addresses for all defined contexts are returned.
The test command returns a list of defined <cid>.

AT+CGPADDR – Show PDP address(es)	
Test Command	**AT+CGPADDR=?** +CGPADDR: list of defined <cid> OK
Set Command	**AT+CGPADDR[=<cid>[,<cid>[,...]]]** [+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]] [<CR><LF>+CGPADDR: <cid>,[<PDP_addr_1>[,<PDP_addr_2>]] [...]] OK
Execution Command	**AT+CGPADDR** [+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]] [<CR><LF>+CGPADDR: <cid>,[<PDP_addr_1>[,<PDP_addr_2>]] [...]] OK
Parameters	
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
<PDP_addr_1> <PDP_addr_2>	String type Identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2>are omitted if none is available. Both <PDP_addr_1> and <PDP_addr_2> are included when both IPv4 and IPv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6. When +CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter <PDP_addr_1> or <PDP_addr_2> returned with the execute form of +CGPADDR.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
The syntax of the AT Set Command is corrected to be according to ITU T Recommendation V.250. Older versions of the specification specify incorrect syntax +CGPADDR=[,<cid>[,<cid>[,...]]].

Note2:
In dual-stack terminals (<PDP_type> IPV4V6), the IPv6 address will be provided in <PDP_addr_2>. For terminals with a single IPv6 stack (<PDP_type> IPV6) or due to backwards compatibility, the IPv6 address can be provided in parameter <PDP_addr_1>.

5.13 AT+CGPIAF – Printing IP address format

Set command decides what format to print IPV6 address parameters of other AT commands. See RFC 4291 for details of the IPv6 address format.
The +CGPIAF parameters <IPv6_AddressFormat>, <IPv6_SubnetNotation>, <IPv6_LeadingZeros> and <IPv6_CompressedZeros> affect the following commands and parameters:
a)in +CGTFT and +CGTFTRDP, the <remote_address_and_subnet_mask>;
b)in +CGDCONT, the <PDP_addr>;
c)in +CGPADDR, the <PDP_addr_1> and <PDP_addr_2>;
d)in +CGCONTRDP, the <local address and subnet mask>, <DNS_prim_addr>, <DNS_sec_addr>, <P_CSCF_prim_addr> and <P_CSCF_sec_addr>; and
e)in +CRC, the <PDP_addr> of unsolicited result code GPRS <PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]].
Read command returns the current command parameter settings.
Test command returns values supported as compound values.

AT+CGPIAF – Printing IP address format	
Test Command	**AT+CGPIAF=?** +CGPIAF: (list of supported <IPv6_AddressFormat>s),(list of supported <IPv6_SubnetNotation>s),(list of supported <IPv6_LeadingZeros>s),(list of supported <IPv6_CompressZeros>s) OK
Read Command	**AT+CGPIAF?** +CGPIAF: <IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>,<IPv6_CompressZeros> OK
Set Command	**AT+CGPIAF=[<IPv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_LeadingZeros>[,<IPv6_CompressZeros>]]]]** OK
Parameters	
<IPv6_AddressFormat>	Integer type Decides the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address. 0: Use IPv4-like dot-notation. IP address, and subnetwork mask if applicable, are dot-separated. Example:For <remote_address_and_subnet_mask>: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0.255.255.255.255.255.255.255.240.0.0.0.0.0.0.0.0" For other IP address parameters: "32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0" 1: Use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space. Example:For <remote_address_and_subnet_mask>: "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" For other IP address parameters: "2001:0DB8:0000:CD30:0000:0000:0000:0000"
<IPv6_SubnetNotation>	Integer type Decides the subnet-notation for <remote_address_and_subnet_mask. Setting does not apply if <IPv6_AddressFormat> = 0.

	0: Both IP Address and subnet mask are stated explicitly, separated by a space. Example:"2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" 1: The printout format is applying / (forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation. Example:"2001:0DB8:0000:CD30:0000:0000:0000:0000/60"
<IPv6_LeadingZeros>	Integer type Decides whether leading zeros are omitted or not. Setting does not apply if <IPv6_AddressFormat> = 0. 0: Leading zeros are omitted. Example:"2001:DB8:0:CD30:0:0:0:0" 1: Leading zeros are included. Example:"2001:0DB8:0000:CD30:0000:0000:0000:0000"
<IPv6_CompressZeros>	Integer type Decides whether 1-n instances of 16-bit zero-values are replaced by only '::'. This applies only once. Setting does not apply if <IPv6_AddressFormat> = 0. 0: No zero compression. Example:"2001:DB8:0:CD30:0:0:0:0" 1: Use zero compression. Example:"2001:DB8:0:CD30::"
Max Response Time	5 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

5.14 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 Packet GW in EPS for routing of packets onto different QoS flows towards the TE. The concept is further described in the 3GPP TS 23.060. 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 is to be 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 Packet GW in EPS only at activation or MS-initiated modification of the related context. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGTFT command is effectively an extension to these commands. The Packet Filters consist of a number of parameters, each of which may be set to a separate value.
A special form of the set command, +CGTFT=<cid> causes all of the Packet Filters in the TFT for context number <cid> to become undefined. At any time, there may exist only one PDP context with no associated TFT amongst all PDP contexts associated to one PDP address. At an attempt to delete a TFT, which would violate this rule, an error is reported.
The read command returns the current settings for all Packet Filters for each defined context.
The test command returns values supported as compound values. If the MT supports several PDP types, the parameter value ranges for each PDP type are 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 – Traffic flow template	
Test Command	**AT+CGTFT=?** +CGTFT: <PDP_type>, (list of supported <packet_filter_identifier>s), (list of supported <evaluation_precedence_index>s), (list of supported <remote_address_and_subnet_mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <local_port_range>s), (list of supported <remote_port_range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s), (list of supported <direction>s), (list of supported <local address and subnet mask>s) [<CR><LF> +CGTFT: <PDP_type>, (list of supported <packet_filter_identifier>s), (list of supported <evaluation_precedence_index>s), (list of supported <remote_address_and_subnet_mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <local_port_range>s), (list of supported <remote_port_range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s),(list of supported <flow label (ipv6)>s), (list of supported <direction>s),(list of supported <local address and subnet mask>s) [...]] OK
Read Command	**AT+CGTFT?** [+CGTFT: <cid>,<packet_filter_identifier>,<evaluation_precedence_index>,

	<remote_address_and_subnet_mask>,<protocol number (ipv4) / next header (ipv6)>,<local_port_range>,<remote_port_range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<local address and subnet mask>] [<CR><LF>+CGTFT:<cid>,<packet_filter_identifier>,<evaluation_precedence_index>,<remote_address_and_subnet_mask>,<protocol number (ipv4) / next header (ipv6)>,<local_port_range>,<remote_port_range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<local address and subnet mask> [...]] OK
Set Command	**AT+CGTFT=[<cid>,[<packet_filter_identifier>,<evaluation_precedence_index>[,<remote_address_and_subnet_mask>[,<protocol number (ipv4) / next header (ipv6)>[,<local_port_range>[,<remote_port_range>[,<ipsec security parameter index (spi)>[,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>[,<flow label (ipv6)>[,<direction>[,<local address and subnet mask>]]]]]]]]]]** OK
Parameters	
<cid>	Integer type Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).
<PDP_type>	String type Specifies the type of packet data protocol (see the +CGDCONT command).
<packet_filter_identifier>	Integer type Value range is from 1 to 16.
<evaluation_precedence_index>	Integer type The value range is from 0 to 255.
<remote_address_and_subnet_mask>	String type The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGTFT.
<protocol number (ipv4) / next header (ipv6)>	Integer type. Value range is from 0 to 255.
<local_port_range>	String type The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".
<remote_port_range>	String type The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".
<ipsec security parameter index (spi)>	Numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.
<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>	String type The string is given as dot-separated numeric (0-255) parameters on the form "t.m".
<flow label (ipv6)>	Numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.
<direction>	Integer type

	Specifies the transmission direction in which the packet filter shall be applied. 0: Pre-Release 7 TFT filter (see 3GPP TS 24.008, table 10.5.162) 1: Uplink 2: Downlink 3: Birectional (Up & Downlink)
<local address and subnet mask>	String type The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGTFT.
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note:
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.

5.15 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. If reporting is enabled, the MT returns the unsolicited result code +CRTDCP: <cpdata_length>,<cpdata> when data is received from the network.
Read command returns the current settings.
Test command returns supported values as compound values.

AT+CRTDCP – Reporting of terminating data via the control plane	
Test Command	**AT+CRTDCP=?** +CRTDCP: (list of supported <reporting>), (range of supported <cid>), (maximum number of octets of user data indicated by <cpdata_length>) OK
Read Command	**AT+CRTDCP?** +CRTDCP: [<reporting>] OK
Set Command	**AT+CRTDCP=[<reporting>]** OK
Parameters	
<reporting>	Integer type Reporting of mobile terminated control plane data events 0: Disable reporting of MT control plane data. 1: Enable reporting of MT control plane data by the unsolicited result code +CRTDCP.
<cpdata_length>	Integer type Indicates the number of bytes of the <cpdata> information element. When there is no data to transmit, the value shall be set to zero.
<cpdata>	String type Contains the User data container contents (refer 3GPP TS 24.301 subclause 9.9.4.24). When there is no data to transmit, the <cpdata> shall be an empty string (""). The length of <cpdata> is implementation specific.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

5.16 AT+CSCON – Signalling connection status

The set command controls the presentation of an unsolicited result code +CSCON. If <n>=1, +CSCON: <mode> is sent from the MT when the connection mode of the MT is changed. If <n>=2 and there is a state within the current mode, +CSCON: <mode>[,<state>] is sent from the MT. If <n>=3, +CSCON: <mode>[,<state>[,<access>]] is sent from the MT. If setting fails, an MT error, +CME ERROR: <err> is returned.

When the MT is E-UTRAN, the mode of the MT refers to idle when no PS signalling connection and to connected mode when a PS signalling connection between UE and network is setup.

The read command returns the status of result code presentation and an integer <mode> which shows whether the MT is currently in idle mode or connected mode. State information <state> is returned only when <n>=2. Radio access
type information <access> is returned only when <n>=3.

Test command returns supported values as a compound value.

AT+CSCON – Signaling connection status	
Test Command	**AT+CSCON=?** +CSCON: (list of supported <supported range>) OK
Read Command	**AT+CSCON?** +CSCON: <n>,<mode>[,<state>[,<access>]] OK
Set Command	**AT+CSCON=[<n>]** +CSCON=[<n>] OK
Parameters	
<n>	Integer type 0: disable unsolicited result code 1: enable unsolicited result code +CSCON: <mode> 2: enable unsolicited result code +CSCON: <mode>[,<state>] 3: enable unsolicited result code +CSCON: <mode>[,<state>[,<access>]]
<mode>	Integer type Indicates the signalling connection status 0: idle 1: connected
<state>	Integer type Indicates the CS or PS state while in GERAN and the RRC state information if the MT is in connected Mode while in UTRAN and E-UTRAN. 7: E-UTRAN connected state (only support)
<access>	Integer type Indicates the current radio access type. 4: Indicates usage of radio access of type E-UTRAN FDD, see 3GPP TS 36.300 (only support)
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

5.17 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.
This command optionally indicates that the application on the MT expects that the exchange of data will be completed with this uplink data transfer; or will be completed with the next received downlink data.
This command also optionally indicates whether or not the data to be transmitted is an exception data.
This command causes transmission of an ESM DATA TRANSPORT message, as defined in 3GPP TS 24.301.
Test command returns range of supported <cid>, the maximum number of bytes of user data indicated by <cpdata_length>, supported <RAI> and supported <type_of_user_data> as compound values.

AT+CSODCP – Sending of originating data via the control plane	
Test Command	**AT+CSODCP=?** +CSODCP: (range of supported <cid>), (maximum number of octets of user data indicated by <cpdata_length>), (list of supported <RAI>),(list of supported <type_of_user_data>) OK
Set Command	**AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>]]** OK
Parameters	
<cid>	Integer type Numeric parameter which 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 the +CGDCONT and +CGDSCONT commands).
<cpdata_length>	Integer type 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 of octets Contains the user data container contents (refer 3GPP TS 24.301 subclause 9.9.4.24). 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 type Indicates the value of the release assistance indication, refer 3GPP TS 24.301 subclause 9.9.4.25. 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.
<type_of_user_data>	Integer type Indicates whether the user data that is transmitted is regular or exceptional. 0: Regular data. 1: Exception data.
Max Response Time	5 sec

Parameter Saving Mode	NA
Reference	3GPP TS 27.007

Note1:
There is a maximum data length of 589 bytes.

Note2:
Only one message will be buffered at a time.

6 Network services commands

6.1 AT+CCIOTOPT – CIoT optimization configuration

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.
A UE supporting CIoT functionality may support control plane CIoT EPS optimization or user plane CIoT EPS optimization or both (see 3GPP TS 24.301, subclause 9.9.3.34). Based on the application characteristics the UE may prefer to be registered for control plane CIoT EPS optimization or for user plane CIoT EPS optimization (see 3GPP TS 24.301, subclause 9.9.3.0B).
Further, the network may support control plane CIoT EPS optimization or user plane CIoT EPS optimization or both (see 3GPP TS 24.301, subclause 9.9.3.12A).

The set command is also used to control the unsolicited result code +CCIOTOPTI. An unsolicited result code +CCIOTOPTI: <supported_network_opt> is used to indicate the supported CIoT EPS optimizations by the network.

The read command returns the current settings for supported and preferred CIoT EPS optimizations and the current status of unsolicited result code +CCIOTOPTI.
The test command returns values supported as compound values.

AT+CCIOTOPT – CIoT optimization configuration	
Test Command	**AT+CCIOTOPT=?** +CCIOTOPT: (list of supported <n>), (list of supported <supported_UE_opt>), (list of supported <preferred_UE_opt>) OK
Read Command	**AT+ CCIOTOPT?** +CCIOTOPT: <n>,<supported_UE_opt>,<preferred_UE_opt> OK
Set Command	**AT+CCIOTOPT=<n>,[<supported_UE_opt>[,<preferred_UE_opt>]]** OK
Parameters	
<n>	Integer type Enables or disables reporting of unsolicited result code +CCIOTOPTI: 0: disable reporting 1: enable reporting 3: disable reporting and reset the parameters for CIoT EPS optimization to the default values
<supported_UE_opt>	Integer type Indicates the UE's support for CIoT EPS optimizations: 0: no support 1: support for control plane CIoT EPS optimization 2: support for user plane CIoT EPS optimization 3: support for both control plane CIoT EPS optimization and user plane CIoT EPS optimization
<preferred_UE_opt>	Integer type Indicates the UE's preference for CIoT EPS optimizations:

	0: no preference 1: preference for control plane CIoT EPS optimization 2: preference for user plane CIoT EPS optimization
<supported_network_opt>	Integer type Indicates the Network support for CIoT EPS optimizations: 0: no support 1: support for control plane CIoT EPS optimization 2: support for user plane CIoT EPS optimization 3: support for both control plane CIoT EPS optimization and user plane CIoT EPS optimization
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.2 AT+CEDRXS – eDRX settings

The 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.

The set command also controls the presentation of an unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] when <n>=2 and there is a change in the eDRX parameters provided by the network.
A special form of the command can be given as +CEDRXS=3. In this form, eDRX will be disabled and data for all parameters in the command +CEDRXS will be removed or, if available, set to the manufacturer specific default values.

The read command returns the current settings for each defined value of <AcT-type>.
The 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 – eDRX settings	
Test Command	**AT+CEDRXS=?** +CEDRXS: (list of supported <mode>s), (list of supported <AcT-type>s), (list of supported <Requested_eDRX_value>s) OK
Read Command	**AT+CEDRXS?** [+CEDRXS: <AcT-type>,<Requested_eDRX_value> [<CR><LF>+CEDRXS: <AcT-type>,<Requested_eDRX_value> [...]]] OK
Set Command	**AT+CEDRXS=[<mode>,[,<AcT-type>[,<Requested_eDRX_value>]]]** OK
Parameters	
<mode>	Integer type Indicates to 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>. 0: Disable the use of eDRX 1: Enable the use of eDRX 2: Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] 3: Disable the use of eDRX and discard all parameters
<AcT-type>	Integer type Indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. 0: Access technology is not using eDRX. This parameter value is only used in the unsolicited result code. 5: E-UTRAN (NB-S1 mode)
<Requested_eDRX_value>	String type 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. Does not support values: 0,1,4,6,7,8.
<NW-provided_eDRX_value>	String type 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.
<Paging_time_window>	String type 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.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.3 AT+CEDRXRDP – eDRX Read dynamic parameters

The execution command returns <act-type> and <requested_edrx_value>, <nwprovided_edrx_value> and <paging_time_window> if eDRX is used for the cell that the MS is currently registered to. If the cell that the MS is currently registered to is not using eDRX, <act-type>=0 is returned.

AT+CEDRXRDP – eDRX Read dynamic parameters	
Test Command	**AT+CEDRXRDP=?** OK
Execution Command	**AT+CEDRXRDP** <act_type>[,<requested_edrx_value>[,<nwprovided_edrx_value>[,<paging_time_window>]]] OK
Parameters	
<act_type>	Integer type Indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. 0: Access technology is not using eDRX 5: E-UTRAN (NB-S1 mode)
<requested_edrx_value>	String type 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.
<nw_provided_edrx_value>	String type 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.
<paging_time_window>	String type 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.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

6.4 AT+CEREG – EPS network registration status

The set command controls the presentation of an unsolicited result code +CEREG: <stat> .

- When <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]
- When <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are provided only if available
- The value <n>=3 further extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes.

If the UE wants to apply PSM for reducing its power consumption, see +CPSMS command and 3GPP TS 23.682, the set command controls the presentation of an unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]].

- When <n>=4 the unsolicited result code will provide the UE with 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.
- The value <n>=5 further enhances the unsolicited result code with <cause_type> and <reject_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause_type>, <reject_cause>, <Active-Time> and <Periodic-TAU> are provided only if available.

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

AT+CEREG – EPS network registration status	
Test Command	**AT+CEREG=?** +CEREG:(< list of supported <n>) OK
Read Command	**AT+CEREG?** when <n>=0, 1, 2 or 3 and command successful: +CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]] OK when <n>=4 or 5 and command successful: +CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]] OK
Set Command	**AT+CEREG=<n>** OK
Parameters	
<n>	Integer type 0: Disable network registration unsolicited result code 1: Enable network registration unsolicited result code +CEREG: <stat> 2: Enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]] 3: Enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]] 4: For a UE that wants to apply PSM, enable network registration and location

	information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]] 5: For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]
<stat>	Integer type Indicates the EPS registration status: 0: not registered, MT is not currently searching an operator to register to 1: registered, home network 2: not registered, but MT is currently trying to attach or searching an operator to register to 3: registration denied 4: unknown (e.g. out of E-UTRAN coverage) 5: registered, roaming 8: attached for emergency bearer services only (see Note 1) Note 1: 3GPP TS 24.008 and 3GPP TS 24.301 specify the condition when the MS is considered as attached for emergency bearer services.
<tac>	String type Two tracking bytes are coded in hexadecimal format (e.g. "00B5" equals 181 in decimal)
<ci>	String type Four-byte E-UTRAN cell ID in hexadecimal format
<act>	Integer type Indicates the access technology of the serving cell: 9E-UTRAN (NB-S1 mode)
<cause_type>	Integer type Indicates the type of <reject_cause>: 0: Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 Annex A. 1: Indicates that <reject_cause> contains a manufacturer-specific cause.
<reject_cause>	Integer type Cause of the failed registration. The value is of type as defined by <cause_type>.
<Active-Time>	String type One byte in an 8 bit format. It indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The 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 Table 10.5.163. See also 3GPP TS 23.682 and 3GPP TS 23.401.
<Periodic-TAU>	String type One byte in an 8 bit format. It indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The 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 Table 10.5.163a. See also 3GPP TS 23.682and 3GPP TS 23.401.
Max Response Time	1 sec
Parameter Saving Mode	Saved to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.5 AT+CESQ – Extended signal quality

Execution command returns received signal quality parameters.

AT+CESQ – Extended Signal Quality	
Test Command	**AT+CESQ=?** +CESQ: (list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s)
Execution Command	**AT+CESQ** +CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp> OK
Parameters	
<rxlev>	99 as the serving cell is not a GERAN cell
<ber>	99 as the serving cell is not a GERAN cell
<rscp>	255 as the serving sell is not a UTRA cell
<ecno>	255 as the serving sell is not a UTRA cell
<rsrq>	Integer type Reference signal received quality (see 3GPP TS 36.133 subclause 9.1.7). 0: rsrq < -19.5 dB 1: -19.5 dB ≤ rsrq < -19 dB 2: -19 dB ≤ rsrq < -18.5 dB … 32: -4 dB ≤ rsrq < -3.5 dB 33: -3.5 dB ≤ rsrq < -3 dB 34: -3 dB ≤ rsrq 255: Not known or not detectable
<rsrp>	Integer type Reference signal received power (see 3GPP TS 36.133 subclause 9.1.4). 0: rsrp < -140 dBm 1: -140 dBm ≤ rsrp < -139 dBm 2: -139 dBm ≤ rsrp < -138 dBm … 95: -46 dBm ≤ rsrp < -45 dBm 96: -45 dBm ≤ rsrp < -44 dBm 97: -44 dBm ≤ rsrp 255 Not known or not detectable
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

6.6 AT+CLCK – Facility lock

Execute command is used to lock, unlock or interrogate a UE or a network facility <fac>. Password is normally needed to do such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>. This command is abortable when network facilities are set or interrogated.

Call barring facilities are based on GSM/UMTS supplementary services (refer 3GPP TS 22.088). The interaction of these with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

Test command returns facility values supported as a compound value.

AT+CLCK – Facility lock	
Test Command	**AT+CLCK=?** +CLCK:(<list of supported <fac>) OK
Set Command	**AT+CLCK=<fac>,<mode>,[<passwd>]** If <mode>=2 and command successful: +CLCK: <status>[,<class1> [<CR><LF>+CLCK: <status>,<class2> [...]] OK
Parameters	
<fac>	String type Only value “SC” is supported: SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password in UE power-up and when this lock command issued)
<mode>	Integer type 0: unlock 1: lock 2: query status
<status>	Integer type 0: not active 1: active
<passwd>	String type Shall be the same as password specified for the facility from the UE user interface or with command Change Password +CPWD
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after reboot
Reference	3GPP TS 27.007

6.7 AT+COPS – PLMN selection

Set command forces an attempt to select and register the EPS network operator using the SIM/USIM card installed in the currently selected card slot.
<mode> is used to select whether the selection is done automatically by the MT or is forced by this command to operator <oper> (it shall be given in format <format>) to a certain access technology, indicated in <Act>.
The selected operator name format shall apply to further read commands (+COPS?) also.
<mode>=2 forces an attempt to deregister from the network. The selected mode affects to all further network registration (e.g. after <mode>=2, MT shall be unregistered until <mode>=0 or 1 is selected). This command should be abortable when registration/deregistration attempt is made.

Read command returns the current mode, the currently selected operator and the current Access Technology. If no operator is selected, <format>, <oper> and <Act> are omitted.

Test command returns a set of five parameters, each representing an operator present in the network.
A set consists of:

- an integer indicating the availability of the operator <stat>
- long alphanumeric format of the name of the operator
- short alphanumeric format of the name of the operator
- numeric format representation of the operator
- access technology.

Any of the formats may be unavailable and should then be an empty field.
The list of operators is in order: HPLMN selector, User controlled PLMN selector,
Operator controlled PLMN selector and PLMN selector (in the SIM or GSM application), and other networks.

AT+COPS – PLMN selection	
Test Command	**AT+COPS=?** +COPS: [list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<Act>])s][,,(list of supported <mode>s),(list of supported <format>s)] OK
Read Command	**AT+COPS?** +CMD:<mode>[,<format>,<oper>[,<Act>]] OK
Set Command	**AT+COPS=[<mode>[,<format>[,<oper>[,<Act>]]]]** OK
Parameters	
<mode>	Integer type Selection mode: 0: automatic (<oper> field is ignored) 1: manual (<oper> field shall be present, and <Act> optionally) 2: deregister from network 3: set only <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> and <Act> fields are ignored); this value is not applicable in read command response
<format>	Integer type Specified the format of parameter <oper> 0: long format alphanumeric <oper>

	1: short format alphanumeric <oper> 2: numeric <oper>
<oper>	String type Operator In case of long alphanumeric format, <oper> can be up to 16 characters long. In case of short alphanumeric format, <oper> can be up to 8 characters long. In case of a numeric format, <oper> is the GSM Location Area Identification number (refer 3GPP TS 24.008 subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T Recommendation E.212 Annex A, plus a two BCD digit network code, which is administration specific; Returned <oper> is not in BCD format, but in IRA characters converted from BCD . Hence the number has structure: country code digit 3, country code digit 2, country code digit 1, network code digit 3, network code digit 2, network code digit 1.
<stat>	Integer type Indicates the operator availability: 0: unknown 1: available 2: current 3: forbidden
<Act>	Integer type Access technology selected 9: E-UTRAN (NB-S1 mode)
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.8 AT+CPIN – Enter PIN

The set command sends to the UE a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken towards UE and an error message, +CME ERROR, is returned to TE.

If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second PIN, <newpin>, is used to replace the old PIN in the SIM.

The read command returns an alphanumeric string indicating whether a password is required or not.

AT+CPIN – Enter PIN	
Test Command	**AT+CPIN=?** OK
Read Command	**AT+CPIN?** +CPIN:<code> OK
Set Command	**AT+CPIN=<pin>[,<newpin>]** OK
Parameters	
<pin>	String type Pin value
<newpin>	String type New PIN value
<code>	Values listed below: • READY: UE is not pending for any password • SIM PIN: UE is waiting SIM PIN to be given • SIM PUK: UE is waiting SIM PUK to be given • PH-SIM PIN: UE is waiting phone-to-SIM card password to be given • PH-FSIM PIN: UE is waiting phone-to-very first SIM card password to be given • PH-FSIM PUK: UE is waiting phone-to-very first SIM card unblocking password to be given • SIM PIN2: UE is waiting SIM PIN2 to be given (this <code>is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation) • SIM PUK2: UE is waiting SIM PUK2 to be given (this <code>is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation) • PH-NET PIN: UE is waiting network personalization password to be given • PH-NET PUK: UE is waiting network personalization unblocking password to be given • PH-NETSUB PIN: UE is waiting network subset personalization password to be given • PH-NETSUB PUK: UE is waiting network subset personalization unblocking password to be given • PH-SP PIN: UE is waiting service provider personalization password to be given • PH-SP PUK: UE is waiting service provider personalization unblocking password to be given

	• PH-CORP PIN: UE is waiting corporate personalization password to be given • PH-CORP PUK: UE is waiting corporate personalization unblocking password to be given
Max Response Time	1 sec
Parameter Saving Mode	SAVED in SIM (NOT SAVED in NVM) Takes effect immediately.
Reference	3GPP TS 27.007

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

6.9 AT+CPSMS – Power saving mode setting

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, the requested extended periodic TAU value in E-UTRAN and the requested Active Time value.
To get the Active Time value and the extended periodic TAU value that are allocated to the UE by the network, use the command AT+CEREG.

A special form of the command can be given as +CPSMS=2. In this form, the use of PSM will be disabled and data for all parameters in the command +CPSMS will be removed or, if available, set to the manufacturer specific default values.

The read command returns the current parameter values.

The test command returns the supported <mode> and the value ranges for the requested extended periodic RAU value, the requested extended periodic TAU value in E-UTRAN and the requested Active Time value as compound values.

AT+CPSMS – Power saving mode setting	
Test Command	**AT+CPSMS=?** +CPSMS: (list of supported <mode>), (list of supported <requested_periodic_RAU>), (list of supported <requested_GPRS_READY_timer>), (list of supported <requested_periodic_TAU>), (list of supported <requested_active_time>) OK
Read Command	**AT+CPSMS?** +CPSMS: (list of supported <mode>), (list of supported <requested_periodic_RAU>), (list of supported <requested_GPRS_READY_timer>), (list of supported <requested_periodic_TAU>), (list of supported <requested_active_time>) OK
Set Command	**AT+CPSMS=[<mode>[,<requested_periodic_RAU>[,<requested_GPRS_READY_timer>[,<requested_periodic_TAU>[,<requested_active_time>]]]]]** OK
Parameters	
<mode>	Integer type Indication to disable or enable the use of PSM in the UE: 0: disables the use of PSM 1: enables the use of PSM 2: disables the use of PSM and discard all parameters for PSM or, if available, reset to the manufacturer specific default values. The read command AT+CPSMS? could only get mode value 0 and 1.
<requested_periodic_RAU>	String type One byte in an 8-bit format. This field is not supported in NB-IOT. No value will be output, and any input will be ignored.
<requested_GPRS_READY_timer>	String type One byte in an 8-bit format. This field is not supported in NB-IOT. No value will be output, and any input will be

	ignored.
<requested_ periodic_TAU>	String type 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 Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 and 3GPP TS 23.401. The unit (first 3 bit value) does not support 7. (see 3GPP TS 24.008 10.5.7.4a.)
<requested_active_ time>	String type 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 Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682, 3GPP TS 23.060 and 3GPP TS 23.401. The unit (first 3 bit value) does not support 3,4,5,6. (see 3GPP TS 24.008 10.5.7.3.)
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.10 AT+CPWD – Change password

The set command defines a new password for the facility lock function handled by command Facility Lock +CLCK.

The test command returns a list of pairs which presents the available facilities and the maximum length of their password.

AT+CPWD – Change password	
Test Command	**AT+CPWD=?** +CPWD: list of supported (<fac>,<pwdlength>)s OK
Set Command	**AT+CPWD=<fac>,<oldpwd>,<newpwd >** OK
Parameters	
<fac>	String type Only value “SC” is supported
<pwdlength>	Integer type Maximum length of the password for the facility
<oldpwd>	String type Old Password, should be the same as password specified for the facility with previous command +CPWD
<newpwd>	String type New password
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately
Reference	3GPP TS 27.007

6.11 AT+CTZR – Time Zone Reporting

The set command controls the time zone change event reporting. If reporting is enabled, the UE returns the unsolicited result code +CTZV: <tz>, +CTZE: <tz>,<dst>,[<time>], or +CTZEU: <tz>,<dst>,[<utime>] whenever the time zone is changed.
The UE also provides the time zone upon network registration if provided by the network.
The read command returns the current reporting settings in the UE.
The test command returns supported <reporting> values as a compound value.

AT+CTZR – Time Zone Reporting	
Test Command	**AT+CTZR=?** +CTZR: (list of supported <reporting>s) OK
Read Command	**AT+CTZR?** +CTZR:<reporting> OK
Set Command	**AT+CTZR=[<reporting>]** OK
Parameters	
<reporting>	Integer type Reporting value: 0: disable time zone change event reporting. 1: enable time zone change event reporting by unsolicited result code +CTZV: <tz>. 2: enable extended time zone and local time reporting by unsolicited result code: +CTZE: <tz>,<dst>,[<time>]. 3: enable extended time zone and universal time reporting by unsolicited result code: +CTZEU: <tz>,<dst>,[<utime>].
<tz>	String type Sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two-digit integer with the range -48 ... +56. To maintain a fixed width, numbers in the range -9 ... +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<dst>	Integer type Value indicating whether <tz>includes daylight savings adjustment: 0: <tz> includes no adjustment for Daylight Saving Time 1: <tz> includes +1 hour (equals 4 quarters in <tz>) adjustment for daylight saving time 2: <tz> includes +2 hours (equals 8 quarters in <tz>) adjustment for daylight saving time
<time>	String type Local time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). The local time can be derived by the UE from information provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and local time reporting if the universal time is provided by the network.
<utime>	String type Universal time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date(DD), hour (hh), minute (mm) and

	second (ss). The universal time can be provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and universal time reporting if provided by the network.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007

6.12 AT#PTW – eDRX Paging Time Window

The set command controls the setting of the UEs Paging Time Window (PTW) which is requested to the network for eDRX configuration.

The read command returns the current settings of this requested UEs PTW.

The test command returns the supported range of <requested_paging_time_window> in 4-bit format.

AT#PTW – eDRX Paging Time Window	
Test Command	**AT#PTW=?** #PTW: Range of <requested_paging_time_window> OK
Read Command	**AT#PTW?** #PTW: <requested_paging_time_window>
Set Command	**AT#PTW=<requested_paging_time_window>** OK
Parameters	
<requested_paging_time_window>	String type Half a byte in a 4-bit format. The PTW 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.
Max Response Time Parameter Saving Mode	1 sec SAVED to NVM using AT#RESET=1 Takes effect after reboot
Reference	Custom

7 SMS commands

7.1 AT+CMGF – Message Format

This command indicates input and output format for SMS messages.

AT+CMGF – SMS Message Format	
Test Command	**AT+CMGF=?** +CMGF: (list of supported <mode>) OK
Read Command	**AT+CMGF?** +CMGF:<mode> OK
Set Command	**AT+CMGF=<mode>** OK
Parameter	
<mode>	Integer type 0: PDU mode
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

Note:
Only PDU mode is supported.

7.2 AT+CMGS – Send Message

Execution command sends SMS message from TE to the network (SMS-SUBMIT).
Only PDU mode is supported (AT+CMGF=0).
Message reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service>value is 1 and network supports) <ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code.
If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned.
This command should be abortable.

AT+CMGS – Send Message	
Test Command	**AT+CMGS=?** OK
Set Command	**AT+CMGS=<length><CR>** **><PDU><ctrl-Z/ESC>** OK
Parameters	
<length>	Integer type Length is the number of bytes of the PDU (SMSC address bytes are excluded)
<PDU>	PDU given in one line in hexadecimal format after the > prompt character The <ctrl-Z> character must be used to indicate the ending of PDU The sending can be cancelled by giving <ESC> character See examples below
Max Response Time	5 min
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

Example 1:
This example shows how to send a message in PDU mode - 7 bit format

- Message is text message 'SMS message': This text message composed of 7-bit ASCII characters are packed into 8-bit bytes to be inserted in PDU
- SMSC address is '764332637249279'
- Destination address is '764332637249270'

AT+CMGS=26<CR>
>
09816734233627947 2F911000F816734233627947 2F00000AA0BD3E614D42ECFE7E17319<ctrl-Z>

0x09 is the number of bytes for the SMSC format and address
0x81 (=129) is the SMSC format
67342336279472F9 is the SMSC address
swapped digit by digit
F added as number is odd
0x11 TPDU
0x00 is the message reference number
0x0F is the length of the destination address
0x81 is the destination address format
67342336279472F0 is the destination address
0x00 is the protocol identifier
0x00 to select 7-bit mode

0xAA
0x0B is the length of the 7-bit message
D3E614D42ECFE7E17319 is the message

Example 2:

This example shows how to send a message in PDU mode 8 bit format

- Message is '010203040506070809'
- SMSC address is '764332637249279'
- Destination address is '764332637249270'

AT+CMGS=25<CR>
>
09816734233627947 2F911000F816734233627947 2F00004AA090102030405060708 09<ctrl-Z>

0x09 is the number of bytes for the SMSC format and address
0x81 (=129) is the SMSC format
67342336279472F9 is the SMSC address
swapped digit by digit
F added as number is odd
0x11 TPDU
0x00 is the message reference number
0x0F is the length of the destination address
0x81 is the destination address format
67342336279472F0 is the destination address
0x00 is the protocol identifier
0x04to select 8-bit mode
0xAA
0x09 is the length of the message in bytes
010203040506070809 is the message

7.3 AT+CNMA – New Message Acknowledgement

This command confirms reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE (refer command +CNMI). This acknowledgement command shall be used when +CSMS parameter <service> equals 1.
In PDU mode, it is possible to send either positive (RPACK) or negative (RP-ERROR) acknowledgement to the network. Parameter <n> defines which one will be sent.
Optionally (when <length> is greater than zero) an acknowledgement TPDU (SMS-DELIVER-REPORT for RPACK 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 format of <ackpdu> is used instead of <PDU> (i.e. SMSC address field is not present). PDU shall not be bounded by double quotes. TA shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.
If ME does not get acknowledgement within required time (network timeout), ME should respond as specified in 3GPP TS 24.011 [6] to the network. ME/TA shall automatically disable routing to TE by setting both <mt> and <ds> values of +CNMI to zero.
If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code +CMS ERROR: <err> is returned.

AT+CNMA – New Message Acknowledgement	
Test Command	**AT+CNMA=?** +CNMA:(list of supported <n>s) OK
Set Command	**AT+CNMA [=<n>[,<length>[<CR><PDU><CTRL-Z/ESC>]]]** OK
Parameters	
<n>	Integer type 0: command operates similarly as defined for the text mode 1: send RP-ACK (or buffered result code received correctly) 2: send RP-ERROR (if PDU is not given, ME/TA shall send SMS-DELIVER-REPORT with 3GPP TS 23.040 [3] TP-FCS value set to 'FF' (unspecified error cause))
<length>	String type 1 to 3 characters Number of bytes in the PDU
<PDU>	Hexadecimal format See AT+CMGS chapter for details.
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

7.4 AT+CNMI – New Message Indication

This command selects the procedure, how receiving of new messages from the network is indicated to the TE.

AT+CNMI – New Message Indication	
Test Command	**AT+CNMI=?** +CNMI: (list of supported <mode>), (list of supported <mt>), (list of supported <bm>), (list of supported <ds>), (list of supported <bfr>) OK
Read Command	**AT+CNMI?** +CNMI:<mode>,<mt>,<bm>,<ds>,<bfr> OK
Set Command	**AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]** OK
Parameters	
<mode>	Integer type 1: Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Other value: forward them directly to the TE.
<mt>	Integer type 2: SMS-DELIVER are routed directly to the TE using unsolicited result code: +CMT: [<alpha>],<length><CR><LF><pdu> (PDU mode enabled)
<bm>	Integer type Not used
<ds>	Integer type 0: No SMS-STATUS-REPORTs are routed to the TE. 1: SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled)
<bfr>	Integer type 0: TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes). 1: TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

7.5 AT+CSCA – Service Center Address

This command sets the SMS center address through which mobile originated SMS are transmitted. In PDU mode, this is used only when the length of the SMSC address coded in the PDU equals zero.

AT+CSCA – Service Center Address	
Test Command	**AT+CSCA=?** OK
Read Command	**AT+CSCA?** +CSCA:<sca>,<tosca> OK
Set Command	**AT+CSCA =<sca>[,<tosca>]** OK
Parameters	
<sca>	String format between " " Service Center Address value field BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS in 3GPP TS 27.007); type of address given by <tosca>
<tosca>	Integer type Service Center Address format
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

7.6 AT+CSMS – Select SMS Message Service

This command selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages.
If chosen service is not supported by the ME (but is supported by the TA), final result code +CMS ERROR: <err> shall be returned.

AT+CSMS – Select SMS Message Service	
Test Command	**AT+CSMS=?** +CSMS:(<mt>,<mo>) OK
Read Command	**AT+CSMS?** +CSMS: <service>,<mt>,<mo>,<bm> OK
Set Command	**AT+CSMS=<service>** +CSMS: <mt>,<mo>,<bm> OK
Parameter	
<service>	Integer type 0: refer to 3GPP TS 23.040 and 3GPP TS 23.041 1: refer to 3GPP TS 23.040 and 3GPP TS 23.041 2 to 127: reserved
<mt>	Mobile Terminated 0: type not supported 1: type supported
<mo>	Mobile Originated 0: type not supported 1: type supported
<bm>	Broadcast Messages 0: type not supported 1: type supported
Max Response Time	5 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.005

8 USIM commands

8.1 AT+CCHC – Close logical channel

This command requests the ME to close a communication session with the UICC the UE is attached to.

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.

AT+CCHC – Close logical channel	
Test Command	**AT+CCHC=?** OK
Set Command	**AT+CCHC=<sessionid>** +CCHC OK
Parameters	
<sessionid>	Integer type Session identifier to be used in order to target a specific application on the UICC using logical channels mechanism.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 31.101, 3GPP TS 27.007

8.2 AT+CCHO – Open logical channel

The set command starts the allocation and establishment of a session with the UICC the UE is attached to.

The currently selected UICC will open a new logical channel; select the application identified by the <dfname> received with this command and return a session Id <sessionid> as the response.

The ME shall restrict the communication between the TE and the UICC to this logical channel.

AT+CCHO – Open logical channel	
Test Command	**AT+CCHO=?** OK
Set Command	**AT+CCHO=<dfname>** +CCHO: <sessionid> OK
Parameters	
<dfname>	String type All selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes
<sessionid>	Integer type Session Id to be used in order to target a specific application on the UICC using logical channels mechanism.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 31.101, 3GPP TS 27.007

Note:
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.

See 3GPP TS 31.101 for further information on logical channels in APDU commands protocol.

8.3 AT+CGLA – Generic UICC logical channel access

In mobile networks, in a user equipment (UE), the terminal adapter (TA) is used by the terminal equipment (TE) to access the mobile termination (MT) using AT commands.

The +CGLA command helps sending to the TA some commands that shall be forwarded to the UICC that is attached to the TA.

This command allows direct control of the currently selected UICC by a distant application on the TE. The TE shall then take care of processing UICC information within the frame specified by the network.

See the references below for more details about the command usage.

AT+CGLA – Generic UICC logical channel access	
Test Command	**AT+CGLA=?** OK
Set Command	**AT+CGLA=<sessionid>,<length>,<command>** +CGLA: <length>,<response> OK
Parameters	
<sessionid>	Integer type Session identifier to be used in order to send the APDU commands to the UICC. It is mandatory in order 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 type Length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response)
<command>	command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 (hexadecimal character format)
<response>	Hexadecimal character format response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 31.101, 3GPP TS 31.102, 3GPP TS 27.007

Note:
Compared to Restricted UICC Access command +CRLA, the definition of +CGLA allows TE to take more control over the UICC-MT interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/MT (by interpreting <command> parameter). In case that TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, MT may release the locking.

8.4 AT+CRSM – Restricted SIM access

By using this command instead of the generic SIM Access +CSIM, TE application has easier but more limited access to the SIM database.

Set command transmits to the MT the SIM <command> and its required parameters. If a SIM is installed in the currently selected card slot, 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. MT error result code +CME ERROR may be returned when the command cannot be passed to the SIM, but failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters.

See references below for more details about the command usage.

AT+CRSM – Restricted SIM access	
Test Command	**AT+CRSM=?** OK
Set Command	**AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]** +CRSM: <sw1>,<sw2>[,<response>] OK
Parameters	
<command>	String type Command passed on by the MT to the SIM. Refer to 3GPP TS 51.011 ‘176’: READ BINARY ‘178’: READ RECORD ‘192’: GET RESPONSE ‘214’: UPDATE BINARY ‘220’: UPDATE RECORD ‘242’: STATUS ‘203’: RETRIEVE DATA ‘219’: SET DATA all other values are reserved See Note 1
<fileid>	Integer type Identifier of an elementary datafile on SIM. Mandatory for every command except STATUS. See Note 2.
<P1>, <P2>, <P3>	Integer type Parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in 3GPP TS 51.011 .
<data>	Hexadecimal character format Information which shall be written to the SIM .
<pathid>	String type Contains the path of an elementary file on the SIM/UICC in hexadecimal format as defined in ETSI TS 102 221 (e.g. "7F205F70" in SIM and UICC case). The <pathid> shall only be used in the mode "select by path from MF" as defined in ETSI TS 102 221. See Note 3.
<sw1>, <sw2>	Integer type Information from the SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.
<response>	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 (refer 3GPP TS 51.011). 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.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	3GPP TS 27.007, 3GPP TS 51.011, ETSI TS 102 221

Note1:
The MT internally executes all commands necessary for selecting the desired file, before performing the actual command.

Note2:
The range of valid file identifiers depends on the actual SIM and is defined in 3GPP TS 51.011. Optional files may not be present at all.

Note3:
Since valid elementary file identifiers may not be unique over all valid dedicated file identifiers, the <pathid> indicates the targeted UICC/SIM directory path in case of ambiguous file identifiers.

8.5 AT+CSIM – Generic SIM access

The set command transmits to the MT the <command> it then shall send as it is to the SIM. In the same manner, the SIM <response> shall be sent back by the MT to the TA as it is.

This command allows direct control of the SIM that is installed in the currently selected card slot, by a distant application on the TE. The TE shall then take care of processing SIM information within the frame specified by the network.

AT+CSIM – Generic SIM access	
Test Command	**AT+CSIM=?** OK
Set Command	**AT+CSIM=<length>,<command>** +CSIM: <length>,<response> OK
Parameters	
<length>	Integer type Length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response)
<command>	Hexadecimal character format Command passed on by the MT to the SIM in the format as described in 3GPP TS 51.011
<response>	Hexadecimal character format Response to the command passed on by the SIM to the MT in the format as described in 3GPP TS 51.011
Max Response Time	1 sec
Parameter Saving Mode	NA.
Reference	3GPP TS 27.007, 3GPP TS 51.011

Note:
Compared to Restricted SIM Access command +CRSM, the definition of +CSIM allows the TE to take more control over the SIM-MT interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/MT (by interpreting <command> parameter). In case that the TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, MT may release the locking.

8.6 AT+ICCID – Request Integrated Circuit Card IDentifier

AT+ICCID command execution allows the UE to return the Integrated Circuit Card IDentifier number of the SIM card.

AT+ICCID – Request Integrated Circuit Card IDentifier	
Test Command	**AT+ICCID=?** OK
Execution Command	**AT+ICCID** +ICCID: <iccid> OK
Parameters	
<iccid>	String without double quote Integrated Circuit Card IDentifier
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To get <iccid> of the UE:
AT+ICCID
+ICCID: 988812910100001424F9
OK

9 TCP-IP commands

9.1 AT#DNS – Request address name resolution

This command is used to request domain name resolution from the DNS server configured via the AT#IPPARAMS command. **Before using the AT#DNS resolution command, make sure that the DNS server's IP address is set in AT#IPPARAMS.**

AT#DNS – Request address name resolution	
Test Command	**AT#DNS=?** #DNS: <context_id>,<ip_mode>,<hostname> OK
Read Command	**AT#DNS?** #DNS: <DNSv4>,<DNSv6> OK
Set Command	**AT#DNS=<context_id>,<ip_mode>,<hostname>[,<read_timeout>[,<max_attempts>]]** #DNS: <ipv_address>,<dns_ttl> OK
Parameters	
<context_id>	Integer type Context number established on modem side.
<ip_mode>	Integer type 0: To resolve the domain name to an IPv4 address using IPv4 DNS server. 1: To resolve the domain name to an IPv6 address using IPv4 DNS server. 2: To resolve the domain name to an IPv4 address using IPv6 DNS server. 3: To resolve the domain name to an IPv6 address using IPv6 DNS server.
<hostname>	String type The domain name in textual format, without the http:// or https:// prefix (e.g., www.google.com). The maximum supported length is 255 bytes.
<read_timeout>	Integer type Maximum waiting time for a single DNS response attempt, expressed in seconds. If omitted, the default value is 5 seconds. Minimum value: 1, maximum value: 0xFFFF.
<max_attempts>	Integer type Maximum number of DNS resolution attempts in case of no response from the DNS server. If omitted, the default value is 2 attempts. Minimum value: 1.
<ipv_address>	String type The IP address (IPv4 or IPv6) of the requested domain name.
<dns_ttl>	Integer type The Time to Live (TTL) value of the IP address returned by DNS, expressed in seconds.
<DNSv4>	String type IPv4 address of the DNS server used to resolve the requested domain name once the IPv4 stack is configured.
<DNSv6>	String type IPv6 address of the DNS server used to resolve the requested domain name once the

	IPv6 stack is configured.
Max Response Time	Time in seconds equals the product of <read_timeout> and <max_attempts>.
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.2 AT#IPCFG – IPv4 or IPv6 configuration

This command is used to configure and activate the IPv4 or IPv6 protocol stack on top of an already established PDP context.
3 ways are possible to setup a new IP address:

- Create a static (manual) IP address. The entered IP address is analysed to determine the IP version (v4 or v6).
  - In case of IPv4 address, only the IP address is specified.
  - In case of IPv6 address, the IP address or prefix, and the prefix length shall be specified.
- Use the IPv6 autoconfiguration mechanism. Only available for IPv6.

AT#IPCFG – IPv4 or IPv6 configuration	
Test Command	**AT#IPCFG=?** #IPCFG: <context_id>,<ip_mode>,<ip_address>[,<prefix_length>] OK
Read Command	**AT#IPCFG?** #IPCFG: <context_id>[,<ipv4_status>,<ipv4_address>][,<ipv6_status>,<ipv6_address>]] OK
Set Command	**AT#IPCFG=<context_id>,<ip_mode>,<ip_address>[,<prefix_length>]** OK
Parameters	
<context_id>	Integer type Context number established on modem side.
<ip_mode>	Integer type 0: Static/Manual IP configuration. Used when the IP address is provided by the network. This address can be read using the AT command AT+CGPADDR
<ipv4_status> <ipv6_status>	Integer type 0: The IP address is down due to the deactivation of PDP context 1: The IP address is active and its related PDP context is also active
<ip_address> <ipv4_address> <ipv6_address>	String type. IPv4 or IPv6 address provided by the network: IPv4 example: 192.168.10.30 IPv6 example: cafe:baba::01
<prefix_length>	Integer type Length, in number of bit, of the prefix. Only used in case of IPv6.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.3 AT#IPDEL – Delete IP configuration

AT#IPDEL – Delete IP configuration	
Test Command	**AT#IPDEL=?** #IPDEL: <context_id> OK
Set Command	**AT#IPDEL: <context_id>** OK
Parameters	
<context_id>	Integer type Context number established on modem side.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.4 AT#IPPARAMS – IP stack configuration

This command is used to configure the IP stack parameters before using it.

AT#IPPARAMS – IP stack configuration	
Test Command	**AT#IPPARAMS=?** #IPPARAMS: <auto_ip>,[<preferred_ip_version>],[<max_ipstack_periodicity>],[<auto_ip_timeout>],[<nbsent_urc>],[<DNSv4>],[<DNSv6>],[<max_ip_frame_size>],[<dns_to_use>] OK
Read Command	**AT#IPPARAMS?** #IPPARAMS: <auto_ip>,<preferred_ip_version>,<max_ipstack_periodicity>,<auto_ip_timeout>,<nbsent_urc>,<DNSv4>,<DNSv6>,<max_ip_frame_size>,<dns_to_use> OK
Set Command	**AT#IPPARAMS=<auto_ip>,<preferred_ip_version>,<max_ipstack_periodicity>,<auto_ip_timeout>,<nbsent_urc>,<DNSv4>,<DNSv6>,<max_ip_frame_size>,<dns_to_use>** OK
Parameters	
<auto_ip>	Integer type 0: Automatic configuration of IP link not activated. 1: Automatic configuration of IP link activated. When activated, the stack will, by itself, configure the IPv4 and IPv6 addresses and parameters with the information provided by the network.
<preferred_ip_version>	Integer type 0: IPv4 is the preferred stack 1: IPv6 is the preferred stack. The preferred IP stack version will be used by default in case the parameter provided by the user cannot help to decide.
<max_ipstack_periodicity>	Integer type Max Timer in second for the IP stack periodicity. By default, it is set to 0xFFFF (no periodic wake-up is supported unless except it is managed in the Customer Application mode). Minimum value: 1, maximum value: 0xFFFF.
<auto_ip_timeout>	Integer type Timer in second between the module startup and attached PS attachment state for entering in sleep
<nbsent_urc>	Integer type Indicates if the NB_SENT shall be sent in addition of OK / ERROR answer in case of UDP packet transmission. The NB_SENT response occurs when the packet has been received and acknowledged by the eNodeB. However, it does not guarantee that the packet has been received by the remote server. 0: No NB_SENT answer 1: NB_SENT answer
<DNSv4>	String type IPv4 address of the Domaine Name Server (DNS)
<DNSv6>	String type IPv6 address of the Domaine Name Server (DNS)

<max_ip_frame_size>	Integer type Maximum size of an IP frame (including IP header) in terms of bytes. Minimum value: 512, maximum value: 1600.
<dns_to_use>	Integer type Specify the DNS address to be used: DNS address provided by the network or DNS address saved in NVM. In case user wants to use the IP address provided by the network and no address is provided, the system will switch to the address saved in NVM. 0 : Use address stored in NVM 1 : Use address provided by the network
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after module reboot.

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.5 AT#IPPING – ICMPv4/v6 request (ping)

This command is used to send IPv4 or IPv6 ping to a remote device, using an already established IP context.

AT#IPPING – ICMPv4/v6 request (ping)	
Test Command	**AT#IPPING=?** #IPPING: <context_id>,<ip_address> [,<timeout>,<number_of_bytes>,<number_of_ping>] OK
Set Command	**AT#IPPING=<context_id>,<ip_address>[,<timeout>,[<number_of_bytes>,[<number_of_ping>]]]** 1,<result>,<nb_bytes_transmitted>,<transmission_time> 2,<result>,<nb_bytes_transmitted>,<transmission_time> … <number_of_ping>,<result>,<nb_bytes_transmitted>,<transmission_time> #IPPING:<nb_ping_sent>,<nb_ping_received>,<nb_ping_lost>, <min_transmission_time>,<max_transmission_time>, <average_transmission_time> OK
Parameters	
<context_id>	Integer type Context number established on modem side.
<ip_address>	String type IPv4 or IPv6 address of the remote target.to ping.
<timeout>	Integer type Timeout value waiting for the ICMP answer (1 to 120 seconds) This parameter is optional. By default it is set to 10 seconds
<number_of_bytes>	Integer type Number of bytes in the ICMP request. The minimum value is 1 and the maximum is 450. This parameter is optional. By default it is set to 10.
<number_of_ping>	Integer type Number of ping to transmit. Minimum number is 1 and maximum is 20. This parameter is optional. By default it is set to 1.
<result>	Integer type Result of the transmission of an ICMP message. Can take the values: 0: Ping OK 1: Ping KO – No answer to ICMP request received before timeout. 2: Bad sequence number received. 3: ICMP transmission failed
<nb_bytes_transmitted>	Integer type Number of data correctly transmitted in the ICMP packet
<transmission_time>	Integer type Transmission time in milliseconds. In case the ICMP answer is not received before timeout, the returned transmission time is 999999
<nb_ping_sent>	Integer type Final status - Number of ping transmitted by the module
<nb_ping_received>	Integer type Final status - Number of ICMP answer received by the module

<nb_ping_lost>	Integer type Final status - Number of ping transmitted without answer received
<min_transmission_time>	Integer type Final status – Minimum transmission time in milliseconds
<max_transmission_time>	Integer type Final status – Maximum transmission time in milliseconds
<average_transmission_time>	Integer type Final status – Average transmission time in milliseconds
Max Response Time	<timeout> seconds
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.6 AT#IPREAD – Read data available in TCP or UDP receiving buffer

AT#IPREAD – Read data available in TCP or UDP receiving buffer	
Test Command	**AT#IPREAD=?** #IPREAD: <context_id>,<socket_id> OK
Set Command	**AT#IPREAD=<context_id>,<socket_id>** #IPREAD: <context_id>,<socket_id>,<data_length> <data> OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<data_length>	Integer type The length of the read data, in bytes.
<data>	String type The read data
Max Response Time	30 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.7 AT#IPSENDTCP – Send data over an established socket using TCP protocol

This command is used to send data in TCP mode using a previously established IP socket.

AT#IPSENDTCP – Send data over an established socket using TCP protocol	
Test Command	**AT#IPSENDTCP=?** #IPSENDTCP: <context_id>,<socket_id>,<data_type>,[<data_length>,][<data>] OK
Set Command	**AT#IPSENDTCP=<context_id>,<socket_id>,<data_type>,[<data_length>,][<data>]** OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command for a TCP connection. The TCP link shall be established before calling this command.
<data_type>	Integer type Type of data to transmit: 0: ASCII String as next parameter 1: Binary data. Next parameter is the data length followed by <CR><LF> Data in binary format is entered just after. 2: Hex data in text mode: 01A34B... = 0x01 0xA3 0x4B
<data_length>	Integer type Number of data. Only present for binary mode. Can take value from 1 to 1340
<data>	String or Hex or Binary type Maximum size is 1340 bytes. (IP frame max size = 1400 bytes)
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.8 AT#IPSENDUDP – Send data using UDP protocol.

This command is used to send data in UDP mode using a previously established IP link.

AT#IPSENDUDP – Send data using UDP protocol.	
Test Command	**AT#IPSENDUDP=?** #IPSENDUDP: <context_id>,<socket_id>,<ip_address>,<port_number>,[<rai>],<data_type>,[<data_length>,] [<data>] OK
Set Command	**AT#IPSENDUDP=<context_id>,<socket_id>,<ip_address>,<port_number>,[<rai>],<data_type>,[<data_length>,][<data>]** OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command for an UDP communication.
<ip_address>	String type IPv4 or IPv6 address of the remote target.
<port>	Integer type Port number
<rai>	Integer type Specifies release assistance information: 0: TE will let the network managing the Release of Connection. This setting should be used when there may be more data to send or receive in the near future. 1: TE will send only 1 UL packet and no DL packets expected. 2: TE will send only 1 UL packet and only 1 DL packet expected. ,, : Empty : RAI mode is not specified (Means empty field: ,,). This setting should be used when there is no expectation on data sending or receiving.
<data_type>	Integer type Type of data to transmit: 0: ASCII String as next parameter 1: Binary data. Next parameter is the data length follow by <CR><LF> Data in binary format is entered just after. 2: Hex data in text mode: 01A34B... = 0x01 0xA3 0x4B
<data_length>	Integer type Number of data. Only present for binary mode. **Can takes value from 1 to 1340**
<data>	String or Hex or Binary type **Maximum size if 1340 bytes.** (IP frame max size = 1400 bytes)
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.9 AT#SOCKETCLOSE – Close a socket identify by the context number

AT#SOCKETCLOSE – Close a socket identify by the context number	
Test Command	**AT#SOCKETCLOSE=?** #SOCKETCLOSE: <context_id>,<socket_id> OK
Set Command	**AT#SOCKETCLOSE=<context_id>,<socket_id>** OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command. If a TCP link is connected on this socket, it will be automatically closed.
Max Response Time	60 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.10 AT#SOCKETCREATE – Create a new socket on top of an existing IPv4/v6 link

This command is used to configure and activate the IPv4 or IPv6 protocol stack on top of an already established PDP context.

AT#SOCKETCREATE – Create a new socket on top of an existing IPv4/v6 link	
Test Command	**AT#SOCKETCREATE=?** #SOCKETCREATE: <context_id>,<ip_version>,<socket_type>,[<local_port>], <send_timeout>,<receive_timeout>[,<frame_received_urc>[, <security_profile_id>]] OK
Read Command	**AT#SOCKETCREATE?** #SOCKETCREATE: <context_id>,<socket_id>,<ip_version>,<socket_type>,<local_port>, <send_timeout>,<receive_timeout>,<frame_received_urc>, <security_profile_id> … #SOCKETCREATE: <context_id>,<socket_id>,<ip_version>,<socket_type>,<local_port>, <send_timeout>,<receive_timeout>,<frame_received_urc>, <security_profile_id> OK
Set Command	**AT#SOCKETCREATE=<context_id>,<ip_version>,<socket_type>, [<local_port>],<send_timeout>,<receive_timeout> [,<frame_received_urc>[,<security_profile_id>]]** #SOCKETCREATE: <socket_id> OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type ID of the new created socket. This number starts with 0 and is incremented each time a new socket is created. The maximum number of sockets supported by the system is 3: one TCP socket and two UDP sockets. The <socket_id> value must be indicated when using the socket for data transmission or to close the socket.
<ip_version>	Integer type The IP version to use for the socket: 0: IPv4 1: IPv6 This parameter shall be in line with the IP link configuration. If IPv4 version is requested and the IP address of the link is IPv6, or if IPv6 is requested for IPv4 link, an error will be reported.
<socket_type>	String type The type of socket to create: “TCP”: TCP communication “UDP”: UDP communication “RAW”: Data RAW communication
<local_port>	Integer type The local port number of the socket. This parameter is mandatory but can be empty. In this case, the IP stack will provide a random local port.

	0 or empty : the IP stack will provide port in range 49408 – 65535 1 – 49407 : Enter by user.
<send_timeout>	Integer type Maximum time needed for transmission of packet over the air and reception of acknowledgement.
<receive_timeout>	Integer type Maximum time needed for transmission of packet over the air.
<frame_received_urc>	Integer value (0, 1 or 2) Indicates if an URC (#IPRECV) shall be generated when TCP or UDP data are available and can be read with AT#IPREAD command: 0: Disable URC 1: Enable URC with format #IPRECV: <context_id>,<socket_id> 2: Enable URC with format #IPRECV: <context_id>,<socket_id>,<total_data_length>
<security_profile_id>	Integer type Optional parameter If specified and if the security profile exists, a TLS link with the specified profile will be used for the socket.
Max Response Time	2 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.11 AT#TCPCONNECT – Establish a TCP link using a configured IP socket

This command is used to establish a TCP connection using a previously established IP socket. The socket is identified by its context number.

AT#TCPCONNECT – Establish a TCP link using a configured IP socket	
Test Command	**AT#TCPCONNECT=?** #TCPCONNECT: <context_id>,<socket_id>,<ip_address>,<port_number> OK
Read Command	**AT#TCPCONNECT?** # TCPCONNECT: <context_id>,<socket_id>,<status> OK
Set Command	**AT#TCPCONNECT=<context_id>,<socket_id>,<ip_address>,<port_number>** OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<ip_address>	String type IPv4 or IPv6 address of the remote target.
<port_number>	Integer type Port number
<status>	Integer type Status of the TCP link: 3: TCP not connected 4: TCP connecting 5: TCP connected 6: TCP closure ongoing
Max Response Time	20 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

9.12 AT#DTLSCONNECT – Establish a DTLS link using a configured IP socket

This command is used to establish a TCP connection using a previously established IP socket. The socket is identified by its context number.

AT#DTLSCONNECT – Establish a DTLS link using a configured IP socket	
Test Command	**AT#DTLSCONNECT=?** #DTLSCONNECT: <context_id>,<socket_id>,<ip_address>,<port_number>[,<cid_len>[,<cid>]] OK
Read Command	**AT#DTLSCONNECT?** # DTLSCONNECT: <context_id>,<socket_id>,<status>[,<cid_len>[,<cid>]] OK
Set Command	**AT#DTLSCONNECT=<context_id>,<socket_id>,<ip_address>,<port_number>[,<cid_len>[,<cid>]]** OK
Parameters	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<ip_address>	String type IPv4 or IPv6 address of the remote target.
<port_number>	Integer type Port number
<status>	Integer type Status of the DTLS link
<cid_len>	Integer type None : cid disabled. 0: cid enabled with 0 length client cid. 1~32 : cid enabled.
<cid>	String type HEX ASCII value of cid array with <cid_len> size.
Max Response Time	20 sec
Parameter Saving Mode	NA

Note:
Timeout & retransmission is configured as RFC6347 4.2.4. Timeout and Retransmission.

Informative example:
To find examples, refer to the TCP/UDP/IP application note (see table 3).

10 HTTP commands

10.1 AT#HTTPBODY – Add data to HTTP Body request

This command is used to add data to HTTP body request. If this command is called multiple time, data will be appended.

AT#HTTPBODY – Add data to HTTP body request	
Test Command	**AT#HTTPBODY=?** #HTTPBODY: <format>,<data> OK
Set Command	**#HTTPBODY=<format>,<data>** OK
Parameters	
<format>	Integer type Type of data to transmit: 0: String as next parameter (formatted if between single or double quotes) 2: Hex data in text mode: 01A34B... = 0x01 0xA3 0x4B
<data>	String type : Contains the value of data to add to HTTP request body
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom RFC 7231

Informative example:
To find examples, refer to the HTTP application note (see table 3).

10.2 AT#HTTPHEADER – Add a field to HTTP request header

This command is used to add a field/value pair to HTTP request header.

AT#HTTPHEADER – Add a field to HTTP request header	
Test Command	**AT#HTTPHEADER=?** #HTTPHEADER: <field>,<value> OK
Set Command	**#HTTPHEADER=<field>,<value>** OK
Parameters	
<field>	String type : Name of the header to add (e.g. 'Content-Type')
<value>	String type : Value to set for the corresponding header
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom RFC 7231

Note:
"Content-Length" field will be added automatically on HTTP request send, according the HTTP Body length.

Informative example:
To find examples, refer to the HTTP application note (see table 3).

10.3 AT#HTTPMETHOD – Select method of HTTP request

This command is used to select method (GET, POST, HEAD or PUT) of HTTP request.

AT#HTTPMETHOD – Select method of HTTP request	
Test Command	**AT#HTTPMETHOD=?** #HTTPMETHOD: <method>,<host>,<path>[,<keep_alive>[,<user_agent>]] OK
Set Command	**#HTTPMETHOD=<method>,<host>,<path>[,<keep_alive>[,<user_agent>]]** OK
Parameters	
<method>	String type Type of the HTTP method (on the opened TCP link). Method must be one of the following strings: GET, POST, HEAD or PUT
<host>	String type URL of HTTP server domain (e.g. 'example.com:8080')
<path>	String type Path of the target HTTP server resource (it must start with '/', e.g. '/test/example')
<keep_alive>	Boolean 0 : TCP connection is closed after the response from the server is received 1 : TCP connection is kept open after the response from the server is received
<user_agent>	String type User-Agent identifier to use for the HTTP method
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom RFC 7231

Informative example:
To find examples, refer to the HTTP application note (see table 3).

10.4 AT#HTTPSEND – Send HTTP request to HTTP server

This command is used to send the overall HTTP request (setup with previous HTTP commands) to a remote server. TCP/IP socket shall already be established and connected to the server.

AT#HTTPSEND – Send HTTP request	
Test Command	**AT#HTTPSEND =?** #HTTPSEND: <context_id>,<socket_id>[,<body_content>] OK
Set Command	**#HTTPSEND: <context_id>,<socket_id>[,<body_content>]** OK
Parameter	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<body_content>	String type : String data body content to send. Max size is 1300 bytes
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom RFC 7231

Informative example:
To find examples, refer to the HTTP application note (see table 3).

10.5 AT#HTTPSTART – Start the HTTP protocol stack

This command is used to start the HTTP protocol stack.

AT#HTTPSTART – Start the HTTP protocol stack	
Test Command	**AT#HTTPSTART=?** #HTTPSTART: OK
Read Command	**AT#HTTPSTART?** If initialized: #HTTPSTART: 1 OK If initialized and connected to a remote server: #HTTPSTART: 1, <context_id>,<socket_id> OK Or If not initialized: #HTTPSTART: 0 OK
Execution Command	**AT#HTTPSTART** OK
Parameter	
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the HTTP application note (see table 3).

10.6 AT#HTTPSTOP – Stop the HTTP protocol stack

This command is used to stop HTTP protocol stack.

AT#HTTPSTOP – Stop the HTTP protocol stack	
Test Command	**AT#HTTPSTOP=?** OK
Execution Command	**AT#HTTPSTOP** OK
Max Response Time	10 sec
Parameter Saving Mode	NA

10.7 AT#HTTPREAD – Read the Asynchronous data come from HTTP protocol stack

This command is used to read received HTTP response chunk.
Chunk can be complete/partial response header or complete/partial response body.

AT#HTTPREAD – READ the data coming from protocol stack (#HTTPRECV)	
Test Command	**AT#HTTPREAD=?** #HTTPREAD: OK
Execution Command	**AT#HTTPREAD** #HTTPREAD: <received_bytes>
Parameters	
<received_bytes>	Number of bytes of received in the HTTP response chunk
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the HTTP application note (see table 3).

11 MQTT commands

11.1 AT#MQTTCFG – Configure the MQTT protocol stack

This command is used to configure the MQTT protocol stack before using it.
If this command is not called, the parameters saved in NVM are used.

AT#MQTTCFG – Configure the MQTT protocol stack	
Test Command	**AT#MQTTCFG=?** #MQTTCFG: [<client_name>],[<connection_timeout>],[<protocol_timeout>], [<publish_retry>],[<keep_alive_pub_msg>] OK
Read Command	**AT#MQTTCFG?** #MQTTCFG: <client_name>,<connection_timeout>,<protocol_timeout>,<publish_retry>, <keep_alive_pub_msg> OK
Set Command	**AT#MQTTCFG=[<client_name>],[<connection_timeout>],[<protocol_timeout>],** **[<publish_retry>],[<keep_alive_pub_msg>]** OK
Parameters	
<client_name>	UTF-8 encoded string Maximum size is 25 characters. Name of the MQTT client that is provided to the broker.
<connection_timeout>	Integer type Connection to the broker timeout in seconds.
<protocol_timeout>	Integer type Transmission timeout, in seconds, of MQTT protocol messages.
<publish_retry>	Integer type Number of times a publish message is sent to the broker in case of transmission issue.
<keep_alive_pub_msg>	Integer type If no data flow over the open TCP is observed after the keep alive period (in seconds), the stack will generate a ping request and expect reception of a ping response from the broker.
Max Response Time	1 sec
Parameter Saving Mode	SAVED in NVM after AT#RESET=1 Takes effect immediately.
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

11.2 AT#MQTTCONNECT – connect to a MQTT server

AT#MQTTCONNECT – connect to a MQTT server	
Test Command	**AT#MQTTCONNECT=?** #MQTTCONNECT: <context_id>,<socket_id>,<broker_address>,<broker_port>,[<username>],[<passwd>],[<will_topic>,<will_message>,[<will_qos>],[<will_retain_flag>]] OK
Read Command	**AT#MQTTCONNECT?** If MQTT stack is connected to a Broker: #MQTTCONNECT: 1,<context_id>,<socket_id>,<broker_address>,<broker_port>,<username> OK Or If MQTT stack is NOT connected to a Broker: #MQTTCONNECT: 0 OK
Set Command	**AT#MQTTCONNECT=<context_id>,<socket_id>,<broker_address>,<broker_port>,[<username>],[<passwd>],[<will_topic>,<will_message>,[<will_qos>],[<will_retain_flag>]]** OK
Parameters	
<context_id>	Integer type ID of an established TCP context
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<broker_address>	UTF-8 encoded string IPv4 or IPv6 address of the remote Broker.
<broker_port>	Integer type Port number of the remote Broker.
<username>	UTF-8 encoded string User name can be used by the Server for authentication and authorization. Maximum length is 25.
<passwd>	UTF-8 encoded string. Password associated to the indicated username. Its maximum length is 50.
<will_topic>	UTF-8 encoded string Is the will topic name. It shall not include any wildcard characters. Maximum length is 50.
<will_message>	UTF-8 encoded string Is the payload containing the will message that will be published by the broker when the client unexpectedly disconnects. The content and format of the data is application specific. Maximum length is 50.
<will_qos>	Integer type QoS value used when publishing the will topic: 0: at most once 1: at least once 2: exactly once
<will_retain_flag>	Integer type Used to indicate to broker if the Will Message should be available to any new clients

	subscribing to the topic after the connection. 0: should not be available to new clients 1: should be available to new clients
Max Response Time	20 sec
Parameter Saving Mode	NA
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

11.3 AT#MQTTDISC – Disconnect from a MQTT server

This command requests a disconnection from the MQTT server (broker).

AT#MQTTDISC – Disconnect from a MQTT server	
Test Command	**AT#MQTTDISC=?** #MQTTDISC: OK
Execution Command	**AT#MQTTDISC** OK
Max Response Time Parameter Saving Mode	20 sec NA
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

11.4 AT#MQTTPUB – Publish a message for the specified topic

The Publish command sends from a client to a server or from server to a client an application message for a given topic.

AT#MQTTPUB – Publish a message for the specified topic	
Test Command	**AT#MQTTPUB=?** #MQTTPUB: <topic>,<message>,[<retry_number>],[<qos>],[<retain_flag>] OK
Set Command	**AT#MQTTPUB=<topic>,<message>,[<retry_number>],[<qos>],[<retain_flag>]** OK
Parameters	
<topic>	UTF-8 encoded string Is the topic name. It shall not include any wildcard characters. Maximum length is 50.
<message>	UTF-8 encoded string Is the payload containing the application message that is being published. The content and format of the data is application specific. Maximum length is 50.
<retry_number>	Integer type Number of allowed retries for the message sending. Maximum number is 20.
<qos>	Integer type QoS value used when publishing topic: 0: at most once 1: at least once 2: exactly once
<retain_flag>	Integer type Used to indicate to broker if the Will Message should be available to any new clients subscribing to the topic after the publication. 0: should not be available to new clients 1: should be available to new clients
Max Response Time	20 sec
Parameter Saving Mode	NA
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

11.5 AT#MQTTSUB – Subscribe to specified topic

The Subscribe command is sent from the Client to the Server to create one or more Subscriptions. Each Subscription registers a Client's interest in one or more topics. When subscribing to a topic, when a change occurs for this topic, the result is sent to the caller.

AT#MQTTSUB – Subscribe to specified topic	
Test Command	**AT#MQTTSUB=?** #MQTTSUB: <topic1>,<qos1>[,<topic2>,<qos2>[,...]] OK
Read Command	**AT#MQTTSUB?** #MQTTSUB: <topic1>,<qos1> <topic2>,<qos2> … OK
Set Command	**AT#MQTTSUB=<topic1>,<qos1>[,<topic2>,<qos2>[,...]]** OK
Parameters	
<topic1>, topic2>,…, <topicN>	UTF-8 encoded string. Topic Filter: indicates an interest in one or more topics. A topic filter can include wildcard characters. Maximum length for each topic is 50 characters (without considering AT command's maximum allowed char)
< qos1>, < qos2>,…, <qosN>	Integer type Maximum QoS level (0, 1 or 2) for corresponding topic at which the Server can send application messages to the client. QoS 0: the message is delivered according to the capabilities of the underlying network. No response is sent by the receiver and no retry is performed by the sender. The message arrives at the receiver either once or not at all. QoS 1: This quality of service ensures that the message arrives at the receiver at least once. QoS 2: This is the highest quality of service, for use when neither loss nor duplication of messages are acceptable. There is an increased overhead associated with this quality of service.
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

11.6 AT#MQTTUNSUB – UnSubscribe from the specified topic

This command is sent by the Client to the Server to unsubscribe from topics.

AT#MQTTUNSUB – UnSubscribe from the specified topic	
Test Command	**AT#MQTTUNSUB=?** #MQTTUNSUB: <topic1>[,<topic2>[,…]] OK
Set Command	**#MQTTUNSUB=<topic1>[,<topic2>[,…]]** OK
Parameters	
<topic1>, topic2>,…, <topicN>	UTF-8 encoded string Topic Filter: indicates an interest in one or more topics. A topic filter can include wildcard characters.
Max Response Time	10 sec
Parameter Saving Mode	NA
Reference	Custom MQTT Version 3.1.1 Plus Errata 01

Informative example:
To find examples, refer to the MQTT application note (see table 3).

12 CoAP commands

12.1 AT#COAPCONNECT – Connect to CoAP server

AT#COAPCONNECT – Connect to CoAP server	
Test Command	**AT#COAPCONNECT=?** #COAPCONNECT: <context_id>,<socket_id>,<server_address>,<server_port>[,<cid_len>[,<cid>]] OK
Read Command	**AT#COAPCONNECT?** #COAPCONNECT: <context_id>,<socket_id>,<server_address>,<server_port>,<status>[,<cid_len>[,<cid>]] OK
Set Command	**AT#COAPCONNECT=<context_id>,<socket_id>,<server_address>,<server_port>[,<cid_len>[,<cid>]]** OK
Parameters	
<context_id>	Integer type Context number established on modem side.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
<server_address>	String type Address of the CoAP server (IPv4 or [IPv6]) - IPv6 shall be enclosed in '[' and ']' characters.
<server_port>	Integer type Port number of the CoAP server.
<status>	0: CoAP service is not connected. 1: CoAP service is connected.
<cid_len>	Integer type None : cid disabled. 0: cid enabled with 0 length client cid. 1~32 : cid enabled.
<cid>	String type HEX ASCII value of cid array with <cid_len> size.
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the CoAP application note (see table 3).

12.2 AT#COAPDISCONNECT – Disconnect from a CoAP server

AT#COAPDISCONNECT – Disconnect from a CoAP server	
Test Command	**AT#COAPDISCONNECT=?** #COAPDISCONNECT OK
Execution Command	**AT#COAPDISCONNECT** OK
Max Response Time	10 sec
Parameter Saving Mode	NA

Note:
This command changes CoAP service state to 1(CoAP Service is started), thus the service has to be reconfigured with AT#COAPCFG command.

Informative example:
To find examples, refer to the CoAP application note (see table 3).

12.3 AT#COAPSEND – Send a CoAP Packet to Server

This command is used to send a CoAP request to a CoAP server. The response is indicated with the URC #COAPRECV

AT#COAPSEND – Send a CoAP request to the CoAP server	
Test Command	**AT#COAPSEND=?** #COAPSEND: <message_type>,<method>,[<mid>],[<token>],<path>[,<data_type>,<payload>] OK
Set Command	**AT#COAPSEND=<message_type>,<method>,[<mid>],[<token>],<path>[,<data_type>,<payload>]** OK
Parameters	
<message_type>	Integer type CoAP Message Type 0: Confirmable 1: Non-confirmable 2: Acknowledgement 3: Reset
<method>	Integer type CoAP Method Type 1: GET 2: POST 3: PUT 4: DELETE
<mid>	Integer type CoAP Message ID
<token>	String type CoAP Message Token in Hex data in text mode: 01A34B... = 0x01 0xA3 0x4B
<path>	String Type URI path (ends with “?” for a query). Maximum length is 50 characters. UTF-8 encoded string
<data_type>	Integer type Type of data to transmit: 0: ASCII String as next parameter 2: Hex data in text mode: 01A34B... = 0x01 0xA3 0x4B
<payload>	String Type Data payload in string format. Maximum length is 128 characters. UTF-8 encoded string
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the CoAP application note (see table 3).

12.4 AT#COAPSTART – Start CoAP service

AT#COAPSTART – Start CoAP service	
Test Command	**AT#COAPSTART=?** #COAPSTART OK
Read Command	**AT#COAPSTART?** #COAPSTART: <status> OK
Execution Command	**AT#COAPSTART** OK
Parameters	
<status>	Integer type 0: CoAP service is not started 1: CoAP service is started 2: CoAP service is configured 3: CoAP client is connected
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the CoAP application note (see table 3).

12.5 AT#COAPSTOP – Stop the CoAP service

AT#COAPSTOP – Stop the CoAP service	
Test Command	**AT#COAPSTOP=?** #COAPSTOP OK
Execution Command	**AT#COAPSTOP** OK
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
This command closes the socket assigned by CoAP service.

Informative example:
To find examples, refer to the CoAP application note (see table 3).

12.6 AT#COAPOPT– Add CoAP option

This command is used to add a CoAP Message option for next CoAP request to server by AT#COAPSEND at-command.

AT#COAPOPT – Add CoAP Message Option	
Test Command	**AT#COAPOPT=?** #COAPOPT: <num_opt>[,<opt>[,<value>[,…]]] OK
Set Command	**AT#COAPOPT=<num_opt>[,<opt>[,<value>[,…]]]** OK
Read Command	**AT#COAPOPT?** #COAPOPT: <num_opt>[,<opt>[,<value>[,…]]] OK
Parameters	
<num_opt>	Integer type Number of options in the context AT#COAPOPT=0 will clear all options added.
<opt>	Integer type CoAP option number 1: IF_MATCH option 3: URI_HOST option 4: ETAG option 5: IF_NONE_MATCH option 6: OBSERVE option 7: URI_PORT option 8: LOCATION_PATH option 11: URI_PATH option 12: CONTENT_FORMAT option 14: MAX_AGE option 15: URI_QUERY option 17: ACCEPT option 20: LOCATION_QUERY option 23: BLOCK2 option 27: BLOCK1 option 28: SIZE2 option 35: PROXY_URI option
<value>	CoAP option value If <opt> is 1(IF_MATCH): String type. Hex data in text mode: 01A3... = 0x01 0xA3 3(URI_HOST): String type 4(ETAG) String type. Hex data in text mode: 01A3... = 0x01 0xA3 5(IF_NONE_MATCH) : Integer type To set: No <value> required To get: 1 6(OBSERVE): Integer type 7(URI_PORT): Integer type 8(LOCATION_PATH): String type 11(URI_PATH): String type 12(CONTENT_FORMAT): Integer type 14(MAX_AGE): Integer type 15(URI_QUERY): String type. Queries can be separated by ‘&’ 17(ACCEPT) String type. Hex data in text mode: 01A3... = 0x01 0xA3

	20(LOCATION_QUERY): String type. Queries can be separated by '&' 23(BLOCK2): String type. To set: block_number,block_more,block_size To get: block_number/block_more/block_size 27(BLOCK1): String type. To set: block_number,block_more,block_size To get: block_number/block_more/block_size 28(SIZE2): Integer type
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
Token option is configurable by AT#COAPSEND command.

Informative example:
To find examples, refer to the CoAP application note (see table 3).

13 LwM2M commands

13.1 AT#LWADDOBJ – Add a LwM2M object

AT# LWADDOBJ – Add a LwM2M object	
Test Command	**AT#LWADDOBJ=?** #LWADDOBJ: <object_id>,<instance_id>,<resource_count>,<resource_id> [,<resource_id>[,<resource_id>[,...]]] OK
Read Command	**AT#LWADDOBJ?** #LWADDOBJ: <object_id>,<instance_id>,<resource_count>,<resource_id> [,<resource_id>[,<resource_id>[,...]]] … <object_id>,<instance_id>,<resource_count>,<resource_id> [,<resource_id>[,<resource_id>[,...]]] OK
Set Command	**AT#LWADDOBJ=<object_id>,<instance_id>,<resource_count>,<resource_id>[,<resource_id>[,<resource_id>[,...]]]** OK
Parameters	
<object_id>	Integer type ID of the object to be added
<instance_id>	Integer type ID of the instance to be added
<resource_count>	Integer type Number of resources to create
<resource_id>	Integer type Resource ID to create
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.2 AT#LWCFG – LwM2M configuration

This command is used to set the LwM2M transport configuration. LwM2M service must be start first with AT#LWSTART.

AT#LWCFG – LwM2M configuration	
Test Command	**AT#LWCFG=?** #LWCFG: <context_id>,<socket_id> OK
Read Command	**AT#LWCFG?** #LWCFG: <context_id>,<socket_id> OK
Set Command	**AT#LWCFG=<context_id>,<socket_id>** OK
Execution Command	**AT#LWCFG** OK
Parameters	
<context_id>	Integer type Context number established on modem side.
<socket_id>	Integer type Socket number created on this context with the AT#SOCKETCREATE command.
Max Response Time	1 sec
Parameter Saving Mode	NA

The execution command simplifies the usage for the HOST by combining:

- the creation the socket (IP version is derived from the Server URL set through the AT#LWPARAM command)
- the bind of the created socket to the LwM2M protocol

Note: in case of secure socket, the HOST should manage the creation and binding of the socket.

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.3 AT#LWCHGRSCVAL– Change a LwM2M resource value

AT# LWCHGRSCVAL – Change a LwM2M resource value	
Test Command	**AT#LWCHGRSCVAL=?** #LWCHGRSCVAL: <uri>,<data> OK
Set Command	**AT#LWCHGRSCVAL=<uri>,<data>** OK
Parameter	
<uri>	String type. uri of the LwM2M resource to change such as /3/0/2
<data>	String type. LwM2M resource data to change.
Max Response Time	1 sec
Parameter Saving Mode	NA

The execution command simplifies the usage for the HOST by combining:

- the creation the socket (IP version is derived from the Server URL set through the AT#LWPARAM command)
- the bind of the created socket to the LwM2M protocol

Note: in case of secure socket, the HOST should manage the creation and binding of the socket.

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.4 AT#LWDUMPOBJ – Dump the content of a LwM2M object

This command is used to dump the content of a specific instance of a LwM2M client.

AT#LWDUMPOBJ – Dump LwM2M object	
Test Command	**AT#LWDUMPOBJ=?** #LWDUMPOBJ: <uri> OK
Set Command	**AT#LWDUMPOBJ=<uri>** #LWDUMPOBJ: <uri>[,<data_type>][,<data>] OK
Parameter	
<uri>	String type. URI of the LwM2M instance
<data_type>	Integer type. LwM2M resource data type 0: Undefined 1: Object 2: Object instance 3: Multiple resource 4: String 5: Opaque 6: Integer 7: Unsigned integer 8: Float 9: Boolean 10: Object link 11: Core link
<data>	String type. LwM2M resource data
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.5 AT#LWLISTOBJ – List LwM2M objects

This command is used to list the LwM2M objects.

AT# LWLISTOBJ – List the LwM2M objects	
Test Command	**AT#LWLISTOBJ=?** #LWLISTOBJ OK
Execution Command	**AT#LWLISTOBJ** #LWLISTOBJ: <uri> OK
Parameter	
<uri>	String type URI of the LwM2M instance
<err>	See Error List
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.6 AT#LWLISTSERV – List LwM2M servers

AT#LWLISTSERV – List LwM2M servers	
Test Command	**AT#LWLISTSERV=?** #LWLISTSERV OK
Execution Command	**AT#LWLISTSERV** #LWLISTSERV: <server_type>,<registration_status>,<server_id>[,<location>][,<lifetime>] OK
Parameter	
<server_type>	Integer type 0: bootstrap 1: normal
<registration_status>	Integer type 0: Not registered or bootstrap not started 1: Initial registration delay or delay between retries 2: Registration pending 3: Successfully registered 4: Last registration failed 5: Registration update pending 6: Registration update required 7: Registration update with lifetime modification 8: Registration update with binding modification 9: Registration update with binding and lifetime modifications 10: Registration update with objects modifications 11: Registration update with objects and lifetime modifications 12: Registration update with objects and binding modifications 13: Registration update with objects, binding, and lifetime modifications 14: Deregistration pending 15: Bootstrap hold-off time 16: Bootstrap request sent 17: Bootstrap ongoing 18: Bootstrap finish received 19: Bootstrap completed successfully 20: Bootstrap error occurred 21: Bootstrap failed
<server_id>	Integer type LwM2M Server Id
<location>	String type Registration Location in LwM2M Server
<lifetime>	Integer type. Lifetime in seconds
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.7 AT#LWNTYEXEOBJ – LwM2M Custom object response for Execution Notification

AT#LWNTYEXEOBJ – LwM2M Custom object response for Execution Notification	
Test Command	**AT#LWNTYEXEOBJ=?** #LWNTYEXEOBJ: <server_id>,<object_id>,<instance_id>,<resource_id>[,<error_code>] OK
Set Command	**AT#LWNTYEXEOBJ=<server_id>,<object_id>,<instance_id>,<resource_id>[,<error_code>]** OK
Parameter	
<server_id>	Integer type. ID of the LwM2M Server
<object_id>	Integer type ID of the object to be added
<instance_id>	Integer type ID of the instance to be added
<resource_count>	Integer type Number of Resources to create
<resource_id>	Integer type Resource ID to create
<error_code>	String type Error code provided by the host in response to the notification request.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.8 AT#LWNTYRDOBJ – LwM2M Custom object response for Read Notification

This command is used to respond to LwM2M Custom object's Read Notification.

AT#LWNTYRDOBJ – LwM2M Custom object response for Read Notification	
Test Command	**AT#LWNTYRDOBJ=?** #LWNTYRDOBJ: <server_id>,<object_id>,<instance_id>,<resource_count>, <resource_id>,<resource_type>,<resource_length>,<resource_value> [,<resource_id>,<resource_type>,<resource_length>,<resource_value> [,…]][,<error_code>] OK
Set Command	**AT#LWNTYRDOBJ=<server_id>,<object_id>,<instance_id>,<resource_count>, <resource_id>,<resource_type>,<resource_length>,<resource_value> [,<resource_id>,<resource_type>,<resource_length>,<resource_value> [,…]][,<error_code>]** OK
Parameter	
<server_id>	Integer type ID of the LwM2M Server
<object_id>	Integer type ID of the object to be added
<instance_id>	Integer type ID of the instance to be added
<resource_count>	Integer type Number of resources to create
<resource_id>	Integer type Resource ID to create
<resource_type>	String Type S: Data type String D: Data type Opaque I: Data type Signed Integer U: Data type Unsigned Integer F: Data type Float B: Data type Boolean L: Data type Object Link C: Data type Core Link
<resource_length>	Integer type Number of bytes of resource data
<resource_value>	String type Resource data value
<error_code>	String type Error code provided by the host in response to the notification request.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.9 AT#LWNTYTO – LwM2M Custom object response time out for Service Notification

This command is used to configure LwM2M Custom Object's Notify-response timeout.

AT#LWNTYTO – LwM2M Custom Object Notify-Response Timeout	
Test Command	**AT#LWNTYTO=?** #LWNTYTO: <timeout> OK
Read Command	**AT#LWNTYTO?** #LWNTYTO: <timeout> OK
Set Command	**AT#LWNTYTO=<timeout>** OK
Parameter	
<timeout>	Integer type Timeout value in milliseconds
<err>	See Error List
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.10 AT#LWNTYWROBJ – LwM2M Custom object response for Write Notification

This command is used to response to LwM2M custom object's write notification.

AT#LWNTYWROBJ – LwM2M Custom Object Write Notification response	
Test Command	**AT#LWNTYWROBJ=?** #LWNTYWROBJ: <server_id>,<object_id>,<instance_id>,<resource_count>, <resource_id>[,<resource_id>[,<resource_id>[,…]]][,<error_code>] OK
Set Command	**AT#LWNTYWROBJ=<server_id>,<object_id>,<instance_id>,<resource_count>,<resource_id>[,<resource_id>[,<resource_id>[,…]]][,<error_code>]** OK
Parameter	
<server_id>	Integer type ID of the LwM2M Server
<object_id>	Integer type ID of the object to be added
<instance_id>	Integer type ID of the instance to be added
<resource_count>	Integer type Number of Resources to create
<resource_id>	Integer type Resource ID to create
<error_code>	String type Error code provided by the host in response to the notification request.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.11 AT#LWPARAMS – LwM2M parameter configuration

This command is used to set the LwM2M parameter configuration both for client and server.

AT#LWPARAMS – LwM2M parameter configuration	
Test Command	**AT#LWPARAMS=?** #LWPARAMS: [<client_name>],[<server_id>],[<server_type>],[<server_url>],[<binding_mode>],[<lifetime>],[<storing>],[<auto_reg>],[<urc>],[<security_profile_id>],[<coap_resp_timeout>],[<coap_max_retransmit>] OK
Read Command	**AT#LWPARAMS?** #LWPARAMS: <client_name>,<server_id>,<server_type>,<server_url>,<binding_mode>,<lifetime>,<storing>,<auto_reg>,<urc>,<security_profile_id>,<coap_resp_timeout>,<coap_max_retransmit> OK
Set Command	**AT#LWPARAMS=[<client_name>],[<server_id>],[<server_type>],[<server_url>],[<binding_mode>],[<lifetime>],[<storing>],[<auto_reg>],[<urc>],[<security_profile_id>],[<coap_resp_timeout>],[<coap_max_retransmit>]** OK
Parameters	
<client_name>	String type LwM2M client name
<server_id>	Integer type LwM2M server id
<server_type>	Integer type 0: Bootstrap 1: Normal
<server_url>	String type Server URL scheme ":" ["//" authority] path ["?" query] ["#" fragment] authority = [userinfo "@"] host [":" port]
<binding_mode>	String type U: UDP Q: Queue Mode
<lifetime>	Integer type Lifetime in seconds
<storing>	Integer type Notify storing option 0: deactivated (default) 1: activated (not supported)
<auto_reg>	Integer type Enable Auto Registration option 0: disabled (default) 1: enabled
<urc>	Integer type Enable URC 0: disabled (default) 1: enabled

<security_profile_id>	Integer type Optional parameter Security profile ID linked to key.
<coap_resp_timeout>	Integer type. Optional parameter Response timeout in seconds. The default value is 2 seconds.
<coap_max_retransmit>	Integer type. Optional parameter The maximum number of retransmissions. The default value is 4, and the maximum allowed value is 20.
Max Response Time	1 sec
Parameter Saving Mode	NA
Reference	Custom

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.12 AT#LWREADRSCVAL– HOST reads LwM2M resource value

This command is used when the HOST wants to read the value of a LwM2M resource.

AT#LWREADRSCVAL – Read LwM2M resource value	
Test Command	**AT#LWREADRSCVAL=?** #LWREADRSCVAL: <uri> OK
Set Command	**AT#LWREADRSCVAL=<uri>** #LWREADRSCVAL: <data> OK
Parameter	
<uri>	String type URI of the LwM2M instance
<data>	String type Resource data value
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.13 AT#LWREG – Register to LwM2M server

AT#LWREG – Register to LwM2M server	
Test Command	**AT#LWREG=?**
Response	#LWREG: <opt>[,<server_id>] OK
Set Command	**AT#LWREG=<opt>,<server_id>**
Response	If <opt> is 3 (retrieve registration status) #LWREG: <server_id>,<reg_status> OK Else OK
Parameter	
<server_id>	Integer type LwM2M server id to register. If the server type is normal <server_id> == 0 means any server. Else the server type is bootstrap <server_id> == 0 means boot strap server (Not supported) Server type is configurable with AT#LWPARAMS command.
<opt>	Integer type LwM2M Server registration options 0: Deregister 1: Register 2: Update registration 3: Retrieve registration status
<reg_status>	Integer type LwM2M registration status 0: Not registered or bootstrap not started 1: Initial registration delay or delay between retries 2: Registration pending 3: Successfully registered 4: Last registration failed 5: Registration update pending 6: Registration update required 7: Registration update with lifetime modification 8: Registration update with binding modification 9: Registration update with binding and lifetime modifications 10: Registration update with objects modifications 11: Registration update with objects and lifetime modifications 12: Registration update with objects and binding modifications 13: Registration update with objects, binding, and lifetime modifications 14: Deregistration pending 15: Bootstrap hold-off time 16: Bootstrap request sent 17: Bootstrap ongoing 18: Bootstrap finish received 19: Bootstrap completed successfully 20: Bootstrap error occurred 21: Bootstrap failed
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.14 AT#LWRMOBJ – Remove a LwM2M object

AT# LWRMOBJ – Remove a LwM2M object	
Test Command	**AT#LWRMOBJ=?** #LWRMOBJ: <object_id> OK
Set Command	**AT#LWRMOBJ=<object_id>** OK
Parameter	
<object_id>	Integer type ID of the object to be removed.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.15 AT#LWSTART – Start LwM2M client service

This command is used to start the LwM2M client service.

AT#LWSTART – LwM2M client start command	
Test Command	**AT#LWSTART=?** #LWSTART OK
Read Command	**AT#LWSTART?** #LWSTART: <state> OK
Execution Command	**AT#LWSTART** OK
Parameter	
<status>	Integer type LwM2M Service State 0: LwM2M Stack not started 1: LwM2M Stack started 2: LwM2M Stack configured 3: LwM2M Stack activated
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

13.16 AT#LWSTOP – Stop the LwM2M client

AT#LWSTOP – Stop the LwM2M client	
Test Command	**AT#LWSTOP=?** #LWSTOP OK
Execution Command	**AT#LWSTOP** OK
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the LwM2M application note (see table 3).

14 TLS commands

14.1 AT#TLSCERTADD - Add X.509 DER certificate or PSK identity

The AT#TLSCERTADD command is used to store an X.509 certificate or a PSK identity in a security profile. It can also be used to read any stored data associated with a security profile.

AT#TLSCERTADD – Add X.509 DER certificate or PSK identity	
Test Command	**AT#TLSCERTADD=?** #TLSCERTADD: <sec_id>,<type>[,<data_length>[,<data>]] OK
Set Command	**AT#TLSCERTADD=<sec_id>,<type>[,<data_length>[,<data>]]** If <data_length> and <data> are omitted, query the <type> data for the specified Security profile ID, and respond with: #TLSCERTADD: <sec_id>,<type>,<data_length> <data> OK If <data_length> and <data> are provided, set the <type> data for the specified Security profile ID, and respond with. OK
Parameters	
<sec_id>	Integer type Security profile ID linked to certificate/PSK identity
<type>	Integer type 0: device cert 1: CA root cert 2: PSK identity If eighth bit of <type> is set (i.e. <type> & 0x80), the returned data is in Hex string mode; otherwise, it is in binary mode.
<data_length>	Integer type The length of data, in bytes.
<data>	- If the <data> parameter is provided in the Set command: the data should be sent in Hex string mode (e.g., 01A34B = bytes 0x01 0xA3 0x4B). - If the <data> parameter is omitted in the Set command: the data should be transmitted in binary mode immediately after receiving the OK response.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately

Note:
The certificate MUST be in DER format.

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.2 AT#TLSCERTDEL - Remove certificate in a security profile

AT#TLSCERTDEL command is used to remove stored certificate/PSK identity.

AT#TLSCERTDEL – Remove certificate/PSK identity from secure storage	
Test Command	**AT#TLSCERTDEL=?** #TLSCERTDEL: <sec_id>[,<type>] OK
Set Command	**AT#TLSCERTDEL=<sec_id>[,<type>]** OK
Parameters	
<sec_id>	Integer type Security profile ID
<type>	Integer type 0: device cert 1: CA root cert 2: PSK identity If <type> is omitted, all data associated with the specified security profile ID will be erased.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after reboot

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.3 AT#TLSCERTLIST - List stored certificates/PSK identities

AT#TLSCERTLIST – List stored X.509 certificates/PSK identities	
Test Command	**AT#TLSCERTLIST=?** #TLSCERTLIST: [<sec_id>] OK
Set Command	**AT#TLSCERTLIST=[<sec_id>]** If <type> is 0 or 1, the format is #TLSCERTLIST: <sec_id>,<type>,<data_length>[,<date>] Otherwise: #TLSCERTLIST: <sec_id>,<type>,<data_length> After listing all stored data, the response terminates with: OK
Parameters	
<sec_id>	Integer type Security profile ID If <sec_id> is omitted, all stored certificates across all security profile IDs will be listed.
<type>	Integer type 0: Device Certificate 1: CA Root Certificate 2: PSK Identity
<data_length>	Integer type The length of the data, in bytes, corresponding to the specified <type>.
<date>	String type Certificate expiration date. Format is YYMMDD.
Max Response Time	5 sec
Parameter Saving Mode	NA

Note:
The expiry date is displayed as stored in the X.509 certificate, formatted as YYMMDD.

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.4 AT#TLSCERTSIGN - Sign a Certificate Signing Request form (CSR)

AT#TLSCERTSIGN command is used to sign a CSR in DER format with a stored private key.

AT#TLSCERTSIGN – Sign a Certificate Signing Request form (CSR)	
Test Command	**AT#TLSCERTSIGN=?** #TLSCERTSIGN: <sec_id>,<type>,<data_length>[,<data>] OK
Set Command	**AT#TLSCERTSIGN=<sec_id>,<type>,<data_length>[,<data>]** #TLSCERTSIGN: <sec_id>,<type>,<data_length> <data> OK
Parameters	
<sec_id>	Integer type Security profile ID of the private key to use for signature
<type>	Integer type By setting the eighth bit to 1 (i.e. 0x80), the retuned data is in Hex string mode (e.g., 01A34B = bytes 0x01 0xA3 0x4B), otherwise, it is in binary mode.
<data_length>	Integer type The length of data, in bytes. Maximum value allowed: 1024
<data>	- If the <data> parameter is provided in the Set command: the data should be sent in Hex string mode (e.g., 01A34B = bytes 0x01 0xA3 0x4B). - If the <data> parameter is omitted in the Set command: the data should be transmitted in binary mode immediately after receiving the OK response.
Max Response Time	1 sec
Parameter Saving Mode	NA

Note:
The Certificate Signing Request (CSR) must be provided in DER format, including the signature.
The CSR returned after signing with a stored private key will always be in DER format.

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.5 AT#TLSKEYADD – Store a secret key and bind it to a security profile

AT#TLSKEYADD command is used to store a secret key.

AT#TLSKEYADD – Store a secret key and bind it to a security profile	
Test Command	**AT#TLSKEYADD=?** #TLSKEYADD: <sec_id>,<type>,<storage>,<data_flag>,<data_length>[,<data>] OK
Set Command	**AT#TLSKEYADD=** **<sec_id>,<type>,<storage>,<data_flag>,<data_length>[,<data>]** If <data_flag> Bit1 is 1: #TLSKEYADD: <sec_id>,<type>,<storage>,<data_flag>,<data_length>,<data> OK Otherwise: OK
Parameters	
<sec_id>	Integer type Security profile ID linked to key
<type>	Integer type Bitmap value: Bit0: 0: asymmetric, 1: symmetric Bit1: 0: private,1: public Bit2: 0: ECC curve SECP R1, 1: ECC curve BrainpoolP R1 Bit7: 0: the returned data is in binary mode, 1: the returned data is in Hex string mode (e.g., "01A34B" represents the bytes 0x01, 0xA3, 0x4B)
<storage>	Integer type Secure storage partition: 2: Flash
<data_flag>	Integer type Bitmap value: Bit0: 0:key content follows, 1: key content is created Bit1: 0: no content returned,1: return public key Bit2: 0: DER format, 1: raw binary
<data_length>	Integer type The length of data, in bytes.
<data>	- If the <data> parameter is provided in the Set command: the data should be sent in Hex string mode (e.g., 01A34B = bytes 0x01 0xA3 0x4B). - If the <data> parameter is omitted in the Set command: the data should be transmitted in binary mode immediately after receiving the OK response.
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately

Note:
The supported length for symmetric keys ranges from 1 to 32 bytes. The supported length for asymmetric keys is 32 bytes, used with ECC curves secp256r1 (prime256v1) and brainpoolP256r1.

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.6 AT#TLSKEYDEL - Remove the secret key in a security profile

AT#TLSKEYDEL – Remove a secret key in a security profile	
Test Command	**AT#TLSKEYDEL=?** #TLSKEYDEL: <sec_id> OK
Set Command	**AT#TLSKEYDEL=<sec_id>** OK
Parameters	
<sec_id>	Integer type Security profile ID
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect after reboot

Informative example:
To find examples, refer to the TLS application note (see table 3).

14.7 AT#TLSKEYLIST - List stored keys

AT#TLSKEYLIST – List stored keys	
Test Command	**AT#TLSKEYLIST=?** #TLSKEYLIST: [<sec_id>] OK
Set Command	**AT#TLSKEYLIST=[<sec_id>]** #TLSKEYLIST: <sec_id>,<type>,<cipher>,<algo>,<size> key type: private ECC SECP_R1 size: *nn* bits Or key type: PSK size: *nn* bits OK
Parameters	
<sec_id>	Integer type Security profile ID
<type>	Integer type Key type 0: Private Key 1: PSK
<cipher>	Integer type If <type> is 0 0: ECC Else Bit0: PRF Enabled / Bit1: HKDF Enabled 1: PRF Enabled 2: HKDF Enabled 3: PRF&HKDF Enabled
<algo>	Integer type If <type> is 0 0: SECP_R1 1: Brainpoolpr1 Else 0: SHA256 1: SHA384
<size>	Integer type If <type> is 0 Bit Length of Key Else Byte Length of PSK
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the TLS application note (see table 3).

15 GNSS commands

15.1 AT#GNSSDEINIT – GNSS service un-initialize and stop

AT#GNSSDEINIT – GNSS service un-initialize and stop	
Test Command	**AT#GNSSDEINIT=?** #GNSSDEINIT: OK
Set Command	**AT#GNSSDEINIT** OK
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GNSS application note (see table 3).

15.2 AT#GNSSFIX – GNSS Start or Stop Fix

This command can only be used when GNSS service is in ready state.

AT#GNSSFIX – GNSS Fix	
Test Command	**AT#GNSSFIX=?** #GNSSFIX: <start_stop>,<event_enable>,<format_type>, <format_argument>[,<period>] OK
Read Command	**AT#GNSSFIX?** If <format_type>==AT: #GNSSFIX=<validity>[,<week_number>,<time_of_week>,<latitude>,<longitude>,<altitude>,<accuracy>[,<std_dev_altitude>,<hdop>,<gdop>,<pdop>][,<number_of_satellites>,<satellite1_id>,<satellite1_residual>,…,<satelliten_id>,<satelliten_residual>][,<orientation_degree>,<semi_major>,<semi_minor>]] OK *position fields are printed only if <validity> is zero. If <format_type>==NMEA: Refer to NMEA standard for the following subsets: $GPGGA $GPGSA $GPGSV $GPGLL $GPRMC $GPVTG OK
Set command	**AT#GNSSFIX=<start_stop>,<event_enable>,<format_type>, <format_argument>[,<period>]** OK
Parameters	
<start_stop>	Integer type 0: Stop fix position 1: Start fix position
<event_enable>	Integer type 0: GNSS fix event disabled 1: GNSS fix event enabled: an event will be sent to the HOST every time there is a new fix available
<format_type>	Integer type Answer format selection 0: AT 1: NMEA

<format_argument>	String type
	if <format_type> == AT:
	1000: position data
	0100: accuracy data
	0010: satellites (used for computing position) info
	0001: orientation info
	
	if <format_type> == NMEA:
	100000: $GPGGA
	010000: $GPGSA

	001000: $GPGSV 000100: $GPGLL 000010: $GPRMC 000001: $GPVTG
<period>	Integer type GNSS activation period in second: delay between Position Sample acquisition and next GNSS activation
<validity>	Integer type If value is > 0, the Error code is a bit Mask with possible values 0: Position is valid 1: Not enough valid SVS 2: Not enough valid ephemerides 4: Position calculation Impossible 8: Dop too high 16: SSR too high 32: Accuracy too low 64: Altitude out of bounds 128: Integrity check fail
<week_number>	Integer type Number of weeks since 5-6 January 1980
<time_of_week>	Integer type Elapsed number of milliseconds within the week
<latitude>	Float type Latitude in degrees (positive for North, negative for South)
<longitude>	Float type Longitude in degrees (positive for East, negative for West)
<altitude>	Float type Altitude in meters
<accuracy>	Float type The accuracy of the position in meters
<std_dev_altitude>	Float type The standard deviation of altitude error in meters
<hdop>	Float type Horizontal dilution of precision
<gdop>	Float type Geometric dilution of precision
<pdop>	Float type Position (3D) dilution of precision
<number_of_satellites>	Integer type The number of SVs used to calculate the location
<satellite_id>	Integer type ID of SV
<satellite_residual>	Float type Range residuals in meters of SV
<orientation_degree>	Float type The orientation of the semi-major axis in degrees
<semi_major>	Float type The standard deviation of semi major axis in meters
<semi_minor>	Float type The standard deviation of semi minor axis in meters
Max Response Time	10 sec

Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GNSS application note (see table 3).

15.3 AT#GNSSINIT – GNSS Init

This command is used to Initialize GNSS service and get its status.
User shall wait for #GNSSINIT URC before sending other GNSS AT commands (except AT#GNSSDEINIT).

AT#GNSSINIT – GNSS Init	
Test Command	**AT#GNSSINIT=?** #GNSSINIT: <assistance_gnss>,<constellation_id>[,<context_id>,<supl_server_ip>, <supl_server_port>[,<supl_session_timeout>[,<security_profile_id>]]] OK
Read Command	**AT#GNSSINIT?** #GNSSINIT:[<status>] OK
Set Command	**AT#GNSSINIT=<assistance_gnss>,<constellation_id>** **[,<context_id>,<supl_server_ip>,<supl_server_port>** **[,<supl_session_timeout>[,<security_profile_id>]]]** OK
Parameters	
<status>	Integer type 0: GNSS service not started 1: GNSS service startup: service startup ongoing 2: GNSS service ready: service ready to accept request 3: GNSS download from SUPL: assistance data download ongoing 4: GNSS download fail: error during assistance data download. Retry downloading or perform a cold start. 5: GNSS system failure: severe fault during startup. Service may not be available. 6: GNSS startup delayed after next NBIOT activity.
<assistance_gnss>	Integer type 0: Assistance data download disabled (cold start) 1: Auto: use assistance data only if already available and still valid, but do not download it from SUPL server. 2: Assistance data download enabled --> use assistance data already available if valid. Otherwise, force download (hot start).
<constellation_id>	Integer type 0: GPS 1: GALLILEO 2: GPS+GALLILEO
<context_id>	Integer type Context number established on modem side. The IP stack has been configured for this context with the AT#IPCFG command.
<supl_server_ip>	String type IPv4 or IPV6 GNSS Supplier Server address IPV4 Example: 74.125.140.192 (note this is a Google public SUPL server that could be used) IPv6 Example: cafe:baba::01
<supl_server_port>	Integer type GNSS Supplier Server Port Example: 7276

<supl_session_timeout>	Integer type [seconds] – Optional parameter SUPL server connection and session timeout (default 30 seconds)
<security_profile_id>	Integer type – Optional parameter If specified and if the security profile exist, a TLS link will be used for the socket.
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GNSS application note (see table 3).

15.4 AT#GNSSSV – GNSS Space Vehicles URC configuration

This command is used to enable/disable #GNSSSV URC that reports the status of Space Vehicles currently in view.

AT#GNSSSV – GNSS Space Vehicles URC configuration	
Test Command	**AT#GNSSSV=?** #GNSSSV: <urc_mode> OK
Read Command	**AT#GNSSSV?** #GNSSSV: <urc_mode> OK
Set Command	**AT#GNSSSV=<urc_mode>** OK
Parameters	
<urc_mode>	Integer type 0: URC disabled 1: URC enabled with basic format: #GNSSSV: <tot_number_of_visible_svs>, <sv_id>, <sv_quality>, <constellation_type> 2: URC enabled with verbose format: #GNSSSV: tot_number_of_visible_svs>, <sv_id>, <sv_quality>, <constellation_type>, <code_phase_measurement_chip>, <doppler>, <carrier_to_noise_ratio >, <time_of_week_at_transmission >
<tot_number_of_visible_svs>	Integer type: total number of visible SVs
<sv_id>	Integer type 1 to 32 for GPS 1 to 30 for Galileo
<sv_quality>	Integer type 0: SV detected 1: code locked but not bit synchronized 2: bit synchronized: decoding navigation message 3: TOW decoded 4: usable in position calculation 5: ephemeris decoded 6: ephemeris loaded from assistance
<constellation_type>	String type: 0: GPS 1: GAL
<code_phase_measurement_chip >	Float type: Code phase measurement chip
<doppler>	Float type: SV doppler expressed in Hz
<carrier_to_noise_ratio>	Float type: CN0 expressed in dB
<time_of_week_at_transmission>	Integer type: SV time on week expressed in ms
Max Response Time	10 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the GNSS application note (see table 3).

16 Wi-Fi Scanning commands

16.1 AT#WSCAN – Set parameters, starts and stops Wi-Fi Scanning

This command is used to set the parameters, start and stop the Wi-Fi scanning process.

AT#WSCAN – Configure and launch the Wi-Fi Scan	
Test Command	**AT#WSCAN=?** #WSCAN: <command>[,<param1>[,<param2>[,…]]] OK
Set Command	**AT# WSCAN =<command>[,<param1>[,<param2>[,…]]]** OK Then URC at the beginning of channel scanning: #WSCHANNEL <channel_number> URC when an AP is found: #SWCAN:<channel_number>,<rx_level>,<bssid>,<ssid> And URC at the wraparound of channel list hopping: #WSRESTART
Parameters	
<command>	Integer type 0: Stops the Wi-Fi scanning process 1: Starts the Wi-Fi scanning process 2: Set URC mode 3: Set hopping time between channels scan 4: Set antenna path 5: Number of loops
<param>	Integer type, meaning depends on the <command> value: <command>=0: No param awaited <command>=1: <param>=<channel_number>,<channel_number>,…(up to 14 channel) <command>=2: <param>=<urc_mode> <command>=3: <param>=<hopping_time> <command>=4: <param>=<antenna_path> <command>=5: <param>=<nb_loop>
<channel_number>	Integer type in the range [1,14] Channel number from the Wi-Fi specification
<urc_mode>	Integer type 0: The Wi-Fi AP URC is issued once, the first time the AP is scanned (Default mode), 1: The Wi-Fi AP URC is issued every time the AP is scanned. Note that the URC #WSCHANNEL and #WSRESTART are issued only in <urc_mode> = 1.
<hopping_time>	Integer type Scan time in ms before hopping to the next channel from the channel list
<antenna_path>	Integer type 0: GNSS antenna path is used for the Wi-Fi signal 1: NBIOT antenna path is used for the Wi-Fi signal
<nb_loop>	Integer type in the range [0,256] Defines the number of times the scan will run the channel list. Value 0 means the system will run in an Infinite loop. When the number of loop is reached, the URC #WSSTOP is issued.

<rx_level>	AP beacon received level in dBm
<bssid>	AP basic service set identifier (mac address)
<ssid>	AP service set identifier
Max Response Time	1 sec
Parameter Saving Mode	SAVED to NVM using AT#RESET=1 Takes effect immediately

Informative example:
To find examples, refer to the WIFI Scan application note (see table 3).

17 FOTA commands

17.1 AT#FOTACFG – Configure the FOTA services

AT#FOTACFG – Configure the FOTA services	
Test Command	**AT#FOTACFG=?** #FOTACFG: [<method>],[<protocol>],[<urc>],[<security_profile_id>],[<timeout>],[<retransmit>] OK
Read Command	**AT#FOTACFG?** #FOTACFG: <method>,<protocol>,<urc>,<security_profile_id>,<timeout>,<retransmit> OK
Set Command	**AT#FOTACFG=[<method>],[<protocol>],[<urc>],[<security_profile_id>],[<timeout>],[<retransmit>]** OK
Parameters	
<method>	Integer type. Supported method in bitmap Bit0: PULL
<protocol>	Integer type Supported protocol in bitmap Bit0: CoAP
<urc>	Integer type FOTA Service URC Option 0: None 1: Normal 2: Verbose
<security_profile_id>	Integer type If specified and if the security profile exist, a TLS link will be used for the socket.
<timeout>	Integer type Transport layer request timeout in second. (Default: 2)
<retransmit>	Integer type Transport layer retransmission count in case of request failure. (Default: 4)
Max Response Time	1 s
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the FOTA Scan application note (see table 3).

17.2 AT#FOTADL – Download FOTA image

This command is used to manage the FOTA image download through the FOTA services.

AT#FOTADL – Download FOTA image	
Test Command	**AT#FOTADL=?** #FOTADL: <opt>,<url>[,<auto_update>] OK
Set Command	**AT#FOTADL=<opt>,<url>[,<auto_update>]** If <opt>==0 or <opt>==1: OK Else if <opt>==2: #FOTADL:<fota_state>,<fota_result>,<fota_error>,<auto_update> [,<download_size>,<total_size>] OK
Parameters	
<opt>	Integer type. Download service option: 0: Abort Download 1: Start Download 2: Retrieve Download status
<url>	String type URL of FW image file to download
<auto_update>	Integer type Automatic update enable. Once download is successful, update procedure is automatically launched. 0: Disabled 1: Enabled
<fota_state>	Integer Type 0: IDLE 1: DOWNLOAD ON GOING 2: DOWNLOAD DONE 3: DOWNLOAD FAILED 4: UPDATING DEFERRED 5: UPDATING ON GOING 6: UPDATE DONE 7: UPDATE FAILED
<fota_result>	Integer Type 0: INITIAL 1: SUCCESS UPDATE 2: FAIL FLASH 3: FAIL RAM 4: FAIL CONNECTION 5: FAIL INTEGRITY 6: FAIL PACKAGE TYPE 7: FAIL URI 8: CANCELLED 9: DEFERRED
<fota_error>	Integer type 0: NO ERROR

	1: INVALID BOOT STATE 2: FAILED TO ERASE FLASH 3: FAILED TO PROGRAM FLASH 4: INVALID CRC FLASH 5: INVALID PKG URI 6: FAILED TO CREATE SESSION 7: FAILED TO GET MESSAGE 8: FAILED TO LAUNCH UPDATE 9: GENERAL ERROR
<download_size>	Integer type Downloaded Byte Length
<total_size>	Integer type Total size to download in byte length. (0: Unknown)
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the FOTA Scan application note (see table 3).

17.3 AT#FOTALNCHUP – Update FOTA image

Once a new FOTA image has been downloaded Over The Air, this command is used to manage the image update process.

AT#FOTALNCHUP – Manage the image update process	
Test Command	**AT#FOTALNCHUP=?** #FOTALNCHUP: <opt>[,<defer>] OK
Set Command	**AT#FOTALNCHUP=<opt>** If <opt>==0 or <opt>==1 OK Else If <opt>==2 #FOTALNCHUP: <fota_state>,<fota_result>,<fota_error>,<time_to_update> OK
Parameters	
<defer>	Integer type Time to defer for launching update in seconds.
<opt>	Integer type Update service option: 0: Cancel Update 1: Launch Update 2: Retrieve Update status
<fota_state>	Integer Type 0: IDLE 1: DOWNLOAD ON GOING 2: DOWNLOAD DONE 3: DOWNLOAD FAILED 4: UPDATING DEFERRED 5: UPDATING ON GOING 6: UPDATE DONE 7: UPDATE FAILED
<fota_result>	Integer Type 0: INITIAL 1: SUCCESS UPDATE 2: FAIL FLASH 3: FAIL RAM 4: FAIL CONNECTION 5: FAIL INTEGRITY 6: FAIL PACKAGE TYPE 7: FAIL URI 8: CANCELLED 9: DEFERRED
<fota_error>	Integer type 0: NO ERROR 1: INVALID BOOT STATE 2: FAILED TO ERASE FLASH 3: FAILED TO PROGRAM FLASH 4: INVALID CRC FLASH 5: INVALID PKG URI 6: FAILED TO CREATE SESSION 7: FAILED TO GET MESSAGE 8: FAILED TO LAUNCH UPDATE

	9: GENERAL ERROR
<time_to_update>	Integer type Remaining time to launch the image update in seconds.
Max Response Time	1 sec
Parameter Saving Mode	NA

Informative example:
To find examples, refer to the FOTA Scan application note (see table 3).

19 Unsolicited Response Code (URC)

19.1 URC List

On top of the standard URC defined by the 3GPP, the ST87MXX module may send additional URC to the HOST.

Table 6. URC list

URC	Comment
#SIMST	To indicate SIM status
#SLEEP	To indicate that the module is entering SLEEP mode
#WAKEUP	To indicate that the module has just woken up
#SHUTDOWN	To indicate that the module enters in power off
#GNSSFIX: <validity>,<week_number>,<time_of_week>,<latitude>,<longitude>,<altitude>,<accuracy>[,<std_dev_altitude>,<hdop>,<gdop>,<pdop>][,<number_of_satellites>,<satellite1_id>,<satellite1_residual>,…,<satelliten_id>,<satelliten_residual>][,<orientation_degree>,<semi_major>,<semi_minor>]	To indicate a new fix position is available
#GNSSINIT: 2,<nbiot_delay>	GNSS Service ready, next NBIOT activity scheduled after **<nbiot_delay>**
#GNSSINIT: 4	Failure during Assistance data download
#GNSSINIT: 5	Failure during GNSS Service startup
#GNSSINIT: 6,<nbiot_delay>	GNSS Service startup will be delayed by **<nbiot_delay>**
#IPCFG : <context_id>,<ip_mode>,<ip_status>	Indicates that a PDP context has been established and that an IP address has been assigned to the UE : <context_id>: the modem context ID <ip_mode>: 0 = IPv4; 1 = IPv6 <ip_status>: 0 = IP stack down; 1 = IP stack up; 2 = IP stack up with new different IP address To get the assigned IP address, AT command AT#IPCFG? shall be used (see §9.1) Rem: In case IPv4 and IPv6 address are assigned to the UE, two #IPCFG URC will be displayed.
#IPRECV: <context_id>,<socket_id>[,**<**total_data_length**>]**	Indicates that an UDP or TCP packet has been received. Optional <total_data_length> (total number of received bytes) can be enabled (see §0) To read the received packet, the AT command AT#IPREAD shall be used (see §9.6)
#SOCKETCLOSED: <context_id>,<socket_id>[,<tls_error>]	Indicates that remote TCP server has closed connection. If <tls_error> is present, it means that socket has been closed due to an error during TLS record reception.
#MQTTRECV: <topicName>, <Payload>	Display the payload received for a subscribed topic
#HTTPRECV: <type>,<chunk_length>[,<status_code>[,<content_length>]]	Indicates that an HTTP data has been received. To read the received data, the AT command AT#HTTPREAD shall be used

	<type>: 0: Header, 1: Body, 2: Partial Header, 3: Invalid; <chunk_length> size of data chunk received; If <type> == 0, then: <status_code>: HTTP status code (e.g. 200) <content_length>: content length found inside HTTP response (if not found, it is not printed)
#HTTPDISC[: <tls_error>]	Indicates that an HTTP link is released and disconnected by the network (TCP Socket Create and Connect should be remake and HTTP start also if device wants to send again some data to this HTTP server). In case of HTTPS, if <tls_error> is present, it indicates the TLS error that caused the disconnection.
#HTTPTMO	Timeout between AT#HTTPMETHOD and AT#HTTPSEND, host must repeat HTTP request sequence
#COAPRECV: packet,<mid>,<message_type>,<response_code>,[<token>],<num_opt>,<payload_length>	CoAP message received <mid>: CoAP message ID <message_type>: CoAP message Type <response_code>: CoAP response code 000: Response not received(Timeout) 201: CREATED_2_01 202: DELETED_2_02 203: VALID_2_03 204: CHANGED_2_04 205: CONTENT_2_05 400: BAD_REQUEST_4_00 401: UNAUTHORIZED_4_01 402: BAD_OPTION_4_02 403: FORBIDDEN_4_03 404: NOT_FOUND_4_04 405: METHOD_NOT_ALLOWED_4_05 406: NOT_ACCEPTABLE_4_06 417: PRECONDITION_FAILED_4_12 413: REQUEST_ENTITY_TOO_LARGE_4_13 415: UNSUPPORTED_MEDIA_TYPE_4_15 500: INTERNAL_SERVER_ERROR_5_00 501: NOT_IMPLEMENTED_5_01 502: BAD_GATEWAY_5_02 503: SERVICE_UNAVAILABLE_5_03 504:GATEWAY_TIMEOUT_5_04 505: PROXYING_NOT_SUPPORTED_5_05 <token>: CoAP message token <num_opt>: Number of options in the context <payload_length>: CoAP message size
#COAPRECV: option,<mid>,<opt>,[<value>]	Options in received CoAP Message <mid>: CoAP Message ID <opt>: CoAP option number <value>: CoAP option value
#COAPRECV: payload,<mid> <payload>	Payload in received CoAP Message <mid>: CoAP Message ID <payload>: Received payload content in raw binary format. Payload Starts after newline(“\r\n”).
#LWREG: <server_id>,<reg_status>	LwM2M client’s registration status change <server_id>: LwM2M server id to register <reg_status>: 0: Not registered or bootstrap not started 1: Initial registration delay or delay between retries 2: Registration pending 3: Successfully registered 4: Last registration failed

	5: Registration update pending 6: Registration update required 7: Registration update with lifetime modification 8: Registration update with binding modification 9: Registration update with binding and lifetime modifications 10: Registration update with objects modifications 11: Registration update with objects and lifetime modifications 12: Registration update with objects and binding modifications 13: Registration update with objects, binding, and lifetime modifications 14: Deregistration pending 15: Bootstrap hold-off time 16: Bootstrap request sent 17: Bootstrap ongoing 18: Bootstrap finish received 19: Bootstrap completed successfully 20: Bootstrap error occurred 21: Bootstrap failed
#LWNTYEXEOBJ: <server_id>,<object_id>, <instance_id>,<resource_id>	LwM2M Customer Object Execution Notify
#LWNTYRDOBJ: <server_id>,<object_id>, <instance_id>, <resource_count>, <resource_id>[,<resource_id>[,<resource_id>[, …]]]	LwM2M Customer Object Read Notify
#LWNTYWROBJ: <server_id>,<object_id>, <instance_id>,<resource_count>, <resource_id>,<resource_type>, <resource_length>,<resource_value> [,<resource_id>,<resource_type>, <resource_length>,<resource_value> [,<resource_id>,<resource_type>, <resource_length>,<resource_value> [, …]]]	LwM2M Customer Object Write Notify
#GNSSSV: <number_of_visible_sv>, <sv_id>,<sv_quality>,<constellation_type> [,<code_phase_measurement_chip>, <doppler>, <carrier_to_noise_ratio>, <time_of_week_at_transmission>]	GNSS Space Vehicle status notification.
#FOTA: state,<fota_state>,<fota_result>,<fota_error>	FOTA Service state change <fota_state> Integer Type 0: IDLE 1: DOWNLOAD ON GOING 2: DOWNLOAD DONE 3: DOWNLOAD FAILED 4: UPDATING DEFERRED 5: UPDATING ON GOING 6: UPDATE DONE 7: UPDATE FAILED <fota_result> Integer Type 0: INITIAL 1: SUCCESS UPDATE 2: FAIL FLASH 3: FAIL RAM 4: FAIL CONNECTION

	5: FAIL INTEGRITY 6: FAIL PACKAGE TYPE 7: FAIL URI 8: CANCELLED 9: DEFERRED <fota_error> Integer type 0: NO ERROR 1: INVALID BOOT STATE 2: FAILED TO ERASE FLASH 3: FAILED TO PROGRAM FLASH 4: INVALID CRC FLASH 5: INVALID PKG URI 6: FAILED TO CREATE SESSION 7: FAILED TO GET MESSAGE 8: FAILED TO LAUNCH UPDATE 9: GENERAL ERROR
#FOTA: download,<download_size>,<total_size>	FOTA Download status <download_size> : Downloaded Byte Length <total_size> : Total size to download in byte length. (0: Unknown)
#SYSSTART	Boot after a power on or after a power off action
#REBOOT_RESET	Reboot after a reset
#REBOOT_HOST	Reboot after a reset requested by the AT#RESET command
#REBOOT_FOTA	Reboot after a FOTA action, launch update or Rollback
#REBOOT_WD <core>	Reboot after a watchdog and indicates which <**core**> has generated the Watchdog reboot
#REBOOT_RPM	Reboot after a RPM reset
#ENERGY	Consumption of the module in µWh
#UNDERTEMP_SHUTDOWN	The module reaches the temperature shutdown limit
#OVERTEMP_SHUTDOWN	The module reaches the temperature shutdown limit
#UNDERTEMP_WARNING	The module reaches the temperature warning limit
#OVERTEMP_ WARNING	The module reaches the temperature warning limit
#UNDERVOLTAGE_SHUTDOWN	The module reaches the voltage shutdown limit
#OVERVOLTAGE_SHUTDOWN	The module reaches the voltage shutdown limit
#UNDERVOLTAGE_WARNING	The module reaches the voltage warning limit
#OVERVOLTAGE_ WARNING	The module reaches the voltage warning limit
+CGEV: NW ACT <p_cid>, <cid>, <event_type>	Refer to AT+CGEREP
+CGEV: ME ACT <p_cid>, <cid>, <event_type>	Refer to AT+CGEREP
+CGEV: NW PDN DEACT <cid>	Refer to AT+CGEREP
+CGEV: ME PDN DEACT <cid>	Refer to AT+CGEREP
+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>].	Refer to AT+CGEREP
+CGEV: NW DEACT <p_cid>, <cid>, <event_type>	Refer to AT+CGEREP
+CGEV: NW MODIFY <cid>,<change_reason>,<event_type>	Refer to AT+CGEREP
+CGEV: ME MODIFY <cid>,<change_reason>,<event_type>	Refer to AT+CGEREP
+CGEV: NW IP ADDR CHG <cid>	Refer to AT+CGEREP
#WSCHANNEL <channel_number>	Wi-Fi scan current channel being scanned. Refer to AT#WSCAN

#SWCAN:<channel_number>,<rx_level>, <bssid>,<ssid>	Wi-Fi scan result. Refer to AT#WSCAN
#WSRESTART	Wi-Fi scan channel list wraparound. Refer to AT#WSCAN
#WSSTOP	Wi-Fi scan has ended . Refer to AT#WSCAN

20 Error codes

20.1 Modem generic error code

Table 7. **Modem generic error codes**

Code	Comment
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
40	network personalisation PIN required
41	network personalisation PUK required
42	network subset personalisation PIN required
43	network subset personalisation PUK required
44	service provider personalisation PIN required
45	service provider personalisation PUK required
46	corporate personalisation PIN required
47	corporate personalisation PUK required
48	hidden key required

49	EAP method not supported
50	Incorrect parameters
51	command implemented but currently disabled
52	command aborted by user
53	not attached to network due to MT functionality restrictions
54	modem not allowed - MT restricted to emergency calls only
55	operation not allowed because of MT functionality restrictions
56	fixed dial number only allowed - called number is not a fixed dial number
57	temporarily out of service due to other MT usage
58	language/alphabet not supported
59	unexpected data value
60	system failure
61	data missing
62	call barred
63	message waiting indication subscription failure
64	unknown
96	context ID mismatch
97	IP address mismatch
98	modem state incompatible
102	modem entering sleep
103	Illegal MS (#3)
106	Illegal ME (#6)
107	GPRS services not allowed (#7)
108	GPRS services and non-GPRS services not allowed (#8)
111	PLMN not allowed (#11)
112	Location area not allowed (#12)
113	Roaming not allowed in this location area (#13)
114	GPRS services not allowed in this PLMN (#14)
115	No Suitable Cells In Location Area (#15)
122	Congestion (#22))
125	Not authorized for this CSG (#25)
126	insufficient resources (#26)
127	missing or unknown APN (#27)
128	unknown PDP address or PDP type (#28)
129	user authentication failed (#29)
130	activation rejected by GGSN Serving GW or PDN GW (#30)
131	activation rejected unspecified (#31)
132	service option not supported (#32)
133	requested service option not subscribed (#33)
134	service option temporarily out of order (#34)
140	feature not supported (#40)
141	semantic error in the TFT operation (#41)
142	syntactical error in the TFT operation (#42)
143	unknown PDP context (#43)
144	semantic errors in packet filter(s) (#44)

145	syntactical errors in packet filter(s) (#45)
146	PDP context without TFT already activated (#46)
149	PDP authentication failure
171	Last PDN disconnection not allowed (#49)
172	Semantically incorrect message (#95)
173	Mandatory information element error (#96)
174	Information element non-existent or not implemented (#97)
175	Conditional IE error (#99)
176	Protocol error unspecified (#111)
177	Operator Determined Barring (#8)
178	maximum number of PDP contexts reached (#65)
179	requested APN not supported in current RAT and PLMN combination (#66)
180	request rejected Bearer Control Mode violation (#48)
181	unsupported QCI value (#83)

20.2 Modem custom error code

Table 8. **Modem custom error codes**

Code	Comment
500	Command not available
501	Number of param not correct
502	Exceed parameter number
503	Not enough parameter
504	Command unknown
505	Generic error

20.3 Secure core error code

Table 9. Secure error codes

Code	Comment
1000	Generic error
1001	String too long
1002	Command analysis error
1003	Execution error
1004	Bad number of parameters
1005	Error in parameter conversion
1020	EFLASH MCU : write error
1021	EFLASH MCU : erase error
1022	NVM : read error
1023	NVM : write error
1024	NVM : save error
1025	NVM : erase error
1040	WRITE access error
1041	READ access error
1050	Ring pin : error
1051	Ring pin : setting
1052	Ring pin : delay
1060	GPIO : pin number error
1061	GPIO : mode error
1062	GPIO : value error
1063	GPIO : bank error
1064	GPIO : pin error
1065	GPIO : mux error
1066	GPIO : not available
1070	Date entry error
1071	Time entry error
1072	GMT entry error
1080	Regulator error
1090	Watchdog setting error
1100	Sleep error
1101	Clock error
1102	Calibration clock : 32khz error
1103	Calibration clock : ring oscillator error
1104	Calibration clock : does not exist
1105	RAM test error
1106	Flash test error
1107	Watchdog test error
1120	AT command forward to APP error
1121	AT command forward to Modem error
1122	AT command forward to CAP error
1123	AT command forward to WMBUS error
1130	Real trace error, not in the good mode (Modem/GNSS)
1140	Storage initialization error
1180	PWM : initialization error
1181	PWM : set error
1182	PWM : stop error

1183	PWM : parameters out of bounds error
1184	PWM parameters bad state transition error
1200	Assert fault
1205	Load access fault
1206	Store access fault
1300	Invalid PSA argument
1301	PSA already exists
1302	PSA does not exist
1303	Insufficient PSA memory
1304	PSA generic error
1305	PSA not permitted
1306	PSA storage failure
1307	PSA invalid signature
1308	PSA storage cert ID error
1309	PSA invalid handle
1400	GNSS Lib not started
1410	WMBUS lib already started
1411	WMBUS lib already stopped

20.4 Application core error code

Table 10. Application error codes

Code	Comment
2000	System memory issue
2001	System queue transmission issue
2008	ADC invalid parameter : channel
2009	ADC : no answer received
2010	System invalid parameter : time for PSM
2011	System invalid parameter : auto IP success timeout
2012	Invalid AT command
2013	FreeRTOS issue
2014	Invalid function usage
2100	TCP/IP invalid parameter : context id
2101	TCP/IP invalid parameter : IP mode
2102	TCP/IP invalid parameter : IP version
2103	TCP/IP invalid parameter : IP address
2104	TCP/IP invalid parameter : socket id
2105	TCP/IP: no more contexts available
2106	TCP/IP: network is down
2107	TCP/IP invalid parameter : IP max size
2108	TCP/IP invalid parameter : DNS address to use
2110	TCP/IP invalid parameter : ipv4 address
2111	TCP/IP invalid parameter : DHCP not supported
2112	TCP/IP invalid parameter : ipv4 dns
2120	TCP/IP invalid parameter : ipv6 address
2121	TCP/IP invalid parameter : ipv6 prefix
2122	TCP/IP invalid parameter : ipv6 prefix length
2123	TCP/IP invalid parameter : ipv6 dns
2124	TCP/IP invalid parameter : dhcp6 not supported
2130	TCP/IP : unable to ping
2131	TCP/IP invalid parameter : number of bytes
2132	TCP/IP invalid parameter : number of pings
2133	TCP/IP invalid parameter : send/receive/ping timeout
2140	TCP/IP invalid parameter : socket type (UDP, TCP, RAW)
2141	TCP/IP invalid parameter : port number
2142	TCP/IP invalid parameter : data
2143	TCP/IP : IP address missing
2144	TCP/IP : invalid parameter : display number of data
2145	TCP/IP : invalid parameter : data type
2146	TCP/IP : invalid parameter : data length
2147	TCP/IP : invalid parameter : RAI
2148	TCP/IP : invalid parameter : NB sent/NB clear
2149	TCP/IP : invalid parameter : IP reception URC activation
2150	TCP/IP : socket creation error
2151	TCP/IP : socket already bound to different port
2152	TCP/IP : socket error while connecting
2153	TCP/IP : socket not created
2154	TCP/IP : socket issue during data transfer
2155	TCP/IP : socket bind error

2156	TCP/IP : socket invalid context
2157	TCP/IP : socket already connected
2158	TCP/IP : socket reception error
2159	TCP/IP : maximum number of sockets reached
2160	TCP/IP invalid parameter : type of TLS algorithm
2161	TCP/IP invalid parameter : security profile ID
2162	TCP/IP error while setting TLS credentials
2170	DNS invalid parameter : web URL
2171	DNS invalid parameter : IP address not found
2172	DNS invalid parameter : timeout
2173	DNS invalid parameter : max attempts
2180	DTLS : invalid CID length
2181	DTLS : invalid CID
2182	TLS : invalid parameter
2183	TLS : insufficient memory
2184	TLS : invalid credentials
2185	TLS : handshake failed
2186	TLS : internal error
2187	TLS : connection failure
2188	TLS : key store failure
2200	MQTT : initialization failed
2201	MQTT : protocol stack not initialized
2202	MQTT invalid parameter : client name
2203	MQTT invalid parameter : connection timeout
2204	MQTT invalid parameter : protocol timeout
2205	MQTT invalid parameter : publish retries
2206	MQTT invalid parameter : keep alive publish message
2207	MQTT invalid parameter : username
2208	MQTT invalid parameter : password
2209	MQTT invalid parameter : topic
2210	MQTT invalid parameter : message
2211	MQTT invalid parameter : subscribe
2212	MQTT invalid parameter : number of retries
2213	MQTT invalid parameter : QoS
2214	MQTT : connection failed
2215	MQTT : publish failed
2216	MQTT : subscribe failed
2217	MQTT : unsubscribe failed
2218	MQTT : not connected
2219	MQTT : disconnection failed
2220	MQTT : protocol stack already connected
2221	MQTT : not configured
2222	MQTT : max number of subscribe reached
2223	MQTT : invalid parameter : retain flag
2300	HTTP : initialization issue
2301	HTTP : protocol stack not initialized
2302	HTTP : protocol stack already initialized
2303	HTTP : invalid parameter : method
2304	HTTP : invalid parameter : method path
2305	HTTP : request initialization failed
2306	HTTP : request transmission failed
2307	HTTP : protocol stack not connected
2308	HTTP : invalid parameter method : host

2309	HTTP : invalid parameter method : keep alive
2310	HTTP : method not initialized
2311	HTTP : invalid parameter : field
2312	HTTP : invalid parameter : value
2313	HTTP : invalid parameter : body
2314	HTTP : method already ongoing
2400	CoAP : invalid parameter: client name
2401	CoAP : invalid parameter: server address
2402	CoAP : invalid parameter: message type
2403	CoAP : invalid parameter: method
2404	CoAP : invalid parameter: URI path
2405	CoAP : invalid parameter: payload
2406	CoAP : invalid parameter: command string
2407	CoAP : invalid parameter: payload
2408	CoAP : invalid parameter: message id
2409	CoAP : invalid parameter: token
2410	CoAP : invalid status: not configured
2411	CoAP : invalid status: not started
2412	CoAP : invalid status: not connected
2413	CoAP : invalid parameter : option
2500	LwM2M invalid parameter : client name
2501	LwM2M invalid parameter : server address
2502	LwM2M invalid parameter : server port
2503	LwM2M invalid parameter : server id
2504	LwM2M invalid parameter : server type
2505	LwM2M invalid parameter : binding mode
2506	LwM2M invalid parameter : lifetime
2507	LwM2M invalid parameter : storing
2508	LwM2M invalid parameter : object id
2509	LwM2M invalid parameter : URI
2510	LwM2M invalid parameter : data
2511	LwM2M invalid parameter : command type
2512	LwM2M invalid parameter : command string
2513	LwM2M invalid parameter : register option
2514	LwM2M : invalid stack status
2515	LwM2M : failed to create device object
2516	LwM2M : failed to create security object
2517	LwM2M : failed to create server object
2518	LwM2M : failed to create firmware object
2519	LwM2M : failed to create eSIM object
2520	LwM2M : failed to initialize protocol
2521	LwM2M : general failure
2522	LwM2M : failed to create custom object
2523	LwM2M : max object number
2524	LwM2M : failed to remove custom object
2525	LwM2M : invalid resource
2526	LwM2M : notify not initialized
2527	LwM2M : invalid notify
2528	LwM2M : notify timed out
2529	LwM2M : notify mismatch
2530	LwM2M : invalid server URL parameter
2531	LwM2M : invalid auto-registration parameter
2532	LwM2M : invalid URC parameter

2533	LwM2M : invalid error code parameter
2534	LwM2M : invalid security profile id parameter
2535	LwM2M : invalid CoAP response timeout parameter
2536	LwM2M : invalid CoAP max retransmit parameter
2600	FOTA : invalid option
2601	FOTA : invalid URI
2602	FOTA : failed to download
2603	FOTA : failed to abort download
2604	FOTA : failed to update
2605	FOTA : failed to cancel update
2700	GNSS : invalid mode
2701	GNSS : invalid constellation
2702	GNSS : invalid IP address
2703	GNSS : invalid port
2704	GNSS : invalid timeout
2705	GNSS : invalid sate
2706	GNSS : invalid data
2707	GNSS : failed to start
2708	GNSS : invalid event
2709	GNSS : invalid format
2710	GNSS : invalid period
2711	GNSS : SV status fail
2712	GNSS : busy
2750	WiFi Scan invalid parameter : command
2751	WiFi Scan invalid parameter : channel
2752	WiFi Scan invalid parameter : URC mode
2753	WiFi Scan invalid parameter : hopping time
2754	WiFi Scan : busy
2755	WiFi Scan : error
2756	WiFi Scan : stack not ready
2800	RSP : busy
2801	RSP : not initialized
2802	RSP : already initialized
2803	RSP : invalid parameter
2804	RSP : parameter out of range
2805	RSP : message too short
2806	RSP : odd number of hexadecimal characters (must be even)
2807	RSP : invalid long eIM message buffer
2808	RSP : insufficient internal buffer length
2809	RSP : read unexpected number of bytes from EUICC
2810	RSP : EUICC logic channel is closed
2811	RSP : unknown answer from EUICC
2812	RSP : send overflow error
2813	RSP: parsing error
2814	RSP : could not send message to modem
2815	RSP : low level FSM error
2816	RSP : received eIM message with unknown tag
2817	RSP : invalid transaction ID
2818	RSP : ASN encoding/decoding error
2819	RSP : missing Matching ID/Confirmation Code or failed profile activation
2900	Requests Layer : busy
2901	Requests Layer : URL parsing error
2902	Requests Layer : no scheme or host specified

2903	Requests Layer : invalid server IP address
2904	Requests Layer : IP context is down
2905	Requests Layer : invalid scheme
2906	Requests Layer : protocol not supported
2907	Requests Layer : socket error
2908	Requests Layer : context error
2909	Requests Layer : message to send is too large
2910	Requests Layer : message to receive is too large
2911	Requests Layer : overflow during message reception
2912	Requests Layer : timer error
2913	Requests Layer : stack not initialized
2914	Requests Layer : CoAP send error
2915	Requests Layer : CoAP receive error
2916	Requests Layer : CoAP error code
2917	Requests Layer : HTTP send error
2918	Requests Layer : HTTP receive error
2919	Requests Layer : HTTP error code

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