



WL865E4-P AT Command Reference Guide

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APPLICABILITY TABLE

PRODUCTS

		SW Versions
■	■ WL865E4-P	36.07.000
■	■ WL865E4-P	36.07.001

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1. INTRODUCTION

1.1. Scope

This document covers the more significant standard and proprietary AT commands provided by Telit's modules. Several module features are described and for each one of them the related AT commands are explained through examples. This document is not an exhaustive description of the AT commands implemented on the Telit's modules series; its target is only to give you an entry point to the AT commands world.

1.2. Audience

This manual is designed for software engineers who want to evaluate, design, and implement the modules within their environment. To use this manual, you will need a basic understanding of wireless networks, network principles, and network protocols.

1.3. Contact Information, Support

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

- TS-SRD@telit.com

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

<https://www.telit.com>

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

Telit appreciates feedback from the users of our information.

1.4. Text Conventions



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



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



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

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

1.5. Related Documents

Please refer to <https://www.telit.com/> for current documentation and downloads.

For EVK: -

WL865E4-P Evaluation Board Quick Start Guide

2. OVERVIEW

This chapter provides guidelines for using AT command line interface to design, configure and provision WL865E4-P module in a wireless network using serial commands.

2.1. AT Commands

Telit wireless module family can be controlled via the serial interface using the standard AT commands.

2.2. Command Definition

This document uses the following syntactical definitions:

- Color text indicates cross-reference, hyperlinks to supplemental information
- Command notation indicates commands, sub commands, or command elements

Following table describes the text conventions used in this manual for software procedures that are explained using the AT command line interface.

Convention Type	Description
[] Square brackets	Name enclosed in square brackets are optional parameters. Square brackets themselves do not appear in the command line.
<CR> Carriage return	It is the command line and result code terminator character. The ASCII equivalent decimal value of <CR> is 13.
<LF> Line Feed	It is the character recognized as line feed character. The ASCII equivalent decimal value of <LF> is 10. The line feed character is output after carriage return character if verbose result codes are used (ATV1 option used) otherwise, if numeric format result codes are used (ATV0 option used) it will not appear in the result codes.
<CR><LF> Carriage return Line feed	Each command is terminated by <CR><LF>.
< > Angle brackets	Name enclosed in angle brackets are optional parameters. Angle brackets themselves do not appear in the command line.
= Equal sign	Separates the variable from explanatory text and is entered as part of the command. PROCESSID = <CID>
. Dot (period)	Allows the repetition of the element that immediately follows it multiple times. Do not enter as part of the command. . AA:NN can be expanded to 1:01 1:02 1:03.
A.B.C.D IP address	IPv4-style address. 10.0.11.123
LINE End-to-line input token	Indicates user input of any string, including spaces. No other parameters may be entered after input for this token. string of words
WORD Single token	Indicates user input of any contiguous string (excluding spaces). singlewordnospaces

Table 1: Document Text Convention

2.3. AT Command Syntax

Following table describes the syntax rules followed by Telit implementation used in this manual for software procedures that are explained using the AT command line interface.

Convention Type	Description
command syntax monospaced font	This monospaced font represents command strings entered on a command line and sample source code. AT XXXX
Proportional description font	Gives specific details about a parameter. <Data> DATA.
UPPERCASE Variable parameter	Indicates user input. Enter a value according to the descriptions that follow. Each uppercased token expands into one or more other token.
lowercase Line Feed	Indicates keywords. Enter values exactly as shown in the command description.
M/O	Gives the condition of the parameter as mandatory or optional.

Table 2: AT Command Syntax

2.4. Command Lines

A command line is made up of three elements: the prefix, the body and the termination character. The command line prefix consists of the characters “AT” or “at”, followed by “+” or “#” or without “+/#”. Most commands are prefixed with “AT+”.

To repeat the execution of the previous command line, the characters “A” or “a” or AT#/ or at#/ is used. The termination character may be selected by a user option, the default being <CR>.

The basic structures of the command line are:

- AT+CMD<CR> where AT+ is the command line prefix, YLC is the body of a basic command.
<CR> is the command line terminator character AT+YLC=0<CR> where 0 is a sub parameter
- AT+CMD? <CR> This is a Read command for checking current sub parameter values.



The set of proprietary AT commands differentiates from the standard one because

the name of each of them begins with either “@”, “#”, “\$” or “*”.

Proprietary AT

commands follow the same syntax rules as extended commands.

Following are the AT commands that do not have prefixes in Responses:

AT+CGMI, AT#SWPKGV, AT+CGMR, AT+CGMM, ATIn and ATl.

Following are the AT commands that do not have prefixes “AT+” in Command:

ATCn, ATEn, ATVn, AT&Wn, AT&Yn, ATZn, AT&F, AT&Kn, AT#SWPKGV, ATIn and ATl.

2.5. Information Response and Result Codes

Following is an example of a command executed with response in verbose and non-verbose mode:

SI No	Verbose mode	Non-verbose mode
1	AT+WNCN=1,"Telit_Guest","Welcome",6<CR>	AT+WNCN=1,"Telit_Guest","Welcome",6<CR>
2	<CR><LF>+WNCN:CONNECTED,192.168.3.45,255.255.255.0,192.168.3.1<CR><LF>	+WNCN:CONNECTED,192.168.3.45,255.255.255.0,192.168.3.1<CR><LF>
3	<CR><LF>OK<CR><LF>	0<CR>

4	<CR><LF>+WNCN:CONNECTED,192.168.3.46,255.255.255.0,192.168.3.1<CR><LF>	+WNCN:CONNECTED,192.168.3.46,255.255.255.0,192.168.3.1<CR><LF>

Table 3: Example Response

Synchronous Response:

Synchronous messaging is a two-way communication i.e. the information sent as a response of the command after the complete execution from the host. It is followed by the status of the command after execution.

In the above example, the node sends connection request to AP, AP sends response, node gets connected by acquiring IP address, net mask and Gateway.

Asynchronous Response:

Asynchronous Response is a one-way communication i.e. the information is sent as an indication of an event that occurred. This event may be due to the command issued previously.

For example, in disassociation event, when the AP gets reset a message is seen on the module.

In few cases, there will be multiple responses. Following are the responses to the command scan:

AT+WS=1<CR>

<CR><LF>+WS:C0:C1:C0:A6:7F:3A,"ssid153126173420",1,INFRA,-80,NONE<CR><LF>

<CR><LF>+WS:2C:30:33:DC:83:FE,"dd-wrt",1,INFRA,-82,NONE<CR><LF>

<CR><LF>+WS:C8:B3:73:4A:33:48,"wifiVirus",1,INFRA,-90,WPA2 PSK<CR><LF>

<CR><LF>+WS:98:FC:11:F8:C7:15,"FWUP",3,INFRA,-94,WPA2 PSK<CR><LF>

<CR><LF>+WS:68:7F:74:52:6F:D4,"homekit",6,INFRA,-90,NONE<CR><LF>

<CR><LF>+WS:00:03:7F:50:00:01,"QSoftAP",6,INFRA,-93,WPA2 PSK<CR><LF>

<CR><LF>+WS:00:8E:F2:56:24:04,"GainSpan4",6,INFRA,-79,WPA2 PSK<CR><LF>

<CR><LF>OK<CR><LF>

The result or status codes for all possible responses are as follows:

Verbose mode	Non-verbose mode	Description
OK	0	Parsing and processing of command done successfully.
ERROR	1	Parsing done but processing failed.
INVALID PARAM	2	Parsing of parameter failed, because one of the parameters entered is wrong-it may be because of data type mismatch.
INVALID COMMAND	3	Parsing of command failed as the command entered is not a valid command.
PARAMETEROUTOF RANGE	4	Parsing of parameter failed as the parameter value entered is not within the range.
NO MEMORY	5	Parsing or processing of command failed, since the memory allocation failed.
EXCESS DATA RECIEVED	6	Parsing of parameter of type data failed, because the data entered is excess compared to the length mentioned in the command.

Table 4: Status Responses

Verbose Mode:

Verbose Mode displays the status of a command executed, is enabled by default. It is in the ASCII (human readable) format.

Example:

```
ATV1
OK
```

Non-Verbose Mode:

Non-Verbose Mode displays the output in numerical digits, each digit indicates specific status.

Example:

```
ATV0
0
```

2.6. Parameter Types

Following are different types of parameter:

Integer: The value must be entered in decimal format and that is stored in 4bytes value. The range specified is the range of its value.

HEX: Hexadecimal value up to 4 bytes e.g. FF FF FF FF is the range specified is the range of its value.

Long integer: A decimal value that cannot be stored in 4bytes value and can be stored in 8bytes value. The range specified is the range of its value.

String: It must be entered in double quote. All the special character can be used within the string. To have double quote, escape character ('\') must be appended, e.g. "Te\lit". The range specified is the length of the string.

IP Address: It can be IPv4 address or IPv6 address notation.

IPv4 Address: It must be IPv4 notation.

IPv6 Address: It must be IPv6 notation.

MAC Address: It must be in the format (EUI48) i.e. XX:XX:XX:XX:XX:XX.

Fixed String: It is a predefined string and doesn't come in double quote.

Hex Stream: It is a stream of hex bytes. The range specifies the length of the byte stream, e.g. 1234aabbcc is 5 bytes long.

Binary Data: Binary data is not processed by parser and it is given as is to command processor. It is always preceded by integer parameter that gives the length of the binary data. The binary data is not echoed by the parser.

As the parameter Data and Data length are mutually inclusive, if either of this parameter is present (optional or mandatory) then the other parameter must also be present in the command.

Example:

```
AT+NHTTPDSENDATA=0,0[,0,]
```


3. ARCHITECTURE

This chapter provides a brief overview of the system and the architecture of Serial-to-Wireless application.

3.1. System Overview

The Serial to Wireless stack is used to provide wireless capability to any device having a serial interface. This approach offloads WLAN, TCP/IP stack and network management overhead to the wireless chip, allowing a small embedded host (for example an MCU) to communicate with other hosts on the network using a wireless link. The host processor can use serial commands to configure the serial to wireless application and create wireless or network connections.

The user will receive a pre-loaded firmware to Run the application. To customize the application user is required to perform the following steps.

3.2. Working Principle

The architecture of the Serial to Wireless interface communicates to and from TCP/IP network commands. These are network management commands of serial to wireless interface. The network connections intercepts using Command Processor. Following diagram represents the sequence of communication between the interfaces:

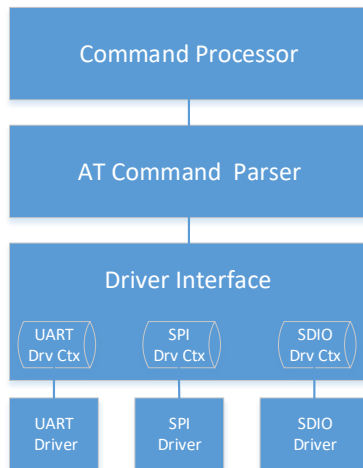


Figure 1: Communication between the Interfaces

Serial to Wireless application takes command input from three different IOs. The software configurations can be UART and either SPI or SDIO combinations. The driver interface gives a transparent interface to the AT command parser. AT command parser does the parsing and calls the command processor API to process the command.

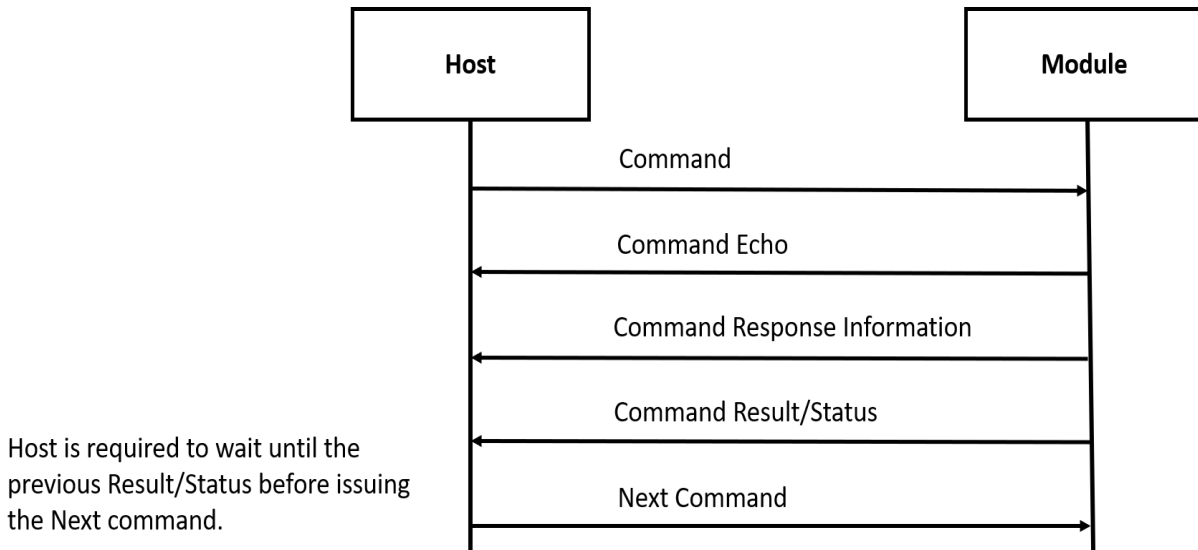


Figure 2: Command processing in Serial to Wireless Application

Following is an example of command processing in serial to wireless application:

SI No	Verbose mode	Non-verbose mode	Description
1	AT+WNCN=1,"Telit_Guest","Welcome",6<CR>	AT+WNCN=1,"Telit_Guest","Welcome",6<CR>	Command
2	<CR><LF>+WNCN:CONNECTED,192.168.3.45,255.255.255.0,192.168.3.1<CR><LF>	+WNCN:CONNECTED,192.168.3.45,255.255.255.0,192.168.3.1<CR><LF>	Command Response
3	<CR><LF>OK<CR><LF>	0<CR>	Command Status

3.3. System Initialization

Upon startup the serial to wireless interface performs the following actions:

- During the initialization process, the module software tries to fetch the configuration file (also called as profile) from the file system. If the profile is not found, it sets the factory default values to profile and creates the file in the file system.
For a default profile, the interface starts in Legacy command mode. User is required to check the mode of the command processing and start the specific operation.
- In the profile, configuration related to wireless network- UDP/TCP/DNS/MDNS are kept. If the auto connection mode is set, then the module will attempt to join the wireless network and tries to open connection based on the UDP/TCP configuration.
- Serial to wireless application is initialized based on the profile settings.

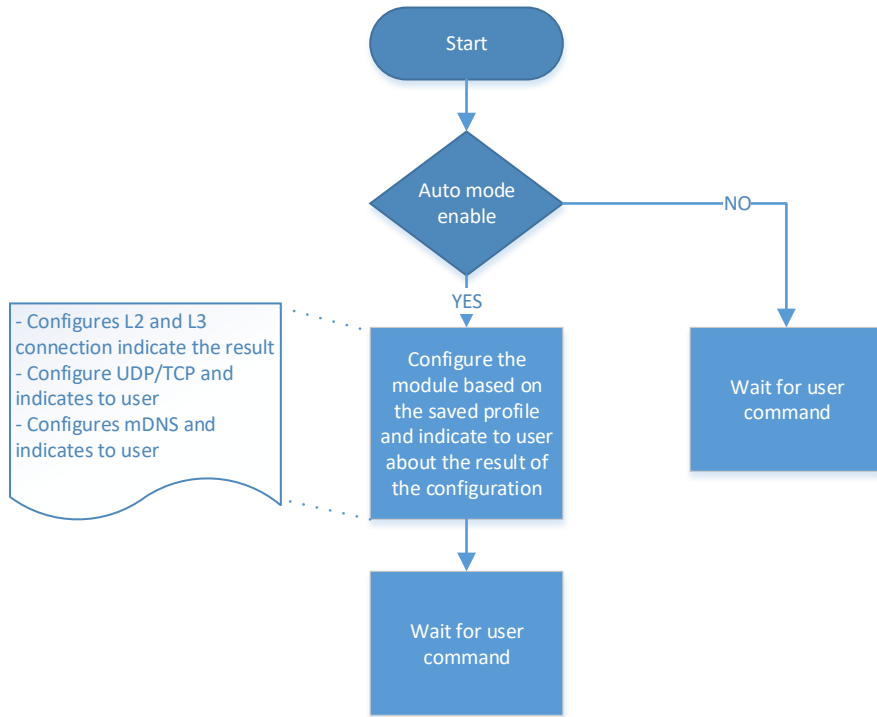


Figure 3: Operating Modes of Serial to Wireless Application

4. HOST INTERACTION

4.1. Interface

An embedded host uses one of the serial IO interfaces to connect to the module.

By default, UART0 interface is enabled. When the module boots up, it initializes the UART0 interface to receive command. Host can enable the second interface by issuing AT command (e.g. AT+YSIF = 1). The second interface supported can be either SPI or SDIO. Both SPI and SDIO supports Slave mode.

By default, the second interface is disabled. User can enable and save it in profile for the next boot where the module automatically starts the second interface. Upon factory reset, the second interface is disabled.

The default UART0 configuration is as shown below:

Baud rate:	115200
Data:	8 bit
Parity:	none
Stop:	1 bit
Flow control:	none

4.1.1. UART

4.1.1.1. Baud Rate - B

Description

This command is used to configure UART and set the UART parameters.

Pre-requisites

None.

Syntax

ATB=<Port>,<Baud rate>,[<Bits per character>,<Parity mode>,<Stop bits>]

Parameters Description

Parameter	Value	Format	Description
Port	Range: 0,1	Integer	It specifies port of the UART to be configured, where:

			0 - High Speed UART, 1 - Debug UART.
Baud rate	Range: 300,600,1200,2400,4800,9600,14400,19200,38400,57600,115200,230400,460800,921600	Integer	It specifies rate at which the data transmits over a channel, port 0 supports only 115200 baud rate and port 1 supports the baud rate 300 to 115200.
Bits per character	Range: 5-8 Default: 8	Integer	It specifies the bits per character.
Parity mode	Range: 0-3 Default: 0	Integer	It specifies the parity mode being used, where:- 0 is No Parity, 1 is odd Parity, 2 is Even Parity, 3 is Space Parity.
Stop bits	Range: 0-3 Default: 1	Integer	It specifies the

			number of stop bits.
--	--	--	----------------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

ATB=0,115200,5,0,1

OK

4.1.1.2. Hardware Flow Control - &Kn

Description

This command is used to enable or disable the hardware flow control for UART interface.

Pre-requisites

None.

Syntax

AT&Kn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0,3	Integer	It specifies state of the hardware flow control for UART interface, where: 3-Enables hardware flow control, 0-Disables hardware flow control.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT&K0

OK

Following command is used to get the status of the hardware flow control in UART interface:

Syntax

AT&K?

Response

&K:<mode>

Response Parameters Description

Parameter	Range	Type	Description
mode	0,3	Integer	It returns 0 or 3, if the HW flow control is disabled or enabled respectively.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT&K?
&K:0
OK
```

4.1.2. SPI/SDIO

WL865E4-P I/O interfaces supports two I/O interfaces:

1. UART: - First interface which is a default interface.
2. SPI/SDIO: - Second interface can be either SPI or SDIO.

User can use either SPI or SDIO interface along with UART interface.

SPI/SDIO Interface:

When WL865E4-P (Slave) device boots up, it starts with UART interface, by using UART interface user can issue AT+YSIF=1(SPI)/2(SDIO) command to select required second interface.

Following are the SDIO pin connections of WL865E4-P(Host) to WL865E4-P (Slave):

MASTER BOARD		
GROUP	PIN	SIGNAL
PL 604	2	SDIO_CLK
PL 604	3	SDIO_CMD
PL 604	4	SDIO_D0
PL 604	5	SDIO_D1
PL 604	6	SDIO_D2
PL 604	7	SDIO_D3
PL 604	8	GND

SLAVE BOARD		
GROUP	PIN	SIGNAL
PL 604	2	SDIO_CLK
PL 604	3	SDIO_CMD
PL 604	4	SDIO_D0
PL 604	5	SDIO_D1
PL 604	6	SDIO_D2
PL 604	7	SDIO_D3

PL 604	8	GND
---------------	---	-----

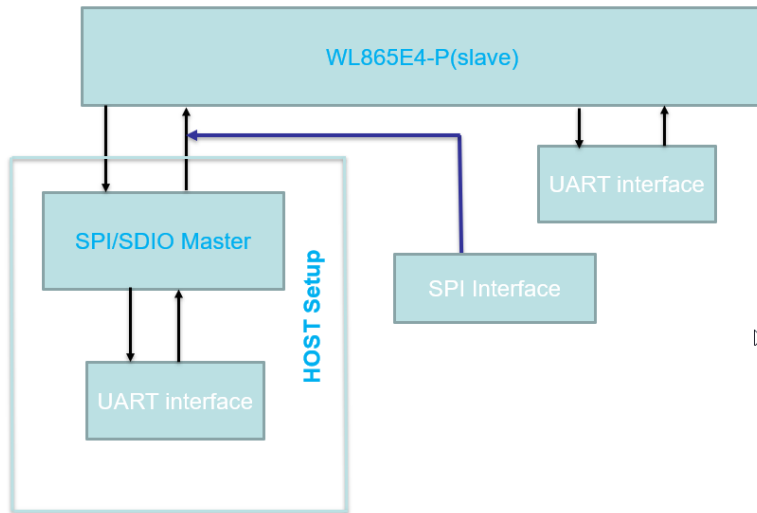
Following are the SPI pin connections of WL865E4-P (Host) to WL865E4-P (Slave):

MASTER BOARD		
GROUP	PIN	SIGNAL
PL 605	3 (Out)	SPI_M_MOSI
PL 605	5 (In)	SPI_M_MISO
PL 605	7 (Out)	SPI_M_CLK
PL 605	9 (Out)	SPI_M_CS
PL 605	11	GND
PL604	5 (In)	SDIO_D1

SLAVE BOARD		
GROUP	PIN	SIGNAL
PL 604	7 (In)	SDIO_D3 (MOSI)
PL 604	4 (Out)	SDIO_D0 (MISO)
PL 604	2 (In)	SDIO_CLK (CLOCK)
PL 604	3 (In)	SDIO_CMD (CS)
PL 604	8	GND
PL 604	5 (Out)	SDIO_D1 (Slave interrupt)

Now the Host (also called as master or bridge which can be any device, including WL865E4-P module) connects to WL865E4-P(slave) with SPI/SDIO interface.

Following figure shows WL865E4-P UART and SPI/SDIO dual interface. Here the SPI/SDIO master device sends command received from UART interface to SPI/SDIO interface.



Following are the steps to demonstrate SPI/SDIO interface:

1. Flash both master and slave devices with their binaries.
2. Connect master and slave according to the given pin configuration.
3. Run both the devices together.
4. First issue AT+YSIF=1 (SPI)/2 (SDIO) command on the slave end by using slave's UART interfaces.
5. Issue AT+YIDEMO command at the master end to initialize and send the commands.

4.1.2.1. SPI/SDIO Interface - +YSIF

Description

This command sets the second interface. First interface is the UART IO and second interface is either SPI or SDIO. It also saves the information in the profile and enables automatically when it boots.

Pre-requisites

None.

Syntax

AT+YSIF=<Input/output type>

Parameters Description

Parameter	Value	Format	Description
Input/output type	Range: 0-2	Integer	It specifies serial IO to use, where: 0-Disables, 1-SPI, 2-SDIO.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YSIF = 1
OK
```

4.1.2.2. SPI/SDIO Interface Demonstration - +YIDEMO

Description

This command demonstrates SPI or SDIO host interface.

To demonstrate the SPI or SDIO interface, connect two WL865E4-P modules through the jumper wires. One of the module acts as bridge and sends the command received from UART port to the SPI or SDIO port. The bridge simulates the host connected to the WL865E4-P module through SPI or SDIO interface. This command is read by the Bridge module and sends appropriate command to the WL865E4-P module via SPI or SDIO.

Following are the command usage in all possible cases:-

1.INITialization:

AT+YIDEMO=1, interface type (1 for SPI, 2 for SDIO),clock frequency(KHZ)

2.SHOW Received message

AT+YIDEMO=2, display mode (1 for text format, 2 for HEX format)

3.SENDs command to host with '\r\n' appending.

AT+YIDEMO=3, Parameter

4.SENDs command to host without appending .

AT+YIDEMO=4, Parameter

6.SENDs command to host with '\r' appending.

AT+YIDEMO=6, Parameter

5.starts transmit throughput test

AT+YIDEMO=5, packet size, packet count

7.initiates receive throughput test.

AT+YIDEMO=7, packet size, packet count

8.Stops throughput test in case of receive throughput.

AT+YIDEMO=8

9.Display statistics.

AT+YIDEMO=9

Pre-requisites

Before executing initialization command at the host end, the user must issue AT+YSIF=1 (SPI)/2 (SDIO) command at slave end

For SDIO Host:

1). Set the teraterm terminal settings to:-

New-Line/Transmit as CR+LF and

New-Line/Receive as AUTO

2). Issue ATE1 command at Host end.

Syntax

AT+YIDEMO=<Configuration ID>,[<Parameter 2>,<Parameter 3>]

Parameters Description

Parameter	Value	Format	Description
Configuration ID	Range: 1-9	Integer	<p>It specifies the value of the ID for configuration, where:</p> <ul style="list-style-type: none"> 1-Initializing interface (either SPI or SDIO depends on the second parameter). 2-Display of the received message (display mode depends on the second parameter). 3-Sends second parameter to the slave with '\r\n' appending. 4-Sends second parameter to the slave without appending any data. 5-Starts transmitting throughput test. 6-Sends second parameter to the slave with '\r' appending. 7-Initiates receive throughput test. 8-Stops throughput test in receive throughput(this configuration ID does not require param2 and param3 parameters). 9-Display statistics(this configuration ID does not require param2 and param3 parameters).
Parameter 2	Range: NA Default: NA	RAW Data	<p>It specifies the function of the parameter based on configuration ID. The format of the command with Parameter2 is:</p> <p>AT+YIDEMO=<Configuration ID>, <Parameter 2>, <Parameter 3></p> <p>Configuration IDParameter 2 -----</p> <ul style="list-style-type: none"> 11 for SPI, 2 for SDIO 21 for text format, 2 for HEX format 3,4,6Slave command 5Transmits packet size 7Receives packet size 8,9Not applicable
Parameter 3	Range: NA Default: NA	RAW Data	<p>It specifies the function of the parameter based on configuration ID. The format of the command with</p>

			<p>Parameter2 and Parameter 3 is: AT+YIDEMO=<Command ID>, <Parameter 2>, <Parameter 3></p> <p>Configuration ID Parameter 2 Parameter 3</p> <p>-----</p> <p>-----</p> <p>11 for SPI, 2 for SDIO Frequency in KHZ(3000,4000,6000,8000,12000,16000,24000) 21 for text format, 2 for HEX format Not applicable 3,4,6 Slave command Not applicable 5 Transmits packet size Number of packets 7 Receives packet size Number of packets 8,9 Not applicable Not applicable</p>
--	--	--	--

Note:

Based on the Configuration ID the response of the command is:

Configuration ID	Response

1	'OK' or error messages prints
2	Received data prints on the console
3,4,6	On success 'OK' prints, on error 'ERROR' is printed
7	After successful throughput test it prints statistics
8	On success 'OK' prints, on error 'ERROR' prints
9	Prints statistics

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+YIDEMO=1,1,24000

OK

AT+YIDEMO=6,at+wni=0

OK

AT+YIDEMO=6,at+wncn=1,"SSID"

OK

AT+YIDEMO=2,1

OK

AT+YIDEMO=6,at+wpowersave=1,0

OK

AT+YIDEMO=6,at+yps=0

OK

AT+YIDEMO=6,AT+SC=2,2,0

OK

AT+YIDEMO=6,at+sb=0,192.168.111.1,8377

OK

AT+YIDEMO=6,at+srr=0,1

OK

AT+YIDEMO=2,1

OK

AT+YIDEMO=7,1452,10000

OK

5. GENERAL OPERATIONS

5.1. System Settings

For basic module setting and to get system information, the following AT commands are used:

- ATEn - To enable/disable echo mode
- ATVn – To enable/disable verbose mode
- AT+YSR – To perform a software reset on the board
- AT+YHD – To get heap information
- AT+YTIME – To set and get time
- AT+YLC – To switch between new command and legacy command

To store information in the internal Flash of the module, file system commands are used. User can open/create, read/write and close the file after the completion of specific operation and then delete the file if not required or not in use.

For a file to be saved in secure mode, a password can be provided during file open procedure. If a secured file is opened with a wrong password or without a password, then file read operation will give junk data. User must track and maintain the password of the files saved in secured mode.

User can list the files present in the internal flash and get information on the size of each file.

5.1.1. Switch Between Legacy and AT Command - +YLC

Description

This command resets the module and switches between the Legacy and New AT commands.

Pre-requisites

None.

Syntax

AT+YLC=<Mode>

Parameters Description

Parameter	Value	Format	Description
Mode	Range: 0-1	Integer	It specifies the mode in which the current AT commands are executed, where: 0-Enables New AT command, 1-Enables Legacy command. By default, the command mode is set to legacy command mode. Once this command is issued, the system resets and starts with the set command mode.

Response

+YLC:<mode>

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+YLC = 1

Serial2Wireless APP

Following command is used to get the status of the mode in which the module is currently operating:

Syntax

AT+YLC?

Response

+YLC:<mode>

Response Parameters Description

Parameter	Range	Type	Description
mode	0,1	Integer	It specifies the current command mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YLC?
+YLC=0
OK
```

5.1.2. Echo Mode - En

Description

This command enables or disables Echo mode. In UART interface, echo mode is enabled by default and in SPI and SDIO interface, echo mode is disabled.

Pre-requisites

None.

Syntax

ATEn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the state of echo mode, where: 1-Enables Echo mode, 0-Disables Echo mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATE0
OK
```

5.1.3. Backspace Handling - BKPN

Description

This command enables or disables Backspace handling. Backspace handling is enabled by default, but to optimize throughput this can be disabled.

Pre-requisites

None.

Syntax

ATBKPN

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the state of backspace handling logic, where: 1-Enables backspace handling, 0-Disables backspace handling.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATBKPN
OK
```

5.1.4. Verbose Mode - Vn

Description

This command enables or disables Verbose mode.

Pre-requisites

None.

Syntax

ATVn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the state of Verbose mode, where: 1-Enables Verbose mode 0-Disables Verbose mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATV1
OK
```

5.1.5. Boot Reason - +YBR

Description

This command identifies the reason for system reset.

Pre-requisites

None.

Syntax

AT+YBR

Response

+YBR: <Boot Reason>

Response Parameters Description

Parameter	Range	Type	Description
Boot Reason	N/A	Hardware Reset, Watchdog Reset, Software Reset, Exception Hard Fault, Exception Memory Management Fault, Exception Usage Fault, Exception Bus Fault	It specifies the boot reason.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YBR
+YBR:Hardware Reset
OK
```

5.1.6. Exception Boot Reason - +YBER

Description

This command identifies the reason for system reset and prints the register details, when exception occurs.

Pre-requisites

None.

Syntax

AT+YBER

Response

+YBER:<Boot Reason>, <R1>, <R2>, <R3>, <R4>, <R5>, <R6>, <R7>, <R8>, <R9>, <R10>, <R11>, <R12>, <R13>, <R14>, <R15>, <R16>

Response Parameters Description

Parameter	Range	Type	Description
Boot Reason	N/A	Hardware Reset, Watchdog Reset,	It specifies the boot

		Software Reset, Exception Hard Fault, Exception Memory Management Fault, Exception Usage Fault, Exception Bus Fault	reason.
R1	N/A	Hexadecimal	It specifies the value of register R1.
R2	N/A	Hexadecimal	It specifies the value of register R2.
R3	N/A	Hexadecimal	It specifies the value of register R3.
R4	N/A	Hexadecimal	It specifies the value of register R4.
R5	N/A	Hexadecimal	It specifies the value of register R5.
R6	N/A	Hexadecimal	It specifies the value of register R6.
R7	N/A	Hexadecimal	It specifies the value of register R7.
R8	N/A	Hexadecimal	It specifies the value of register R8.
R9	N/A	Hexadecimal	It specifies the value of register R9.
R10	N/A	Hexadecimal	It specifies the value of register R10.
R11	N/A	Hexadecimal	It specifies the value of register R11.
R12	N/A	Hexadecimal	It specifies the value of register R12.
R13	N/A	Hexadecimal	It specifies the value of register R13.
R14	N/A	Hexadecimal	It specifies the value of register R14.
R15	N/A	Hexadecimal	It specifies the value of register R15.
R16	N/A	Hexadecimal	It specifies the value of register R16.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YBER
+YBER:EXCEPTION USAGE
FAULT,0,10088B40,100877D0,1,0,10088A88,0,0,0,0,100882D0,0,100035B8,100AFFA0,1000619F,0
OK
```

5.1.7. Auto Mode - Cn

Description

This command enables or disables auto mode, it does not erase the profile. So even if auto mode is disabled all saved parameters in profile will not be erased.

In auto mode, the profile can be set using AT&Yn.

Pre-requisites

None.

Syntax

ATCn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the status of Auto mode, where: 1-Enables Auto mode, 0-Disables Auto mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATC0
OK
ATC1
OK
```

Following command is used to get the status of auto mode:

Syntax

ATC?

Response

C:Status

Response Parameters Description

Parameter	Range	Type	Description
Status	N/A	DISABLE, ENABLE	It specifies the auto mode status.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATC?
C:DISABLE
OK
```

5.1.8. Data Mode - An

Description

This command is used to enable data mode.

Pre-requisites

None.

Syntax

```
ATAn
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-11	Integer	It specifies the CID in the data mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
ATA0
OK
```

5.1.9. Debug Log Level - +YLOGSL

Description

This command sets the severity of the debug logs, the module firmware sends debug log over debug UART port.

Pre-requisites

Debug module should be initialized in the application.

Syntax

```
AT+YLOGSL=<Severity level>
```

Parameters Description

Parameter	Value	Format	Description
Severity level	Range: 0-8	Integer	It specifies the level of severity to be set for the debug log, where: 0 - Off logging, 1 - Severity Emergency, 2 - Severity Alert, 3 - Severity Critical,

			4 - Severity Error, 5 - Severity WARN, 6 - Severity NOTICE, 7 - Severity INFO, 8 - Severity DEBUG.
--	--	--	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YLOGSL=5
OK
```

5.1.10. File System

5.1.10.1. File Open - +YFOP

Description

This command opens a specified file with the given option.

Pre-requisites

None.

Syntax

AT+YFOP=<Name>,<Option>,[<Password>]

Parameters Description

Parameter	Value	Format	Description
Name	Range: 1-64	String	It specifies the file name along with the path. Ex: /sys/abc.txt
Option	Range: 0x0-0x2, 0x41, 0x42, 0xC1, 0xC2, 0x241, 0x242, 0x441, 0x442, 0x4C1, 0x4C2	Hexadecimal	It specifies the options for Open flag, following are the options: 0x0 to Open in read only mode. 0x1 to Open in write only mode. 0x2 to Open in read and write mode. In addition to the above flags, any of the following flags can be bitwise "OR"ed: 0x400 APPEND: - Data written will be appended to the end of the file. The file operations will always adjust the position pointer to the end of the file. 0x40 CREAT: - Create the file if it does not exist. 0x80 EXCL: - Used with CREAT. If the file already exists, then fail, and return error. 0x200 TRUNC: - If the file already exists then discard its previous contents, reducing it to an empty file.

Password	Range: 16 Default:	String	It specifies the password for a secured file, supported each time to open a file. If the password is not necessary to open a file, then it is a unsecure file.
----------	-----------------------	--------	--

Response

+FOP:<File Descriptor>

Response Parameters Description

Parameter	Range	Type	Description
File Descriptor	0X0-0XFFFFFFFF	Hexadecimal	It specifies the file descriptor in use for other file operations.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFOP="/abc.txt",42,"TelitIndiaPvtLtd"
+YFOP:1006E6A0
OK
```

5.1.10.2. File Close - +YFCL

Description

This command closes a specified file.

Pre-requisites

A file must be open before issuing this command.

Syntax

AT+YFCL=<File Descriptor>

Parameters Description

Parameter	Value	Format	Description
File Descriptor	Range: 0X0-0XFFFFFFFF	Hexadecimal	It specifies the return value while opening the file.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFCL=0
OK
```

5.1.10.3. File Read - +YFRD

Description

This command reads the specified number of bytes of a file from a given offset and the start of the file.

Pre-requisites

A file must be open before issuing this command.

Syntax

AT+YFRD=<File Descriptor>,[<Offset>],<Length>

Parameters Description

Parameter	Value	Format	Description
File Descriptor	Range: 0X0-0XFFFFFFF	Hexadecimal	It specifies the return value while opening a file.
Offset	Range: -1-16384 Default: -1	Integer	It specifies the offset of the file to start. If the change in offset value is not required then the offset value is -1, else it is 0-4096 for any valid offset value. If the offset value is not given then by default -1 in taken as the offset.
Length	Range: 1-16384	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.

Response

+YFRD:<File Descriptor>,<Requested Length>,<Available Length>,<Data>

Response Parameters Description

Parameter	Range	Type	Description
File Descriptor	0X0-0XFFFFFFF	Hexadecimal	It specifies the File Descriptor.
Requested length	1-4294967295	Integer	It specifies the length requested by user
Available length	1-4294967295	Integer	It specifies the length of data following
Data	1-4294967295	Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Example 1:

AT+YFRD=0,0,5

```
+YFRD=0,5,5,abcde
OK
```

Example2:

If the file size is 4224 and the user request a read command for 4500 bytes, then

```
AT+YFRD=0,4500
+YFRD:0,4500,1024,<data of 1024 bytes>
+YFRD:0,4500,1024,<data of 1024 bytes>
+YFRD:0,4500,1024,<data of 1024 bytes>
+YFRD:0,4500,1024,<data of 1024 bytes>
+YFRD:0,4500,128,<data of 128 bytes>
OK
```

5.1.10.4. File Write - +YFWR

Description

This command writes in a specified file from a given offset.

Pre-requisites

A file is required to be open before issuing this command.

Syntax

AT+YFWR=<File Descriptor>,[<Offset>],<Data length>,<Data>

Parameters Description

Parameter	Value	Format	Description
File Descriptor	Range: 0X0-0XFFFFFFF	Hexadecimal	It specifies the return value while opening a file.
Offset	Range: -1-16384 Default: -1	Integer	It specifies the offset of the file to start. If the change in offset value is not required then the offset value is -1, else it is 0-4096 for any valid offset value. If the offset value is not given then by default -1 in taken as the offset.
Data length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295	Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFWR=0,5,5,fg hij
```

OK

5.1.10.5. File Length - +YFLN

Description

This command is used to get the actual file length and the space occupied in FLASH. If the file is secure, then it adds more bytes to the actual data written by the user.

Pre-requisites

The file should to be present in file system.

Syntax

AT+YFLN=<Name>

Parameters Description

Parameter	Value	Format	Description
Name	Range: 0-64	String	It specifies the file name along with the path.

Response

+YFLN:<Actual file size>,<Total file size>

Response Parameters Description

Parameter	Range	Type	Description
Actual file size	0-4096	Integer	It specifies the actual file size, if the file is secure then it adds more bytes to the actual data written by the user.
Total file size in FLASH	0-4096	Integer	It specifies the total file size occupied in the flash.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFLN="/abc.txt"
+YFLN:55,1024
OK
```

5.1.10.6. File List - +YFLS

Description

This command lists all the files in the specified path.

Pre-requisites

The path of the file should be present in the Flash.

Syntax

AT+YFLS=[<Path>]

Parameters Description

Parameter	Value	Format	Description
Path	Range: 0-64 Default:	String	It specifies the location of the file.

Response

+YFLS:<File Name>,<Actual file size>,<Total file size in the FLASH>

Response Parameters Description

Parameter	Range	Type	Description
File name	0-64	String	It specifies the file name with the path.
Actual file size	0-4096	Integer	It specifies the actual size of the file in bytes. If the file is secure, then it adds more bytes to the actual data written by the user.
Total file size in flash	0-4096	Integer	It specifies the space occupied by the file in flash in bytes.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFLS="/abc"
+YFLS:/abc/xyz.txt,55,1024
+YFLS:/abc/def.txt,110,1024
OK
```

5.1.10.7. File Delete - +YFRM

Description

This command deletes or removes a specified file from the file system.

Pre-requisites

A file should be present in the file system before issuing this command.

Syntax

AT+YFRM=<File name>

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

File name	Range: 1-64	String	It specifies the file to remove or delete.
-----------	-------------	--------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YFRM="/abc.txt"
OK
```

5.1.11. Flash Read - +YFR

Description

This command reads the content of the flash from the specified location.

Pre-requisites

None.

Syntax

```
AT+YFR=<Address>,<Size>
```

Parameters Description

Parameter	Value	Format	Description
Address	Range: 0-4194300	Integer	It specifies the location of the flash to read.
Size	Range: 1-4096	Integer	It specifies the size in bytes to read.

Response

```
+YFR:<Requested Length>,<Available Length>,<Data>
```

Response Parameters Description

Parameter	Range	Type	Description
Requested length		Integer	It specifies the length requested by user
Available length		Integer	It specifies the length of data following
Data		Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example


```
AT+YFR=0,10
+YFR:10,10,abcdef1234
OK
```

5.2. Profile Settings

Following are the set of AT commands for profile setting:

- Profile Read - Zn
- Profile Set - &Yn
- Profile Save - &Wn
- Save TCP Profile - +YPTCP
- Save UDP Profile - +YPUDP
- Profile Clear/Factory Reset - &F

The configuration parameter values that define the behaviour of the node are grouped into Profiles. These profiles are stored in non-volatile memory when not in use. The WL865E4-P node supports two Profiles by default (profile0 and profile1).

Profile includes configuration of layer2 (Wi-Fi), layer3 (DHCP), and Layer4 (TCP, UDP etc.). There are two set of profiles that can be stored in the Flash.

User connects to an access point or creates a network (Limited AP), upon L2 connection. Start the DHCP server and open TCP/UDP sockets for data transmission, all the configuration set up is stored in SRAM.

To save the configuration in flash user must issue AT&Wn (where, n can take 0/1 value based on profile0 and profile1). The profile parameters are saved in JSON format in the file system.

If user enables NCM auto mode, then the system automatically initializes itself with saved profile configuration. After successful connection (layer3/layer4), user can store L2, L3 and L4 (TCP/UDP) socket connection information in Profile.

Following commands are executed to save a specified CID for TCP/UDP configuration in the profile,

- AT+YPTCP
- AT+YPUDP

Following AT commands are executed for reading, setting default and saving the current profile:

- ATZn - To read parameters, from the specified profile. Upon execution of this command, module displays the profile (profile 0, or profile 1) parameters.
- AT&Yn - This command is used to select the default profile. The settings from the profile that are chosen as the default profile are loaded from non-volatile memory, when the device starts.
- AT&Wn - This command is used to save the current profile. Upon execution of this command, the current configuration settings are stored in non-volatile memory under the specified profile (profile 0, or profile 1).

5.2.1. Profile Read - Zn

Description

This command reads the profile from Flash.

Pre-requisites

None.

Syntax

ATZn

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

n	Range: 0-1	Integer	It specifies the Profile number to be read.
---	------------	---------	---

Response

+ZN:<Profile>

Response Parameters Description

Parameter	Range	Type	Description
Profile	0-65575	String	It specifies the profile details in JSON format.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

ATZ0

```
Zn:{"profile":{"s2w_cfg":{"app_type":0,"echo":1,"verbos":1,"auto_mode":0},"system":{"wlan_mode":0,"wlan_domain":0,"sta_cfg":{"wlan":{"enable":0,"ssid":"Telit","pwd":"12345678","auth":0,"enc":0,"channel":1},"ip":{"flag":2,"ipv4":"192.168.240.1","ip_subnet":"255.255.255.0","ip_gw":"192.168.240.1"},"scan_cfg":{"fast_scan_interval":20,"fast_scan_duration":10,"slow_scan_interval":5},"roaming_cfg":{"enable":0,"rssi_low_threshold":65446,"rssi_high_threshold":65516,"poll_time":30,"force_fg_scan":10,"home_dwell_time":10,"force_scan_interval":30,"scan_type":0,"num_of_channel":6,"channel_list":[1,3,6,9,11,0,0,0,0]},"ap_cfg":{"ap_wlan_cfg":{"mac":"5f:97:24:7e:21:02","ssid":"Telit_AP_24975f","pwd":"12345678","channel":6,"auth":4,"enc":3,"hidden_mode":0,"beacon_interval":100,"dtim":3,"wps_flag":0},"ip":{"flag":1,"ipv4":"192.168.3.2","ip_subnet":"255.255.255.0","ip_gw":"192.168.3.1"},"ap_dhcp_cfg":{"start_ip":"192.168.3.3","end_ip":"192.168.3.24","lease_time_ms":86400000},"dns_host_cfg":{"enable":1,"name":"Telit","ip":"192.168.3.1"},"mdns_cfg":{"enable":1,"mdns_host_cfg":{"host_name":"Telit","ttl":60},"mdns_service_cfg":{"enable":1,"service_name":"_QCA4020","service_type":"_MyDevice._tcp.local","service_subtype":"","protocol":"","domain":"Telit","txt_record":"Telit","port":60,"ttl":120}},"uart_cfg":{"enable":1,"port":1,"baud":115200,"parity":0,"stop_bits":1,"char_bits":3,"loopback":0,"flow_ctrl":0},"dbg_cfg":{"enable":1,"debug_config":{"enableCl":0,"buffer_size":1024,"log_level":1024},"sntp_cfg":{"sntp_enable_in":0,"sntp_server_id_in":0,"sntp_server_name_in":0,"sntp_svr_poll_interval_in":0},"ble_cfg":{"ble_connParam_in":{"connIntMax_in":40,"connIntMin_in":20,"slaveLatency_in":0},"ble_centralCfg_in":{"scanDuration_in":10000},"ble_securityCfg_in":{"iocap_in":0,"mitm_in":0},"fixPin_in":"","ble_disInfo_in":{"pnpidVendorId_in":143,"pnpidVendorIdSource_in":1,"pnpidProductId_in":45082,"pnpidProductVersion_in":1792},"ble_advParam_in":{"advIntMax_in":200,"advIntMin_in":100,"advData_in":"","scanRspData_in":"","ble_genParam_in":{"ble_role_in":2,"ble_pairMode_in":1,"ble_bondStore_in":1,"ble_bondSize_in":1,"ble_deviceName_in":"WL865E4","ble_manufacturer_Name_in":"Telit"}}}}
```

OK

5.2.2. Profile Set - &Yn

Description

This command sets a profile to the specified profile number which is used in auto configuration mode.

Pre-requisites

None.

Syntax

AT&Yn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the profile number to be set.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT&Y0

OK

5.2.3. Profile Save - &Wn

Description

This command saves the profile to Flash in JSON format.

Pre-requisites

None.

Syntax

AT&Wn

Parameters Description

Parameter	Value	Format	Description
n	Range: 0-1	Integer	It specifies the profile number to save.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT&W0

OK

5.2.4. Save TCP Profile - +YPTCP

Description

This command saves a specified CID for TCP configuration in the profile.

Pre-requisites

None.

Syntax

AT+YPTCP=<CID>,[<Add or Delete Profile>]

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

CID	Range: 0-15	Integer	It specifies the CID obtained from issuing AT+SC or AT+SA command.
Add or Delete Profile	Range: 0-1 Default: 0	Integer	It specifies the addition or deletion of configuration in Profile, where: 0 - Add, 1 - Delete.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+WNI=0
+WNI:1
OK
AT+WNCN=1,"dtim_5"
+WNCN:192.168.1.110,255.255.255.0,192.168.1.1
OK
    AT+SC=2,1,0
+SC:0
OK
AT+SCO=0,192.168.140.3,8355
OK
AT+YPTCP=0
OK
ATC1
OK
AT&w0
OK
AT+ysr
OK
Serial2Wireless APP
+YPSTA:SUCCESS,192.168.1.110,255.255.255.0,192.168.1.1
+YPTCP:SUCCESS,0,CLIENT,0,192.168.0.109,3456
    
```

5.2.5. Save UDP Profile - +YPUDP

Description

This command saves a specified CID for UDP configuration in the profile.

Pre-requisites

None.

Syntax

AT+YPUDP=<CID>,[<Add or Delete Profile>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from issuing AT+SC or AT+SA command.
Add or Delete Profile	Range: 0-1 Default: 0	Integer	It specifies the addition or deletion of configuration in Profile, where: 0 - Add, 1 - Delete.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+WNI=0
+WNI:1
OK
AT+WNCN=1,"dtim_5"
+WNCN:192.168.1.110,255.255.255.0,192.168.1.1
OK
AT+SC=2,2,0
+SC:0
OK
AT+SB=0,,8355
OK
AT+YPUDP=0
OK
ATC1
OK
AT&w0
OK
AT+ysr
OK
Serial2Wireless APP
+YPSTA:SUCCESS,192.168.1.110,255.255.255.0,192.168.1.1
+YPUDP:SUCCESS,0,SERVER,8355,,
    
```

5.2.6. Profile Clear/Factory Reset - &F

Description

This command resets the profile to factory setting.

Pre-requisites

None.

Syntax

AT&F

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT&F

OK

Serial2Wireless APP

5.3. Default Profile

Default Profile setting provides AT commands to set the default profile parameters. Following are the set of AT commands to set the default profile parameters:

- AP DHCP server configuration - +DPNADSC
- AP Static IP configuration - +DPNAIPC
- AP WLAN configuration - +DPNAWC
- Station Static IP configuration - +DPNSIPC
- Station Retry configuration - +DPSRC
- Station WLAN configuration - +DPNSWC
- Update TCP Profile - +DPTC
- Update UDP Profile - +DPUC

Using this command user can set the default parameters to the profile stored in SRAM, even without validating the profile parameters. To set the AP configuration in STA mode, user can directly set the parameters even without getting connected to it. Similarly, the other profile parameters can be configured without executing the process.

If user wants to save it to flash, to retain these values across boot, AT&Wn command must be issued.

Sequence of execution:

To put the module in auto mode user can follow the following sequence: -

1. Since all the configuration just saved into profile without applying, there is no sequence for all above commands.
2. Enable NCM auto mode by ATCn command.
3. Save profile into flash by AT&Wn command.
4. Reset the device.

5.3.1. AP DHCP server configuration - +DPNADSC

Description

This command sets the DHCP server configuration of AP mode in profile.

Pre-requisites

None.

Syntax

AT+DPNADSC=<IP Start Address>,<IP End Address>,<Lease Time>

Parameters Description

Parameter	Value	Format	Description
IP Start Address	Range: N/A	IP Address	It specifies the starting IP address allocated to the connected stations. This address must have the same network ID as that of the IP address configured in the At command AT+DPNAIPC.
IP End Address	Range: N/A	IP Address	It specifies the end IP address until which the connected STAs will get IP addresses. The end IP address must have the host ID greater than the host ID given in the start address.
Lease Time	Range: 1-4294967295	Integer	It specifies the lease time in seconds for the DHCP server.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change some default profile parameters.

AT+DPNAWC="prasad","password","NONE","NONE",1,0,100,3,0

OK

AT+DPNADSC=192.168.23.24,192.168.23.55,86400000

OK

AT+DPNAIPC=192.168.23.2,255.255.255.0,192.168.23.1

OK

ATC1

OK

AT&w0

OK

AT+ysr

OK

Serial2Wireless APP

+YPAP:SUCCESS,192.168.23.2,255.255.255.0,192.168.23.1

Following command is used to get the DHCP server configurations of an AP.

Syntax

AT+DPNADSC?

Response

+DPNADSC:<IP Start Address>,<IP End Address>,<Lease time>

Response Parameters Description

Parameter	Range	Type	Description
IP Start Address	N/A	IP Address	It specifies the current IP Start address for DHCP server in AP mode.
IP End Address	N/A	IP Address	It specifies the current IP End address for DHCP server in AP mode.
Lease time	1-4294967295	Integer	It specifies the current lease time for DHCP server in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+DPNADSC?
+DPNADSC:192.168.3.5,192.168.3.250,86400000
OK
```

5.3.2. AP Static IP configuration - +DPNAIPC

Description

This command sets the IP configurations for AP.

Pre-requisites

None.

Syntax

AT+DPNAIPC=<IP Address>,<IP Mask>,<IP Gateway>

Parameters Description

Parameter	Value	Format	Description
IP Address	Range: N/A	IP Address	It specifies the static IP address of the interface in AP mode.
IP Mask	Range: N/A	IPv4 Address	It specifies the static net mask of the interface in AP mode.
IP Gateway	Range: N/A	IP Address	It specifies the static gate way of the interface in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change same default profile parameters.

AT+DPNAWC="prasad","password","NONE","NONE",1,0,100,3,0

OK

AT+DPNADSC=192.168.23.24,192.168.23.55,86400000

OK

AT+DPNAIPC=192.168.23.2,255.255.255.0,192.168.23.1

OK

ATC1

OK

AT&w0

OK

AT+ysr

OK

Serial2Wireless APP

+YPAP:SUCCESS,192.168.23.2,255.255.255.0,192.168.23.1

Following command is used to get the AP IP configurations.

Syntax

AT+DPNAIPC?

Response

+DPNAIPC:<IP address>, <Subnet address>, <Gateway address>

Response Parameters Description

Parameter	Range	Type	Description
IP Address	N/A	IP Address	It specifies the current IP address.
Subnet address	N/A	IP Address	It specifies the current Subnet mask address.
Gateway address	N/A	IP Address	It specifies the current Gateway address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+DPNAIPC?

+DPNAIPC:192.168.3.45,255.255.255.0,192.168.3.1

OK

5.3.3. AP WLAN configuration - +DPNAWC

Description

This command sets the AP configurations in profile.

Pre-requisites

None.

Syntax

AT+DPNAWC=<SSID>,[<PWD>,<Auth>,<Enc>],<Channel>,[<Hidden SSID>,<Beacon Interval>,<DTIM Period>,<WPS>]

Parameters Description

Parameter	Value	Format	Description
SSID	Range: 1-32	String	It specifies the SSID of the AP.
PWD	Range: 8-64 Default:	String	It specifies password of the AP
Auth	Range: 4 Default:	String	It specifies the type of security and types are: "NONE", "WPA2".
Enc	Range: 1-4 Default:	String	It specifies the type of encryption and the types are: "NONE", "AES".
Channel	Range: 1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165	Integer	It specifies the channel number of the network.
Hidden SSID	Range: 0-1 Default: 0	Integer	It specifies the hidden SSID flag for a network. 0 - disables the hidden SSID 1 - enables the hidden SSID

Beacon Interval	Range: 100-1000 Default: 100	Integer	It specifies the interval between the beacon frames in TU (unit of time equal to 1024 microseconds). It is not supported
DTIM Period	Range: 1-255 Default: 1	Integer	It specifies the DTIM (Delivery Traffic Indication Map) count. It is not supported
WPS	Range: 0-1 Default: 0	Integer	It specifies the WPS support for a network, where: 0-Disables WPS, 1-Enables WPS. Note: WPS in AP mode is not supported.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change some default profile parameters.

AT+DPNAWC="prasad","password","NONE","NONE",1,0,100,3,0

OK

AT+DPNADSC=192.168.23.24,192.168.23.55,86400000

OK

AT+DPNAIPC=192.168.23.2,255.255.255.0,192.168.23.1

OK

ATC1

```

OK
AT&w0
OK
AT+ysr
OK
Serial2Wireless APP
+YAP:SUCCESS,192.168.23.2,255.255.255.0,192.168.23.1
    
```

Following command is used to get the AP configurations.

Syntax

```
AT+DPNAWC?
```

Response

```
+DPNAWC:<SSID>, <PWD>, <Auth>, <Enc>, <Channel><Hidden SSID>, <Beacon Interval>, <DTIM Period>, <WPS support>
```

Response Parameters Description

Parameter	Range	Type	Description
SSID	1-32	String	It specifies the SSID.
PWD	8-64	String	It specifies the password.
Auth	N/A	None, WPA2	It specifies set Authentication type.
Enc	N/A	None, AES	It specifies set Encryption type.
Channel	1-14	Integer	It specifies the operating channel in AP mode.
Hidden SSID	0-1	Integer	It specifies the status of hidden SSID feature in AP mode.
Beacon Interval	100-1000	Integer	It specifies the current beacon interval value in AP mode.
DTIM Period	1-255	Integer	It specifies the current DTIM count in AP mode.
WPS support	0-1	Integer	It specifies the current WPS support in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+DPNAWC?
```

```
+DPNAWC:"SSID","Password","NONE","NONE",1,0,100,3,0
OK
```

5.3.4. Station Static IP configuration - +DPNSIPC

Description

This command sets the station IP configuration

Pre-requisites

None.

Syntax

AT+DPNSIPC=<IP Flag>,[<IP Address>,<IP Mask>,<IP Gateway>,<DNS Primary Server>,<DNS Secondary Server>]

Parameters Description

Parameter	Value	Format	Description
IP Flag	Range: 1-2	Integer	It specifies the IP configuration, where: 1-Static mode that requires all the optional parameters, 2-Dynamic mode, where DHCP is enabled.
IP Address	Range: N/A Default: N/A	IP Address	It specifies the static IPV4 address of the interface in Station mode.
IP Mask	Range: N/A Default: N/A	IPv4 Address	It specifies the static net mask of the interface in Station mode.
IP Gateway	Range: N/A Default: N/A	IP Address	It specifies the static gate way of the interface in Station mode.
DNS Primary Server	Range: N/A Default: N/A	IP Address	It specifies the Primary DNS server address.
DNS Secondary Server	Range: N/A Default: N/A	IP Address	It specifies the Secondary DNS server address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change some default profile parameters.

AT+DPNSWC=0,"prasad",,"NONE","NONE",6

```

OK
AT+DPNSIPC=1,192.168.1.130,255.255.255.0,192.168.1.1,192.168.1.1,192.168.1.1
OK
AT+DPSRC=5,6000,20,6000,5,20
OK
ATC1
OK
AT&w0
OK
AT+ysr
OK
Serial2Wireless APP
+YPSTA:SUCCESS,192.168.1.130,255.255.255.0,192.168.1.1
    
```

Following command is used to get the STA IP configurations.

Syntax

```
AT+DPNSIPC?
```

Response

```
+DPNSIPC:<IP flag>,<IP address>, <Subnet address>, <Gateway address>, <DNS1>, <DNS2>
```

Response Parameters Description

Parameter	Range	Type	Description
IP flag	N/A	Integer	It specifies the IP flag.
IP Address	N/A	IP Address	It specifies the current IP address.
Subnet address	N/A	IP Address	It specifies the current Subnet mask address.
Gateway address	N/A	IP Address	It specifies the current Gateway address.
DNS1 address	N/A	IP Address	It specifies the Primary DNS server address
DNS2 address	N/A	IP Address	It specifies the Secondary DNS server address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+DPNSIPC?
+DPNSIPC:1,192.168.3.45,255.255.255.0,192.168.3.1,192.168.3.1,0.0.0.0
OK
    
```

5.3.5. Station Retry configuration - +DPSRC

Description

This command sets the configurations of retry counts and intervals for L2 , L3 and L4 connections.

Pre-requisites

None.

Syntax

AT+DPSRC=[<Scan retry count>,<Scan retry time delay>,<L3 retry count>,<L3 retry delay time>,<L4 retry count>,<L4 retry delay time>]

Parameters Description

Parameter	Value	Format	Description
Scan retry count	Range: 1-65535 Default: 3	Integer	It specifies the scan retry count before connection.
Scan retry time delay	Range: 5000-65535 Default: 5000	Integer	It specifies the time between scan retries in milliseconds.
L3 retry count	Range: 1-65535 Default: 10	Integer	It specifies the L3 retry count, when the device is in STA mode.
L3 retry delay time	Range: 5000-65535 Default: 5000	Integer	It specifies the time between L3 retries in milliseconds.
L4 retry count	Range: 1-65535 Default: 3	Integer	It specifies the L4 retry count when device is in STA mode.
L4 retry delay time	Range: 1-65535 Default: 1000	Integer	It specifies the time between L4 retries in milliseconds.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change some default profile parameters.

AT+DPNSWC=0,"prasad",,"NONE", "NONE",6

OK

```

AT+DPNSIPC=1,192.168.1.130,255.255.255.0,192.168.1.1,192.168.1.1,192.168.1.1
OK
AT+DPSRC=5,6000,20,6000,5,20
OK
ATC1
OK
AT&w0
OK
AT+ysr
OK
Serial2Wireless APP
+YPSTA:SUCCESS,192.168.1.130,255.255.255.0,192.168.1.1
    
```

Following command is used to get the Retry configurations in an STA mode.

Syntax

```
AT+DPSRC?
```

Response

```
+DPSRC:<Scan Retry Cnt>,<Scan Retry Delay>,<L3 Retry Cnt>,<L3 Retry Delay>,<L4 Retry Cnt>,<L4 Retry Delay>,
```

Response Parameters Description

Parameter	Range	Type	Description
Scan Retry Cnt	N/A	Integer	It specifies the scan retry count in STA mode set in Profile.
Scan Retry Delay	N/A	Integer	It specifies the scan retry delay in msec in STA mode set in Profile.
L3 Retry Cnt	N/A	Integer	It specifies the L3 retry count in STA mode set in Profile.
L3 Retry Delay	N/A	Integer	It specifies the L3 retry delay in msec in STA mode set in Profile.
L4 Retry Cnt	N/A	Integer	It specifies the L4 retry count in STA mode set in Profile.
L4 Retry Delay	N/A	Integer	It specifies the L4 retry delay in msec in STA mode set in Profile.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example


```
AT+DPSRC?
+DPSRC:5,6000,20,6000,5,20
OK
```

5.3.6. Station WLAN configuration - +DPNSWC

Description

This command sets the STA configurations in profile.

Pre-requisites

None.

Syntax

AT+DPNSWC=[<ID>],<SSID>,[<PWD>,<Auth>,<Enc>,<Channel>]

Parameters Description

Parameter	Value	Format	Description
ID	Range: 0 Default: 0	Integer	It specifies the ID at which the STA configuration is to be set, in current implementation ID supports only 0
SSID	Range: 1-32	String	It specifies the SSID of the AP to connect.
PWD	Range: 8-64 Default:	String	It specifies password of the AP
Auth	Range: 1-4 Default:	String	It specifies the type of security and types are: "NONE", "WPA", "WPA2".
Enc	Range: 1-4 Default:	String	It specifies the type of encryption and the types are: "NONE",

			"TKIP", "AES".
Channel	Range: 0,1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165 Default: 0	Integer	It specifies the channel number of the network.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change same default profile parameters.

AT+DPNSWC=0,"prasad",,"NONE","NONE",6

OK

AT+DPNSIPC=1,192.168.1.130,255.255.255.0,192.168.1.1,192.168.1.1,192.168.1.1

OK

AT+DPSRC=5,6000,20,6000,5,20

OK

ATC1

OK

AT&w0

OK

AT+ysr

OK

Serial2Wireless APP

+YPSTA:SUCCESS,192.168.1.130,255.255.255.0,192.168.1.1

Following command is used to get the STA configurations.

Syntax

AT+DPNSWC?

Response

+DPNSWC:<ID>, <SSID>, <PWD>, <Auth>, <Enc>, <channel>>

Response Parameters Description

Parameter	Range	Type	Description
ID	0	Integer	It specifies the ID of the configuratio

			n.
SSID	1-32	String	It specifies the SSID.
PWD	8-64	String	It specifies the password.
Auth	N/A	None , WPA, WPA 2	It specifies set Authentication type.
Enc	N/A	None , TKIP, AES	It specifies set Encryption type.
Channel	0,1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165	Integer	It specifies the operating channel in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+DPNSWC?
+DPNSWC:0,"SSID","Password","NONE","NONE",6
OK
```

5.3.7. Update TCP Profile - +DPTC

Description

This command saves the TCP configuration in the profile. Maximum 16 sockets (TCP and UDP together) can be stored in profile

Pre-requisites

None.

Syntax

```
AT+DPTC=<index number>,<Add Delete>,[<Enable>,<IO Interface Id>,<network Interface Id>,<Family>,<Autoflag>,<LPort>,<Remote IP address>,<Remote Port>,<client or server>]
```

Parameters Description

Parameter	Value	Format	Description
index number	Range: 0-15	Integer	It specifies the configuration number, it should be in sequence, user can modify any existing configurations by using its configuration number it should be either within available numbers or new

			one in sequence.
Add Delete	Range: 0-1	Integer	It specifies if the configuration is to be added or deleted. 0 to add and 1 to delete.
Enable	Range: 0-1 Default: 1	Integer	It specifies if the configuration is to be enable or disable when the profile applies. 0-disable, 1-enable,If add-delete filed is set to add, then this parameter is mandatory.
IO Interface Id	Range: 1-3 Default: 3	Integer	It specifies the I/O Interface to use, 1-SPI, 2-SDIO, 3-UART. If add-delete filed is set to add, then this parameter is mandatory.
network Interface Id	Range: 0-2 Default: 2	Integer	It specifies the Interface to use, 0-STA, 1-AP, 2-Any. If add-delete filed is set to add, then this parameter is mandatory.
Family	Range: 2-5 Default: 2	Integer	It specifies communications domain in which a socket is to be created, 2 - (IPv4), 3 - (IPv6), 4 - (IPv4 and IPv6), 5 - (packet). If add-delete parameter is set to add, this filed is mandatory.
Autoflag	Range: 0-2 Default: 0	Integer	It specifies if user wants this socket to use it in Auto Recv mode. in case of TCP server it is auto accept the connections. 0 - disable recv ready/ in case of TCP server disables auto accept 1 - enable auto receive/ in case of TCP server enables auto accept 2 - enable receive ready but not auto receive. If add-delete parameter is set to add, this filed is mandatory.
LPort	Range: 0-65535 Default: 0	Integer	It specifies the local port number to bind. If add-delete parameter is set to add, this filed is mandatory.
Remote IP address	Range: N/A Default:	IP Address	It specifies the remote IP address. This parameter is mandatory only in case of TCP client.If add-delete parameter is set to add, this filed is mandatory.

Remote Port	Range: 0-65535 Default: 0	Integer	It specifies the remote port. This parameter is mandatory only in case of TCP client.If add-delete parameter is set to add, this filed is mandatory.
client or server	Range: 1-3 Default:	Integer	It specifies the server or client. 1-TCP server 2-TCP client If add-delete parameter is set to add, this filed is mandatory.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change same default profile parameters.

AT+DPNSWC=0,"prasad",,"NONE","NONE",6

OK

AT+DPNSIPC=1,192.168.1.130,255.255.255.0,192.168.1.1,192.168.1.1,192.168.1.1

OK

AT+DPSRC=5,6000,20,6000,5,20

OK

AT+DPTC=0,0,1,3,0,2,1,8344,192.168.1.128,8366,2

OK

ATC1

OK

AT&w0

OK

AT+ysr

OK

Serial2Wireless APP

+YPOSTA:SUCCESS,192.168.1.130,255.255.255.0,192.168.1.1

+YPTCP:SUCCESS,0,CLIENT,8344,192.168.1.128,8366

Following command is used to get the TCP configurations.

Syntax

AT+DPTC?

Response

+DPTC:<Index>,<Enable>,<IO type>,<nwk if>,<Family>,<Auto>,<Local Port>,<IP address>,<Remote Port>,<client or server>>

Response Parameters Description

Parameter	Range	Type	Description
Index number	0-15	Integer	It specifies the configuration Index.
Enable	0-1	Integer	It specifies whether the configuration is Enabled or Disabled.
IO type	1-3	Integer	It specifies the I/O Interface to use
nwk interface	0-2	Integer	It specifies the Interface to use.
Family	2-5	Integer	It specifies communications domain in which a socket is to be created.
Autoflag	0-2	Integer	It specifies if the configuration will be enabled Auto receive or not.
Local Port	1-65535	Integer	It specifies the local port to use.
Remote IP address	N/A	IP Address	It specifies the remote IP address to use.
Remote Port	1-65535	Integer	It specifies the remote port to use.
client or server	1-2	Integer	It specifies the server or client

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+DPTC?
+DPTC:0,1,2,0,2,2,1234,192.168.3.45,5678,2
OK
```

5.3.8. Update UDP Profile - +DPUC

Description

This command saves the UDP configuration in the profile. Maximum 16 sockets (TCP and UDP together) can be stored in profile

Pre-requisites

None.

Syntax

AT+DPUC=<index number>,<Add Delete>,[<Enable>,<IO Interface Id>,<network Interface Id>,<Family>,<Autoflag>,<LPort>]

Parameters Description

Parameter	Value	Format	Description
index number	Range: 0-15	Integer	It specifies the configuration number, it should be in sequence, user can modify any existing configurations by using its configuration number it should be either within available numbers or new one in sequence.
Add Delete	Range: 0-1	Integer	It specifies if the configuration is to be added or deleted. 0 to add and 1 to delete.
Enable	Range: 0-1 Default: 1	Integer	It specifies if the configuration is to be enable or disable when the profile applies. 0-disable, 1-enable,If add-delete filed is set to add, then this parameter is mandatory.
IO Interface Id	Range: 1-3 Default: 3	Integer	It specifies the I/O Interface to use, 1-SPI, 2-SDIO, 3-UART. If add-delete filed is set to add, then this parameter is mandatory.
network Interface Id	Range: 0-2 Default: 2	Integer	It specifies the Interface to use, 0-STA, 1-AP, 2-Any. If add-delete filed is set to add, then this parameter is mandatory.
Family	Range: 2-5 Default: 2	Integer	It specifies communications domain in which a socket is to be created, 2 - (IPv4), 3 - (IPv6), 4 - (IPv4 and IPv6), 5 - (packet). If add-delete parameter is set to add, this filed is mandatory.
Autoflag	Range: 0-2 Default: 0	Integer	It specifies if user wants this socket to use it in Auto Recv mode. 0 - disable recv ready 1 - enable auto receive 2 - enable receive ready but not auto receive If add-delete filed is set to add, then this parameter is mandatory.
LPort	Range: 0-65535	Integer	It specifies the local port number to bind. If add-delete filed is set to add, then this parameter

	Default: 0		is mandatory.
--	------------	--	---------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Serial2Wireless APP

AT&F

OK

above commands are just to make sure that profile parameters are set to default.

by giving below commands user can change some default profile parameters.

AT+DPNSWC=0,"prasad",,"NONE","NONE",6

OK

AT+DPNSIPC=1,192.168.1.130,255.255.255.0,192.168.1.1,192.168.1.1,192.168.1.1

OK

AT+DPSRC=5,6000,20,6000,5,20

OK

AT+DPUC=0,0,1,3,0,2,1,8344

OK

ATC1

OK

AT&w0

OK

AT+ysr

OK

Serial2Wireless APP

+YPSTA:SUCCESS,192.168.1.130,255.255.255.0,192.168.1.1

+YPUDP:SUCCESS,0,8344

Following command is used to get the UDP configurations.

Syntax

AT+DPUC?

Response

+DPUC:<Index>,<Enable>,<IO type>,<nwk if>,<Family>,<Auto>,<Local Port>

Response Parameters Description

Parameter	Range	Type	Description
index number	0-15	Integer	It specifies the configuration Index.
Enable	0-1	Integer	It specifies whether the configuration is Enabled or Disabled.

IO type	1-3	Integer	It specifies the I/O Interface to use
nwk interface	0-2	Integer	It specifies the Interface to use.
Family	2-5	Integer	It specifies communications domain in which a socket is to be created.
Autoflag	0-2	Integer	It specifies if the configuration will be used in Auto mode or not.
Local Port	1-65535	Integer	It specifies the local port to use.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+DPUC?
+DPUC:0,1,3,0,2,1,8344
OK
```

5.4. Real Time Clock (RTC) Settings

System has a real time clock. The time can be set and get from it. The time is kept till the power is supplied to the system, across different power save mode.

Upon power on, the RTC sets the default time to 01/01/2000,00:00:00+05. User must configure the time to the correct value manually issuing the AT command or user can start NTP to get the time from the NTP server.

Once the device boots up, the system time would set to a default value and the time starts running. If the user sets the time, then the current running time will be updated with the time given as input by issuing this command.

5.4.1. Time Settings - +YTIME

Description

This command is used to set and get time from the RTC module in Julian format. To get the system Time, it is to be set once.

Pre-requisites

None.

Syntax

```
AT+YTIME=<Absolute Time>
```

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

Absolute Time	Range: 1-32	String	It specifies the absolute time to be set in Julian format.
---------------	-------------	--------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YTIME="09/01/2018,11:15:00+04"
OK
```

Following command is used to get time from RTC module:

Syntax

```
AT+YTIME?
```

Response Parameters Description

Parameter	Range	Type	Description
time		String	It specifies the UTC time in Julian format.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YTIME?
+YTIME:"01/01/2000,02:00:45+05"
```

5.5. Power Save

5.5.1. Standby - +YPS

Description

This command puts the system into different power save modes.

Pre-requisites

None.

Syntax

```
AT+YPS=<Mode>,[<Duration>]
```

Parameters Description

Parameter	Value	Format	Description
Mode	Range: 0-3	Integer	It specifies the power save mode, where: 0-Disables sleep mode, 1-Enables sleep mode, 2-Enables deep-sleep, in this mode-the serial IO turns off and the system wakes up only when there is any network event in L4 that is occurred, or if any timer interrupt occurs or if wakeup event is received from GPIO 8.

			3-Puts the system in standby mode. It is necessary to specify the next parameter to set the duration to go to standby.
Duration	Range: 0,100-131072000 Default: 1000	Integer	It specifies the time in msec.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+YPS=3,1000

5.6. Heap Information - +YHD

Description

This command gets information on total heap size and the memory available for allocation. The memory available for allocation is in fragments which results in malloc function to fail, though the requested memory to allocate is less than the available memory.

Pre-requisites

None.

Syntax

AT+YHD

Response

+YFD:<Total heap size>,<Free memory>

Response Parameters Description

Parameter	Range	Type	Description
Total heap size	0-204800	Integer	It specifies the total heap size.
Free memory	0-204800	Integer	It specifies the total available free memory in heap.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+YHD
+YFD:102400,9024
OK

5.7. Heap Information List - +YHLD

Description

This command prints the current allocated memory. For appropriate results, the M2MB_HEAP_DEBUG in the system is enable during binary compilation.

Pre-requisites

None.

Syntax

AT+YHLD

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To get the length a file.

AT+YHLD

File = ../../m2mb/nwk/tr50/tr50.message.c, line = 45, size = 72

File = ../../m2mb/nwk/tr50/util/tr50.json.c, line = 62, size = 6

File = ../../m2mb/nwk/tr50/util/tr50.json.c, line = 69, size = 56

EmptyList!!

OK

5.8. [Reset - +YSR](#)

Description

This command performs a soft reset.

Pre-requisites

None.

Syntax

AT+YSR

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+YSR

Serial2Wireless APP

5.9. [Manufacturer's Name - +CGMI](#)

Description

This command reads the manufacturer's name.

Pre-requisites

None.

Syntax

AT+CGMI

Response

<Manufacturer Name>

Response Parameters Description

Parameter	Range	Type	Description
Manufacturer Name		String	It specifies the manufacturer's name.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+CGMI
Telit
OK
```

5.10. Module Name - +CGMM

Description

This command reads the name of the Module.

Pre-requisites

None.

Syntax

```
AT+CGMM
```

Response

```
<Module Name>
```

Response Parameters Description

Parameter	Range	Type	Description
Module Name	7	String	It specifies name of the module.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+CGMM
WL865E4
OK
```

5.11. Modem Version - +CGMR

Description

This command reads the version number of the Modem.

Pre-requisites

None.

Syntax

AT+CGMR

Response

<Modem Version>

Response Parameters Description

Parameter	Range	Type	Description
Modem Version	10	String	It specifies the current modem version.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+CGMR
MOG.000002
OK
```

5.12. Package Version - #SWPKGV

Description

This command reads all the available version details of the package.

Pre-requisites

None.

Syntax

AT#SWPKGV

Response

<Module Version>, <Modem Version>, <Package Version>, <Application Version>, <Source Code Version>

Response Parameters Description

Parameter	Range	Type	Description
Module Version	20-25	String	It specifies the current Wi-Fi software version of the module.
Modem Version	10	String	It specifies the current version of the modem.
Package Version	10	String	It specifies current version of the software package.
Application Version	10	String	It specifies current Telit application version.
Source Code Version	10	String	It specifies the version

			of ADC source code.
BLE FW Version	10	String	It specifies current BLE software version of the module.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT#SWPKG
36.07.000-B010-P0G.000000
M0G.000002
P0G.000000
A0G.000002
A0G.000002
B0G.000002
OK
```

5.13. Version - +YVER

Description

This command is used to get the version number of the software.

Pre-requisites

None.

Syntax

AT+YVER

Response

+YVER:<VERSION>

Response Parameters Description

Parameter	Range	Type	Description
Version	9-14	String	It specifies the Version number of software.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YVER
+YVER:"36.07.000-B013"
OK
```

5.14. Shut Down - +NSHUTDOWN

Description

This command is used to close all sockets and shutdown the network.

Pre-requisites

Syntax

```
AT+NSHUTDOWN
```

Status

For all possible status responses refer [ResponseCodes](#)

Example

```
AT+NSHUTDOWN
```

```
OK
```


6. NETWORK CONNECTION MANAGER

6.1. Wireless Network Connection Manager (WNCM)

NCM supports commands to set the module in Station mode and to connect to a configured Wi-Fi network. It does L2 and L3 level connection.

It also supports commands to create a network - initializes the AP mode and enable DHCP server to assign IP address to the connecting devices. Commands to configure station and AP mode is also supported. Station mode and AP mode can be configured to run simultaneously.

Following is the sequential execution of the AT commands:

1. AT+WNI
2. AT+WNCN
3. AT+WNIPC
4. AT+WNAPC
5. AT+WNAPIPC
6. AT+WNCR
7. AT+WNDC
8. AT+WNIFCFG
9. AT+WNAPST
10. AT+WNSTAST
11. AT+WNASTINFO

Sequential execution in Station mode:

AT+WNI=0

AT+WNIPC [By default the IP configuration will be through DHCP] is not needed

or

AT+WNIPC=1,2,,, "hostname" [setting hostname with DHCP enabled]

or

AT+WNIPC=1,1,192.168.45.3,255.255.255.0,192.168.45.1,"hostname" [setting static IP and hostname]

AT+WNCN=1,"test_ap","12345678"

Sequential execution in AP mode:

AT+WNI=1

AT+WNAPC=0,1,200,3,0

AT+WNIPC=0,1,192.168.45.3,255.255.255.0,192.168.45.1

AT+WNAPIPC=0,192.168.45.4,192.168.45.25,86400000

AT+WNCR=0,"telit_ap",6,"WPA2","AES","12345678"

6.1.1. NCM Initialize - +WNI

Description

This command initializes the NCM module and the WLAN module internally.

Pre-requisites

None

Syntax

AT+WNI=<Mode>

Parameters Description

Parameter	Value	Format	Description
Mode	Range: 0-1	Integer	It specifies the mode of the NCM module, where: 0-Enables Station mode, 1-Enables AP mode.

Response

+WNI:<WHandle>

Response Parameters Description

Parameter	Range	Type	Description
WHandle	0-1	Integer	It specifies the handle which used in the next NCM AT commands.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNI=1
+WNI:0
OK
```

6.1.2. NCM De-initialize - +WNDI

Description

This command is used to de-initialize the NCM module.

Pre-requisites

AT+WNDI command should be issued, provided the device is in connected state.

Syntax

AT+WNDI=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNDI=1
OK
```

6.1.3. Configure Station Mode - +WNSTAC

Description

This command sets the Station mode configurations. It should be issued before AT+WNCN command, else default values will be taken.

Pre-requisites

AT+WNI=0 command should be issued.

Syntax

AT+WNSTAC=<WHandle>,[<Listen interval>,<Keep alive interval>,<WPS flag>,<Method>,<Pin>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
Listen interval	Range: 1-50 Default: 1	Integer	It specifies the listen interval in station mode in number of beacon intervals.
Keep alive interval	Range: 0-255 Default: 0	Integer	It specifies the keep alive interval in STA mode after connection in seconds.
WPS flag	Range: 0-1 Default: 0	Integer	It specifies the WPS support in Station mode, where: 0-Disables WPS support, 1-Enables WPS support. If WPS flag is enabled, then the module uses WPS method to join the network by executing the command AT+WNCN. Also, the SSID in the command AT+WNCN is not necessary to provide.
Method	Range: 0-1 Default: 1	Integer	It specifies the method used for WPS procedure, where: 0-for PIN method, 1-for PUSH method.
Pin	Range: 8 Default: N/A	String	It specifies the pin used in WPS PIN method during the parameter "Method" selection.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WNSTAC=1,100,0,0,0

OK

Following command is used to get the STA related configurations.

Syntax

AT+WNSTAC?

Response

+WNSTAC:<Listen interval>, <Keep alive interval>, <WPS support>, <WPS method>, <Pin>

Response Parameters Description

Parameter	Range	Type	Description
Listen interval	1-50	Integer	It specifies the value of the current listen interval in Station mode in number of beacon intervals.
Keep alive interval	0-255	Integer	It specifies the value of the current keep alive interval in Station mode in seconds.
WPS support	0-1	Integer	It specifies the method used for WPS support in STA mode.
Method	0-1	Integer	It specifies the method used for WPS procedure. This value is considered only when WPS support is enabled.
Pin	N/A	String	It specifies the current value of the pin in WPS pin method.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNSTAC?
+WNSTAC:100,0,0,0,""
OK
```

6.1.4. Configure AP Mode - +WNAPC

Description

This command sets the AP configurations. It must be executed before AT+WNCR command, else will take default values.

Pre-requisites

AT+WNI=1 command is mandatory.

Syntax

AT+WNAPC=<WHandle>,[<Hidden SSID>,<Beacon Interval>,<DTIM Period>,<WPS>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
Hidden SSID	Range: 0-1 Default: 0	Integer	It specifies the hidden SSID flag for a network. 0 - disables the hidden SSID 1 - enables the hidden SSID
Beacon Interval	Range: 100-1000 Default: 100	Integer	It specifies the interval between the beacon frames in TU (unit of time equal to 1024 microseconds).
DTIM Period	Range: 1-255 Default: 3	Integer	It specifies the DTIM (Delivery Traffic Indication Map) count.
WPS	Range: 0-1 Default: 0	Integer	It specifies the WPS support for a network, where: 0-Disables WPS, 1-Enables WPS.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNAPC=0,0,100,3,1
OK
```

Following command is used to get the AP related configurations.

Syntax

```
AT+WNAPC?
```

Response

```
+WNAPC:<Hidden SSID>, <Beacon Interval>, <DTIM Period>, <WPS support>
```

Response Parameters Description

Parameter	Range	Type	Description
Hidden SSID	0-1	Integer	It specifies the status of hidden SSID feature in AP mode.
Beacon Interval	100-1000	Integer	It specifies the current beacon interval value in AP mode.
DTIM Period	1-255	Integer	It specifies the current DTIM count in AP mode.
WPS support	0-1	Integer	It specifies the current WPS support in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNAPC?
+WNAPC:0,100,3,0
OK
```

6.1.5. Configure IP Address - +WNIPC

Description

This command sets the static IP configurations.

Pre-requisites

AT+WNI command should be issued.

Syntax

```
AT+WNIPC=<WHandle>,<IP Flag>,[<IP Address>,<IP Mask>,<IP Gateway>,<Host Name>]
```

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
IP Flag	Range: 1-2	Integer	It specifies the IP configuration, where: 1-Static mode that requires all the optional parameters, 2-Dynamic mode, where DHCP is enabled, its the optional parameter is not necessary and the Host name is specified to use. Note: 1). In STA mode, DHCP is set by default. 2). In AP mode, user must set the flag to 1.
IP Address	Range: N/A Default: N/A	IP Address	It specifies the static IPV4 address of the interface in either Station or AP mode.
IP Mask	Range: N/A Default: N/A	IPv4 Address	It specifies the static net mask of the interface in Station or AP mode.
IP Gateway	Range: N/A Default: N/A	IP Address	It specifies the static gate way of the interface in Station or AP mode.
Host Name	Range: 0-32 Default: Telit_Device	String	It specifies the host name of the interface in Station or AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNIPC=0,1,"192.168.23.2","255.255.255.0","192.168.23.1","Telit_Device"
OK
```

6.1.6. Configure IP Address in AP Mode - +WNAIPIC

Description

This command sets the DHCP server configuration in AP mode.

Pre-requisites

AT+WNIPC command should be issued.

Syntax

```
AT+WNAIPIC=<WHandle>,<IP Start Address>,<IP End Address>,<Lease Time>
```

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
IP Start Address	Range: N/A	IP Address	It specifies the starting IP address allocated to the connected stations. This address must have the same network ID as that of the IP address configured in the At command +WNIPC.
IP End Address	Range: N/A	IP Address	It specifies the end IP address until which the connected STAs will get IP addresses. The end IP address must have the host ID greater than the host ID given in the start address.
Lease Time	Range: 1-4294967295	Integer	It specifies the lease time in seconds for the DHCP server.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNAIPIC=0,192.168.23.24,192.168.23.55,86400000
OK
```

Following command is used to get the DHCP server configurations of an AP.

Syntax

```
AT+WNAIPIC?
```

Response

```
+WNAIPIC:<IP Start Address>,<IP End Address>,<Lease time>
```

Response Parameters Description

Parameter	Range	Type	Description
-----------	-------	------	-------------

IP Start Address	N/A	IP Address	It specifies the current IP Start address for DHCP server in AP mode.
IP End Address	N/A	IP Address	It specifies the current IP End address for DHCP server in AP mode.
Lease time	1-4294967295	Integer	It specifies the current lease time for DHCP server in AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNAIPIC?
+WNAIPIC:192.168.3.5,192.168.3.250,86400000
OK
```

6.1.7. NCM Create - +WNCR

Description

This command is used to create a network.

Pre-requisites

AT+WNAIPIC command should be issued.

Syntax

```
AT+WNCR=<WHandle>,<SSID>,<Channel>,<Security Type>,<Encryption Type>,[<PassPhrase>]
```

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
SSID	Range: 1-32	String	It specifies the SSID of the network.
Channel	Range: 1-14,36,40,44,48,149,153,157,161,165	Integer	It specifies the channel number of the network.
Security Type	Range: N/A	String	It specifies the type of security and types are: "NONE", "WPA", "WPA2".

Encryption Type	Range: N/A	String	It specifies the type of encryption and the types are: "NONE", "TKIP", "AES".
PassPhrase	Range: 8-64 Default: N/A	String	It specifies the pass phrase for a secured network.

Response

+WNCR:<Create status>

Response Parameters Description

Parameter	Range	Type	Description
Create status	N/A	Not created, Created	It specifies the status of the AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNCR=0,"Telit_Guest",6,"WPA","TKIP","12345678"
+WNCR:CREATED
OK
```

Following command is used to get the status of current AP mode.

Syntax

AT+WNCR?

Response

+WNCR:<Create status>

Response Parameters Description

Parameter	Range	Type	Description
Create status	N/A	Not created, Created	It specifies the status of the AP mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNCR?
+WNCR:CREATED
OK
```

6.1.8. NCM Retry Count - +WNRETRYC

Description

This command sets the configurations to retry counts and intervals at L2 , L3 and L4 connections.

Pre-requisites

AT+WNI=0 command should be issued.

Syntax

AT+WNRETRYC=<WHandle>,[<Scan retry count>,<Scan retry time delay>,<L3 retry count>,<L3 retry delay time>,<L4 retry count>,<L4 retry delay time>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained from AT+WNI command.
Scan retry count	Range: 1-65535 Default: 3	Integer	It specifies the scan retry count before connection.
Scan retry time delay	Range: 5000-65535 Default: 5000	Integer	It specifies the time between scan retries in milliseconds.
L3 retry count	Range: 1-65535 Default: 10	Integer	It specifies the L3 retry count, when the device is in STA mode.
L3 retry delay time	Range: 5000-65535 Default: 5000	Integer	It specifies the time between L3 retries in milliseconds.
L4 retry count	Range: 1-65535 Default: 3	Integer	It specifies the L4 retry count when device is in STA mode.
L4 retry delay time	Range: 1-65535 Default: 1000	Integer	It specifies the time between L4 retries in milliseconds.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WNRETRYC=1,5,6000,20,6000,5,20

OK

Syntax

AT+WNRETRYC?

6.1.9. NCM Connect - +WNCN

Description

This command connects the existing network up to L3 level.

Pre-requisites

AT+WNI=0 command is a mandatory. For static IP address, AT+WNIPC command should be issued.

Syntax

AT+WNCN=<WHandle>,[<SSID>,<PassPhrase>,<Channel>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
SSID	Range: 1-32 Default: N/A	String	It specifies the SSID of the existing network to which user wants to connect. If the SSID is NULL, then the WPS connection happens provided WPS is enabled.
PassPhrase	Range: 0-64 Default: N/A	String	It specifies the pass phrase required to connect to a network. If user doesn't give passphrase and if the profile have the details of same network, then this command will take the passphrase from the profile
Channel	Range: 1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165 Default: 0	Integer	It specifies the channel of an existing AP to connect.

Response

+WNCN:<Connect status>,<IP Address>,<Net Mask>,<Gateway>

Response Parameters Description

Parameter	Range	Type	Description
Connect status	N/A	not connected, connected, disconnected, DHCP failed, auto IP done, new IP	It specifies the current connection status.
IP Address	N/A	IP Address	It specifies the current IP Address.

Net Mask	N/A	IPv4 Address	It specifies the current network mask.
Gateway	N/A	IP Address	It specifies the current gateway address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNCN=1,"Telit_Guest","qwerty123456",1
+WNCN:CONNECTED,192.168.0.88,255.255.255.0,192.168.0.1
OK
```

Following command is used to get the connection status up to L3 level:

Syntax

```
AT+WNCN?
```

Response

```
+WNCN:<connect status>,<IP Address>,<Net Mask>,<Gateway>
```

Response Parameters Description

Parameter	Range	Type	Description
connect status	N/A	not connected, connected	It specifies status of connection.
IP Address	N/A	IP Address	It specifies current IP address
Net Mask	N/A	IPv4 Address	It specifies current subnet mask.
Gateway	N/A	IP Address	It specifies current gateway.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNCN?
+WNCN:CONNECTED,192.168.3.45,255.255.255.0,192.168.3.1
OK
```

Asynchronous Response

```
+WNCN:<Connect status>,<IP Address>,<Net Mask>,<Gateway>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Connect status	N/A	not connected, connected,	It specifies the current connection status.

		disconnected, DHCP failed, auto IP done, new IP	
IP Address	N/A	IP Address	It specifies current IP address.
Net Mask	N/A	IPv4 Address	It specifies current network mask.
Gateway	N/A	IP Address	It specifies current gateway address.

6.1.10. Interface Statistics in AP Mode - +WNPST

Description

This command gets the statistics of WLAN interface in AP mode.

Pre-requisites

AT+WNCR command should be issued.

Syntax

AT+WNPST

Response

+WNPST:<Unicast transmission packets>, <Unicast reception packets>, <Multicast transmission packets>, <Multicast reception packets>, <Broadcast transmission packets>, <Broadcast reception packets>, <Unicast non-null transmission packets>, <Unicast non-null reception packets>, <Unicast filtered accepted transmission packets>, <Unicast filtered accepted reception packets>, <Multicast filtered accepted transmission packets>, <Multicast filtered accepted reception packets>, <Broadcast filtered accept transmission packets>, <Broadcast filtered accept reception packets>, <Unicast filtered rejected transmission packets>, <Unicast filtered rejected reception packets>, <Multicast filtered rejected transmission packets>, <Multicast filtered rejected reception packets>, <Broadcast filtered rejected transmission packets>, <Broadcast filtered rejected reception packets>, <Null transmission packets>, <Null reception packets>, <QOS null transmission packets>, <QOS null reception packets>, <PS poll transmission packets>, <PS poll reception packets>, <Transmission retry count>, <beacon miss count>, <Beacon received count>, <Beacon resync success count>, <Beacon resync failure count>, <Current early wakeup adjustment>, <Average early wakeup adjustment>, <Early termination count>, <UAPSD trigger reception count>, <UAPSD trigger transmission count>, <Total active time>, <Total powersave time>

Response Parameters Description

Parameter	Range	Type	Description
Unicast transmission packets	N/A	Integer	It specifies the number of unicast TX packets.
Unicast reception packets	N/A	Integer	It specifies the number of unicast RX packets.
Multicast transmission packets	N/A	Integer	It specifies the number of multicast TX packets.

Multicast reception packets	N/A	Integer	It specifies the number of multicast RX packets.
Broadcast transmission packets	N/A	Integer	It specifies the number of broadcast TX packets.
Broadcast reception packets	N/A	Integer	It specifies the number of broadcast RX packets.
Unicast non-null transmission packets	N/A	Integer	It specifies the number of unicast TX packets, excluding NULL and QOS NULL packets.
Unicast non-null reception packets	N/A	Integer	It specifies the number of unicast RX packets, excluding NULL and QOS NULL packets.
Unicast filtered accepted transmission packets	N/A	Integer	It specifies the number of unicast filtered and accepted TX packets.
Unicast filtered accepted reception packets	N/A	Integer	It specifies the number of unicast filtered and accepted RX packets.
Multicast filtered accepted transmission packets	N/A	Integer	It specifies the number of multicasts filtered and accepted TX packets.
Multicast filtered accepted reception packets	N/A	Integer	It specifies the number of multicasts filtered and accepted RX packets.
Broadcast filtered accepted transmission packets	N/A	Integer	It specifies the number of broadcasts filtered and accepted TX packets.
Broadcast filtered accepted reception packets	N/A	Integer	It specifies the number of broadcasts filtered and accepted RX packets.
Unicast filtered rejected transmission packets	N/A	Integer	It specifies the number of unicast filtered and rejected TX packets.
Unicast filtered rejected reception packets	N/A	Integer	It specifies the number of unicast filtered and rejected RX packets.
Multicast filtered rejected transmission packets	N/A	Integer	It specifies the number of multicast filtered and rejected TX packets.

Multicast filtered rejected reception packets	N/A	Integer	It specifies the number of multicasts filtered and rejected RX packets.
Broadcast filtered rejected transmission packets	N/A	Integer	It specifies the number of broadcasts filtered and rejected TX packets.
Broadcast filtered rejected reception packets	N/A	Integer	It specifies the number of broadcast filtered and rejected RX packets.
Null transmission packets	N/A	Integer	It specifies the number of NULL TX packets.
Null reception packets	N/A	Integer	It specifies the number of NULL RX packets.
QOS null transmission packets	N/A	Integer	It specifies the number of QOS NULL TX packets.
QOS null reception packets	N/A	Integer	It specifies the number of QOS NULL RX packets.
PS poll reception packets	N/A	Integer	It specifies the number of PS Poll TX packets.
PS poll reception packets	N/A	Integer	It specifies the number of PS Poll RX packets.
Transmission retry count	N/A	Integer	It specifies the number of TX retry count.
Beacon miss count	N/A	Integer	It specifies the number of Beacon miss count.
Beacons received count	N/A	Integer	It specifies the number of Received beacon miss count.
Beacon resync success count	N/A	Integer	It specifies the number of Beacon resync success count.
Beacon resync failure count	N/A	Integer	It specifies the number of Beacon resync failure count.
Current early wakeup adjustment	N/A	Integer	It specifies the number of current early wakeup adjustment in ms.
Average early wakeup adjustment	N/A	Integer	It specifies the number of average early wakeup adjustment in ms.

			Address of the connected station.
--	--	--	-----------------------------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNASTINFO
+WNASTINFO:E0:9D:31:13:BB:38,192.168.3.3
OK
```

6.1.12. Interface Configuration Information - +WNIFCFG

Description

This command is used to get the information of all interfaces.

Pre-requisites

AT+WNI command should be issued.

Syntax

```
AT+WNIFCFG
```

Response

+WNIFCFG:<Device ID>, <MAC address>, <State>, <WLAN State>, <Mode>, <BSSID>, <SSID>, <Channel>, <Security>, <RSSI>, <IP address>, <Subnet address>, <Gateway address>, <DNS1>, <DNS2>, <DNS3>

Response Parameters Description

Parameter	Range	Type	Description
Device ID	0-1	Integer	It specifies the WHandle of the interface.
MAC address	N/A	MAC Address	It specifies the MAC address of the interface.
State	N/A	DOWN, UP	It specifies the NCM status of the interface.
WLAN Status	N/A	NOT CONNECTED, CONNECTED	It specifies the WLAN interface status.
Mode	N/A	NONE, STA, AP	It specifies the Mode of the interface-AP or STA.
BSSID	N/A	MAC Address	It specifies the BSSID of the network in STA mode and own MAC address in AP mode.
SSID	N/A	String	It specifies the SSID of the network to which interface is connected in STA mode and the

			SSID of the created network in AP mode.
Channel	1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165	Integer	It specifies the channel number of the network to which interface is connected in STA mode and SSID of the created network in AP mode.
Security	N/A	NONE, WEP, WPA PSK, WPA ENTERPRISE, WPA2 PSK, WPA2 ENTERPRISE	It specifies the security type on both interfaces.
RSSI	N/A	Integer	It specifies the RSSI value on both interfaces.
IP address	N/A	IP Address	It specifies the current IP address.
Subnet address	N/A	IP Address	It specifies the current subnet mask address.
Gateway address	N/A	IP Address	It specifies the current Gateway address.
DNS1 address	N/A	IP Address	It specifies the current DNS1 address.
DNS2 address	N/A	IP Address	It specifies the current DNS2 address.
DNS3 address	N/A	IP Address	It specifies the current DNS3 address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNIFCFG
+WNIFCFG:0,00:00:00:00:00:00,DOWN,NOT
CONNECTED,NONE,00:00:00:00:00:00,"",0,NONE,0,0.0.0.0,0.0.0.0,0.0.0.0,0.0.0.0,0.0.0.0,0.0.0.0
+WNIFCFG:1,11:22:33:44:55:66,UP,CONNECTED,STA,00:aa:bb:cc:dd:ee,telit_guest,6,
NONE,192.168.3.45,255.255.255.0,192.168.3.1,192.168.3.1,0.0.0.0,0.0.0.0
OK
```

6.1.13. Interface Statistics in Station Mode - +WNSTAST

Description

This command is used to get the statistics of WLAN interface in Station mode.

Pre-requisites

AT+WNCN command should be issued.

Syntax

AT+WNSTAST

Response

+WNSTAST:<Unicast transmission packets>, <Unicast reception packets>, <Multicast transmission packets>, <Multicast reception packets>, <Broadcast transmission packets>, <Broadcast reception packets>, <Unicast non-null transmission packets>, <Unicast non-null reception packets>, <Unicast filtered accepted transmission packets>, <Unicast filtered accepted reception packets>, <Multicast filtered accepted transmission packets>, <Multicast filtered accepted reception packets>, <Broadcast filtered accept transmission packets>, <Broadcast filtered accept reception packets>, <Unicast filtered rejected transmission packets>, <Unicast filtered rejected reception packets>, <Multicast filtered rejected transmission packets>, <Multicast filtered rejected reception packets>, <Broadcast filtered rejected transmission packets>, <Broadcast filtered rejected reception packets>, <Null transmission packets>, <Null reception packets>, <QOS null transmission packets>, <QOS null reception packets>, <PS poll transmission packets>, <PS poll reception packets>, <Transmission retry count>, <beacon miss count>, <Beacon received count>, <Beacon resync success count>, <Beacon resync failure count>, <Current early wakeup adjustment>, <Average early wakeup adjustment>, <Early termination count>, <UAPSD trigger reception count>, <UAPSD trigger transmission count>, <Total active time>, <Total powersave time>

Response Parameters Description

Parameter	Range	Type	Description
Unicast transmission packets	N/A	Integer	It specifies the number of unicast TX packets.
Unicast reception packets	N/A	Integer	It specifies the number of unicast RX packets.
Multicast transmission packets	N/A	Integer	It specifies the number of multicast TX packets.
Multicast reception packets	N/A	Integer	It specifies the number of multicast RX packets.
Broadcast transmission packets	N/A	Integer	It specifies the number of broadcast TX packets.
Broadcast reception packets	N/A	Integer	It specifies the number of broadcast RX packets.
Unicast non-null transmission packets	N/A	Integer	It specifies the number of unicast TX packets excluding NULL and QOS NULL packets.
Unicast non-null reception packets	N/A	Integer	It specifies the number of unicast RX packets excluding NULL and QOS NULL packets.
Unicast filtered accepted transmission	N/A	Integer	It specifies the number of unicast filtered and

packets			accepted TX packets.
Unicast filtered accepted reception packets	N/A	Integer	It specifies the number of unicast filtered and accepted RX packets.
Multicast filtered accepted transmission packets	N/A	Integer	It specifies the number of multicasts filtered and accepted TX packets.
Multicast filtered accepted reception packets	N/A	Integer	It specifies the number of multicasts filtered and accepted RX packets.
Broadcast filtered accepted transmission packets	N/A	Integer	It specifies the number of broadcasts filtered and accepted TX packets.
Broadcast filtered accepted reception packets	N/A	Integer	Specifies the number of broadcasts filtered and accepted RX packets.
Unicast filtered rejected transmission packets	N/A	Integer	It specifies the number of unicast filtered and rejected TX packets.
Unicast filtered rejected reception packets	N/A	Integer	Specifies the number of unicast filtered and rejected RX packets.
Multicast filtered rejected transmission packets	N/A	Integer	It specifies the number of multicasts filtered and rejected TX packets.
Multicast filtered rejected reception packets	N/A	Integer	It specifies the number of multicasts filtered and rejected RX packets.
Broadcast filtered rejected transmission packets	N/A	Integer	It specifies the number of broadcasts filtered and rejected TX packets.
Broadcast filtered rejected reception packets	N/A	Integer	Specifies the number of broadcasts filtered and rejected RX packets.
Null transmission packets	N/A	Integer	It specifies the number of NULL TX packets.
Null reception packets	N/A	Integer	It specifies the number of NULL RX packets.
QOS null transmission packets	N/A	Integer	It specifies the number of QOS NULL TX packets.

QOS null reception packets	N/A	Integer	It specifies the number of QOS NULL RX packets.
PS poll reception packets	N/A	Integer	It specifies the number of PS Poll TX packets.
PS poll reception packets	N/A	Integer	It specifies the number of PS Poll RX packets.
Transmission retry count	N/A	Integer	It specifies the number of TX retry count.
Beacon miss count	N/A	Integer	It specifies the number of Beacon miss count.
Beacons received count	N/A	Integer	It specifies the number of Received beacon miss count.
Beacon resync success count	N/A	Integer	It specifies the number of Beacon resync success count.
Beacon resync failure count	N/A	Integer	It specifies the number of Beacon resync failure count.
Current early wakeup adjustment	N/A	Integer	It specifies the number of current early wakeup adjustment.
Average early wakeup adjustment	N/A	Integer	It specifies the number of average early wakeup adjustment.
Early termination count	N/A	Integer	It specifies the early termination count.
UAPSD trigger reception count	N/A	Integer	It specifies the number of UAPSD trigger RX count.
UAPSD trigger transmission count	N/A	Integer	It specifies the number of UAPSD trigger TX count.
Total active time	N/A	Integer	It specifies the total time in milliseconds for which the WLAN subsystem has been active.
Total powersave time	N/A	Integer	It specifies the total time in milliseconds for which the WLAN subsystem has been in Power Save.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNSTAST
+WNSTAST:0,0,5,45,2,6,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,129,1,0,18,18,0,0,0,77700,0
OK
```

6.1.14. NCM Disconnect - +WNDC

Description

This command disconnects from a connected network in station mode or turn down the created network in AP mode.

Pre-requisites

AT+WNCN in station mode or AT+WNCR in AP mode should be issued.

Syntax

```
AT+WNDC=<WHandle>
```

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.

Response

```
+WNDC:<Disconnect status>
```

Response Parameters Description

Parameter	Range	Type	Description
Disconnect status	N/A	not disconnected, disconnected, down	It specifies the disconnect status of the current interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNDC=1
+WNDC:DISCONNECTED
OK
```

6.1.15. EAP Configuration - +WNEAP

Description

This command sets the parameters related to the 802.1x security in STA mode.

Pre-requisites

AT+WNI=0 command should be issued.

Syntax

AT+WNEAP=<WHandle>,<Method>,[<User Name>,<Password>],<Identifier>,[<CA Certificate>,<Client Certificate>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WNI command.
Method	Range: 1-32	String	It specifies the EAP method that the user wants to set, supported EAP methods are: TTLS-MSCHAPV2, TTLS-MD5, PEAP-MSCHAPV2, TLS.
User Name	Range: 1-32 Default: N/A	String	It specifies the user name for server authentication.
Password	Range: 1-32 Default: N/A	String	It specifies the password for authentication with server.
Identifier	Range: 1-32	String	It specifies the ID in the response identity.
CA Certificate	Range: 1-32 Default: N/A	String	It specifies the name of the CA certificate present in the file system. Refer command AT+NSSLCERTSTORE for certificate loading.
Client Certificate	Range: 1-32 Default: N/A	String	It specifies the name of client certificate present in the file system. Refer command AT+NSSLCERTSTORE for certificate loading.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WNEAP=1,"TTL-MSCHAPV2","gsn","GSDemo123","wifi-user"
OK

7. WIRELESS DRIVER

7.1. Wireless Local Area Network (WLAN)

WLAN supported AT commands gives excellent control on the WLAN driver. Every time the device connects to a wireless access point, WLAN interface initialization is needed.

Following AT commands are sequentially executed to get information:

1. AT+WI
2. AT+WCCG
3. AT+WMACG
4. AT+WPHYMODEG
5. AT+WREGDG
6. AT+WTXRATEG
7. AT+WRSSIG
8. AT+WS=1,"ssid", "channel"

Following AT commands are sequentially executed to set information:

1. AT+WI
2. AT+WBMISINTS
3. AT+WAPPIE
4. AT+WCCS
5. AT+WPHYMODES
6. AT+WREGDS
7. AT+WTXPOWERS
8. AT+TXRATES
9. AT+WPOWERSAVE

Following AT commands are sequentially executed for sending raw packets:

AT+WI=0

AT+WRAWPKTS=1,1,0,5,6,0,0,, "11:22:33:44:55:66", "11:22:33:44:55:63", "11:22:33:44:55:65", "11:22:33:44:66:67"

Following AT commands are sequentially executed for STA and AP mode:

Station mode:

AT+WNI=0

AP mode:

AT+WNI=1

AT+WNIIPC=0,1,192.168.3.2,255.255.255.0,192.168.3.1

AT+WNAPIPC=0,192.168.3.3,192.168.3.24,86400000

AT+WNCR=0,"test_qca_ap",6,"WPA2","AES","12345678"

7.1.1. Interface Initialization - +WI

Description

This command initializes WLAN interface.

Note: User may also use command AT+WNI in place of AT+WI command.

Pre-requisites

None.

Syntax

AT+WI=<Mode>

Parameters Description

Parameter	Value	Format	Description
Mode	Range: 0-1	Integer	It specifies the mode of the WLAN interface, where: 0-enables Station mode, 1-enables AP mode.

Response

+WI:<WHandle>

Response Parameters Description

Parameter	Range	Type	Description
WHandle	0-1	Integer	It specifies the WHandle received after WLAN initialization, where: 0 in AP mode, 1 in STA mode. This is used by other AT commands in WLAN interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WI=0
+WI:1
OK
```

7.1.2. Get MAC Address - +WMACG

Description

This command is used to get the MAC address of the WLAN interface.

Note:

1. Wi-Fi Station MAC address or the Sticker MAC address is global MAC unique addresses. Limited AP MAC address is derived from Station MAC as it is limited to that specific network.
2. BT MAC or Sticker MAC address + 1 is also global MAC unique addresses.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WMACG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained from AT command AT+WI or AT+WNI.

Response

+WMACG:<MAC Address>

Response Parameters Description

Parameter	Range	Type	Description
MAC Address	N/A	MAC Address	It specifies the MAC address of the given interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WMACG=1
+WMACG:00:1D:C9:00:00:12
OK
```

7.1.3. Scan - +WS

Description

This command scans all the channels in the WLAN interface.

Pre-requisites

AT+WI=0 or AT+WNI=0 commands should be issued.

Syntax

AT+WS=<WHandle>,[<SSID>,<Channel>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
SSID	Range: 1-32 Default:	String	It specifies the SSID of the network to scan.
Channel	Range: 1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165 Default: 0	Integer	It specifies the channel to scan.

Response

+WS:<bssid>,<ssid>,<channel>,<type>,<rssi>,<security>

Response Parameters Description

Parameter	Range	Type	Description
BSSID	N/A	MAC Address	It specifies the BSSID of the scanned networks.
SSID	N/A	String	It specifies the SSID of the scanned networks.
CHANNEL	1-14,36,40,44,48,52,56,60,64,100,104,108,112,116,132,136,140,149,153,157,161,165	Integer	It specifies the channel number of the scanned networks.
TYPE	N/A	INFRA, ADHOC	It specifies the network type of the scanned networks.
RSSI	N/A	Integer	It specifies the RSSI value of the scanned networks.
SECURITY	N/A	NONE, WEP, WPA PSK, WPA ENTERPRISE, WPA2 PSK, WPA2 ENTERPRISE	It specifies the security type of the scanned networks.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WS=1
+WS:CC:B2:55:96:E8:CD,"dirwifi",1,INFRA,-82,WPA2 PSK
+WS:A8:9D:21:A2:E8:62,"Team_a_live",6,INFRA,-91,WPA2 PSK
+WS:68:7F:74:52:6F:D4,"homekit",6,INFRA,-55,NONE
+WS:84:1B:5E:E1:EC:BB,"NETGEAR35-5G",153,INFRA,-75,WPA2 PSK
OK
```

7.1.4. Scan Time - +WST

Description

This command sets the scan time for scanning.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WST=<WHandle>,<Scan time>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Scan time	Range: 5-1500	Integer	It specifies the time taken to scan in msec.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WST=1000

OK

7.1.5. Get Country Code - +WCCG

Description

This command is used to get the country code from WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should to be issued.

Syntax

AT+WCCG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.

Response

+WCCG:<Country Code>

Response Parameters Description

Parameter	Range	Type	Description
Country Code	N/A	String	It specifies the current country code of the interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WCCG=1

```
+WCCG:US
OK
```

7.1.6. Set Country Code - +WCCS

Description

This command sets the country code in WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should to be issued.

Syntax

AT+WCCS=<WHandle>,<Country Code>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Country Code	Range: 2-3	String	It specifies the Country code to be set in WLAN enabled interface. Note: Please refer Appendix B - List of Country Code, for list of countries and its code.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WCCS=1,"IN"
OK
```

7.1.7. Get Regulatory Domain - +WREGDG

Description

This command is used to get the Regulatory domain set in the driver.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WREGDG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained from AT+WI or AT+WNI command.

Response

```
+WREGDG:<Regulatory domain>
```

Response Parameters Description

Parameter	Range	Type	Description
Regulatory domain	N/A	ETSI, FCC, APL, TELEC	It specifies the current regulatory domain of the interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WREGDG=1
+WREGDG:ETSI
OK
```

7.1.8. Set Regulatory Domain - +WREGDS

Description

This command sets the Regulatory domain.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WREGDS=<WHandle>,<Regulatory domain>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Regulatory domain	Range: 3-5	String	It specifies the Regulatory domains to be set in WLAN interface. ETSI, FCC, APL, TELEC are the supported domains.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WREGDS=1,"TELEC"
OK
```

7.1.9. Get Physical Mode - +WPHYMODEG

Description

This command gives the physical mode of the WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WPHYMODEG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.

Response

+WPHYMODEG:<Physical mode>

Response Parameters Description

Parameter	Range	Type	Description
Physical mode	N/A	A, B, G, AG, AN, GN, AGN	It specifies the current physical mode of the given interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WPHYMODEG=1
+WPHYMODEG:AGN
OK
```

7.1.10. Set Physical Mode - +WPHYMODES

Description

This command sets the physical mode of the WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WPHYMODES=<WHandle>,<Physical mode>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Physical mode	Range: 1-3	String	It specifies the physical mode of the WLAN enabled interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WPHYMODES=1,"AN"
OK
```

7.1.11. Power Save - +WPOWERSAVE

Description

This command sets the power save option in WLAN interface.

Pre-requisites

AT+WI=0 or AT+WNI=0 command should be issued.

Syntax

AT+WPOWERSAVE=<WHandle>,<Power save>,[<Idle time>,<PS Poll number>,<DTIM Policy>,<Transmission number to wakeup>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI=0 or AT+WNI=0 command.
Power save	Range: 0-1	Integer	It specifies the WLAN driver to enable power save mode or to be in full performance mode. 1-Enables power save mode, 0-Disables power save mode.
Idle time	Range: 0-65535 Default: 200	Integer	It specifies the time (in milliseconds) taken by WLAN driver to enter power save mode after device connection.
PS Poll number	Range: 1-65535 Default: 1	Integer	It specifies the number of contiguous PS-Poll frames the WLAN firmware sends before sending 802.11 NULL frame. To indicate the exit from power save mode in an Access Point.
DTIM Policy	Range: 2-4 Default: 3	Integer	It specifies the DTIM policy followed by a station in power save mode, where: 2-is for Station wakeup in TIM interval, 3-is for Station wakeup only in DTIM interval, 4-is for station wakeup in both TIM and DTIM interval.
Transmission number to wakeup	Range: 0-65535 Default: 1	Integer	It specifies after how many number of contiguous transmission of the packets, the device is set to come out of power save mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WPOWERSAVE=1,1,1000,3,3,5
OK
```


7.1.12. Set Transmission Power - +WTXPOWERS

Description

This command sets the transmission power of the WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WTXPOWERS=<WHandle>,<Transmission power>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Transmission power	Range: 0-63	Integer	It specifies the value of the transmission power in WLAN interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WTXPOWERS=34
OK
```

7.1.13. Get Transmission Rate - +WXRATEG

Description

This command is used to get the value of transmission rate in WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WXRATEG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.

Response

+WXRATEG:<Transmission rate>

Response Parameters Description

Parameter	Range	Type	Description
-----------	-------	------	-------------

Transmission rate	1-20	Integer	<p>It specifies the current transmission rate of the interface, where:</p> <p>The user defined transmission rate is:</p> <p>1-1Mbps, 2-2Mbps, 3-5.5Mbps, 4-6Mbps, 5-9Mbps, 6-11Mbps, 7-12Mbps, 8-18Mbps, 9-24Mbps, 10-36Mbps, 11-48Mbps, 12-54Mbps 13-MCS0, 14-MCS1, 15-MCS2, 16-MCS3, 17-MCS4, 18-MCS5, 19-MCS6, 20-MCS7.</p>
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Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WXRATEG=1
+WXRATEG:12
OK
```

7.1.14. Set Transmission Rate - +WXRATES

Description

This command sets the transmission rate of the WLAN interface.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WXRATES=<WHandle>,<Transmission rate>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Transmission rate	Range: 1-20	Integer	It specifies the value of the transmission rate set in WLAN interface. The user defined transmission rate is: 1-1Mbps, 2-2Mbps, 3-5.5Mbps, 4-6Mbps, 5-9Mbps, 6-11Mbps, 7-12Mbps, 8-18Mbps, 9-24Mbps, 10-36Mbps, 11-48Mbps, 12-54Mbps 13-MCS0, 14-MCS1, 15-MCS2, 16-MCS3, 17-MCS4, 18-MCS5, 19-MCS6, 20-MCS7.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WXRATES=1,12
OK
```

7.1.15. Get RSSI - +WRSSIG

Description

This command is used to get the RSSI value of the WLAN interface.

Pre-requisites

AT+WI=0 or AT+WNI=0 command should be issued.

Syntax

AT+WRSSIG

Response

+WRSSIG:<RSSI value>

Response Parameters Description

Parameter	Range	Type	Description
RSSI value	N/A	Integer	It specifies the RSSI value of the given interface.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WRSSIG
+WRSSIG:30
OK
```

7.1.16. Send Raw Packets - +WRAWPKTS

Description

This command is used to send the raw WLAN packets (Beacon, QOS data, 4 address data).

The device must be in disassociation state and at maximum performance when user send raw WLAN packets.\b

Combinations of four addresses are:

Beacon Data frame:

addr1 - Receiver and destination address, Broadcast address.

addr2 - Transmitter and source address, Own MAC address.

addr3 - BSSID address, Own MAC address.

addr4 - Not used.

QOS Data frame:

addr1 - BSSID and Receiver address of the network (AP).

addr2 - Source and Transmitter address in the network (STA1).

addr3 - Destination address (STA2).

4 ADDR Data frame:

addr1 - Receiver address.

addr2 - Transmitter address.

addr3 - Destination address.

addr4 - Source address.

Pre-requisites

AT+WI or AT+WNI command should be issued.

Syntax

AT+WRAWPKTS=<WHandle>,<Rate index>,<Number of tries>,<Channel>,<Packet type>,<addr1>,<addr2>,<addr3>,[<addr4>],<Data length>,<Payload>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Rate index	Range: 0-20	Integer	It specifies the data rate in which the WLAN raw packet are sent.
Number of tries	Range: 1-14	Integer	It specifies the number of packets that is sent over the air by WLAN driver.
Channel	Range: 1-14	Integer	It specifies the channel in which WLAN raw packets are sent.
Packet type	Range: 0-2	Integer	It specifies the payload sent in raw WLAN packet, where: 0-for Beacon, 1-for QOS data, 2-for 4 addr data packet.
addr1	Range:	MAC Address	It specifies the MAC address of addr1 that sends the raw WLAN packet over the air. The use of addr1 in different scenarios are as described in the command description.
addr2	Range:	MAC Address	It specifies the MAC address of addr2 that sends the raw WLAN packet over the air. The use of addr2 in different scenarios are as described in the command description.
addr3	Range:	MAC Address	It specifies the MAC address of addr3 that sends the raw WLAN packet over the air. The use of addr3 in different scenarios are as described in the command description.
addr4	Range: N/A Default:	MAC Address	It specifies the MAC address of addr4 that sends the raw WLAN packet over the air. The use of addr4 in different scenarios are as described in the command description.
Data length	Range: 1-1400	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.

Payload	Range: 1-1400	Binary Data	It specifies the payload sent in raw WLAN packet (beacon, QOS data, 4 addr data packet).
---------	---------------	-------------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WRAWPKTS=1,1,10,6,0,ff:ff:ff:ff:ff,11:22:33:44:55:63,11:22:33:44:55:65,,5,"abcde"
OK
```

7.1.17. Set Promiscuous Filter - +WPROMISCSETFILTER

Description

This command sets the parameters in the promiscuous filter used for wireless sniffing.

Pre-requisites

AT+WI=1 or AT+WNI=1 command should be issued, as the device supports 0 only.

Syntax

AT+WPROMISCSETFILTER=<WHandle>,<Filter number>,<Channel>,[<Source MAC address>,<Destination MAC address>,<Frame type>,<Sub type>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Filter number	Range: 1-3	Integer	It specifies the number of filters; the user sets or sniffs. Note: Current release supports only 1 filter.
Channel	Range: 1-14	Integer	It specifies the channel to sniff.
Source MAC address	Range: N/A Default: N/A	MAC Address	It specifies the source MAC address of the filter.
Destination MAC address	Range: N/A Default: N/A	MAC Address	It specifies the destination MAC address of the filter.
Frame type	Range: 0-2 Default: 0xff	Integer	It specifies the type of the frame.
Sub type	Range: 0-47 Default: 0xff	Integer	It specifies the sub type.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+WPROMISCSETFILTER=0,1,6,00:8e:f2:56:24:04,ff:ff:ff:ff:ff,0,8
OK
```

7.1.18. Start Promiscuous Mode - +WPROMISCCMD

Description

This command starts the device in Promiscuous mode.

Pre-requisites

AT+WPROMISCSETFILTER command should be issued.

Syntax

AT+WPROMISCCMD=<WHandle>,<Mode>,<Filter number>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Mode	Range: 0-1	Integer	It specifies the mode of the promiscuous filter, where: 0-Disable, 1-Enable.
Filter number	Range: 1-3	Integer	It specifies the number of filters; the user sets or sniffs. Note: Current release supports only 1 filter.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WPROMISCCMD=0,1,1
OK
```

Asynchronous Response

+WPROMISCCMD:<info>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
info	N/A	String	It displays the captured packet.

7.1.19. Application Information Element - +WAPPIE

Description

This command adds the application Information Element (IE) to the beacon, probe response frames in AP mode and probe request frame in Station mode.

In station mode, the application IE and the subsequent probe request will have the IE added by the user.

In AP mode, create a Network and then issue the command to add the application IE.

Pre-requisites

AT+WI command should be issued.

Syntax

AT+WAPPIE=<WHandle>,<Frame type>,<OUI>,[<Data length>,<Vendor content>]

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 0-1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command.
Frame type	Range: 0-2	Integer	It specifies the driver in which the application IE frame is set, where: 0-for Beacon, 1-for Probe request, 2-for Probe response
OUI	Range: 0-6	String	It specifies the parameter used to indicate the WLAN driver with the OUI value of the vendor specific information element. The input is 6bytes. Ex: If the OUI value is 5 6A 9D then user must give 05 6A 9D.
Data length	Range: 0-504 Default: N/A	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Vendor content	Range: 0-504 Default: N/A	Binary Data	It specifies the specific content of the vendor in the Information element.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WAPPIE=1,1,"506f9a",4,
OK
```

7.1.20. Set Beacon Miss Interval - +WBMISSINTS

Description

This command sets the Beacon miss interval, where station mode is disconnected from the network after sync loss.

Pre-requisites

AT+WI=0 or AT+WNI=0 command should be issued.

Syntax

AT+WBMISINTS=<Beacon miss time>

Parameters Description

Parameter	Value	Format	Description
Beacon miss time	Range: 10-60	Integer	It specifies the time set for the missing beacon in seconds.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+WBMISINTS=10

OK

7.2. Bluetooth Low Energy (BLE)

BLE provides AT commands to discovery of the devices, query of services, and sends information. It is used for easy sensor integration, configuration (provisioning), management and diagnostics.

Communication between the devices are:

- Central and Peripheral: It determines the role of BLE connection itself. Device in central role – scans and advertises. Device in peripheral role makes the advertisement.
- GATT server and GATT Client functionality: It determines the type of communication of the devices, once the connection is set up.

7.2.1. BLE Initialize/De-initialize - +BI

Description

This command is used to initialize/de-initialize BLE stack.

Pre-requisites

None.

Syntax

AT+BI=<START>

Parameters Description

Parameter	Value	Format	Description
START	Range: 0-1	Integer	It specifies the initialization/de-initialization of the BLE stack, where: 1- initializes BLE stack, 0- de-initializes BLE stack.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To initialize BLE:

AT+BI=1

```
OK
AT+BI=0
OK
```

7.2.2. BLE Own Device Address - +BOAD

Description

This command is used to read the Bluetooth device address.

Note:

1. Wi-Fi Station MAC address or the Sticker MAC address is global MAC unique addresses. Limited AP MAC address is derived from Station MAC as it is limited to that specific network.
2. BT MAC or Sticker MAC address + 1 is also global MAC unique addresses.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BOAD
```

Response

```
+BOAD:<Bluetooth Device Address>
```

Response Parameters Description

Parameter	Range	Type	Description
Bluetooth Device Address		String	It specifies the Bluetooth device's own device address.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BOAD
+BOAD:"008025123456"
OK
```

7.2.3. BLE Connect - +BCONNECT

Description

This command is used to establish a GATT connection to a peripheral device directly via its address.

Note: It supports a maximum of 4 connections in central role

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BCONNECT=<Bluetooth Remote Address>,<Bluetooth Address Type>

Parameters Description

Parameter	Value	Format	Description
Bluetooth Remote Address	Range: 1-48	String	It specifies the Bluetooth remote device address (12 hex digits) to connect.
Bluetooth Address Type	Range: 1-2	String	It specifies the remote Bluetooth address type, where: t2 - Public address, t3 - Random address.

Response

+BCONNECT:<Connection Handle>

Response Parameters Description

Parameter	Range	Type	Description
Connection Handle		Hexadecimal	It specifies the Connection handle of the device. Once the connection with remote device successful, this connection handle is not set to a fixed value which is different for each connection. The given connection handle is required for further activities in this peripheral device.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BCONNECT="008025D11DE4","t2"
+BCONNECT:1
OK
```

Asynchronous Response

+BCONNECT:<Connect Status>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Connect Status		CONNECT,	It specifies the details of the changed

		DISCONNECT	Characteristic.
--	--	------------	-----------------

7.2.4. BLE Disconnect - +BDISCONNECT

Description

This command is used to disconnect the existing Bluetooth connection addressed by the connection handle, from the corresponding CONNECT event.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BDISCONNECT=<CONNECTION HANDLE>

Parameters Description

Parameter	Value	Format	Description
CONNECTION HANDLE	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the connection handle of the connected device.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BDISCONNECT=1
OK
```

7.2.5. BLE Scan - +BSCAN

Description

This command is used to discover all the BLE devices.

Note: Current release, the scan results are not based on input parameters, so all the discovered BLE devices are printed.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BSCAN=[<Bluetooth Remote Address>]

Parameters Description

Parameter	Value	Format	Description
Bluetooth Remote Address	Range: 1-48 Default:	String	It specifies the scan results using Bluetooth remote address of the devices to be discovered.

Note: 1).The scan time is 10 seconds.

Response

+BSCAN:<BDADDR>,<NAME>,<RSSI>,<BDADDRTYPE>,<CONNECTIONTYPE>

Response Parameters Description

Parameter	Range	Type	Description
BDADDR		String	It specifies the Bluetooth device address of discoverable device.
NAME		String	It specifies the Device advertise friendly name of the discoverable device.
RSSI		Integer	It specifies the RSSI value of discoverable device.
BDADDRTYPE		String	It specifies the Bluetooth device address type of the discoverable device.
CONNECTIONTYPE		String	It specifies the Connection type of the discoverable device.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BSCAN
+BSCAN:"008025D1D6D9","BM+S50",-67,"t2","CONN_UNDIRECTED"
OK
AT+BSCAN="008025D1D6D9"
+BSCAN:"008025D1D6D9","BM+S50",-67,"t2","CONN_UNDIRECTED"
OK
```

7.2.6. BLE Scan Response Data - +BSCANRSPDATA

Description

This command sets the scan response data for a customized advertising.

Pre-requisites

AT+BI=1 command should be issued, and Customized advertising should be enabled using AT+BADVE command.

Syntax

AT+BSCANRSPDATA=<Scan Response Data>

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

Scan Response Data	Range: 0-32	String	It specifies the scan response data for a customized advertising. <value1> .. <valuek> Where: <valuek> represents an octet in hexadecimal format, k <= 31.
--------------------	-------------	--------	---

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To Set UUID of battery service.
AT+BSCANRSPDATA="03020F18"
OK
```

Following command is used to get the status of the scan response data:

Syntax

```
AT+BSCANRSPDATA?
```

Response

```
+BSCANRSPDATA:<Scan Response Data>
```

Response Parameters Description

Parameter	Range	Type	Description
Scan Response Data		String	It specifies the scan response data set by the user.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BSCANRSPDATA?
+BSCANRSPDATA:"03020F18"
OK
```

7.2.7. BLE Device Name - +BNAME

Description

This command is used to modify the local device name that is seen on a remote Bluetooth device during device or service discovery.

Pre-requisites

AT+BI=1 command and AT+BADVE=3 should be issued. After setting the local device name, enable advertising using AT+BADVE=1.

Syntax

```
AT+BNAME=<Local Device Name>
```

Parameters Description

Parameter	Value	Format	Description
Local Device Name	Range: N/A	String	It specifies the name of the local Device which has a limit up to 20 characters. The name suffixes with last 6 digits of the MAC address of the device. Ex: If the device name is given as "MyDevice" and the last 6 digits of mac address is 123456, then the device name is "MyDevice_123456"

Response

+BNAME:<Local Device Name>

Response Parameters Description

Parameter	Range	Type	Description
Local Device Name		String	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set the local device name.

AT+BNAME="MyDevice"

+BNAME:"MyDevice_123456"

OK

where "123456" is last 6 digits of mac address of the device

Following command is used to get the local device name:

Syntax

AT+BNAME?

Response

+BNAME:<Device Name>

Response Parameters Description

Parameter	Range	Type	Description
Device Name		String	It specifies the Device name.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

at+BNAME?

```
+BNAME:"MyDevice_123456"
OK
```

7.2.8. BLE Input/Output Capabilities - +BIOCAP

Description

This command is used to set the input and output capabilities of the device used for SSP (Simple Secure Pairing).

Pre-requisites

Issue the command AT+BI=1 before using this command.

Syntax

AT+BIOCAP=<Input/output capabilities>

Parameters Description

Parameter	Value	Format	Description
Input/output capabilities	Range: 0-4	Integer	It specifies the input and output capabilities of the device used for SSP, where: 0 - Display only, related command-NA, event-SSPPIN. 1 - Display Yes/No, related command-AT+BSSPCONF (secure connection), event-SSPPIN, SSPCONF. 2 - Keyboard only, related command-AT+BSSPPIN, event-SSPPIN. 3 - No Input and No Output (default), NA,NA. 4 - Display and Keyboard, related command-AT+BSSPPIN, AT+BSSPCONF, events-SSPPIN, SSPCONF.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BIOCAP=4
OK
```

Following command is used to get the status of the minimum connection interval:

Syntax

AT+BIOCAP?

Response

+BIOCAP:<Input/output capabilities>

Response Parameters Description

Parameter	Range	Type	Description
Input/output capabilities		Integer	It specifies the Input/output capabilities of the device.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BIOCAP?
+BIOCAP:2
OK
```

Asynchronous Response

+SSPPIN:<Bluetooth address>,<Bluetooth address Type>,<?>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Bluetooth address		String	It specifies the Bluetooth Device Address.
Bluetooth address Type		String	It specifies the Bluetooth Device Address Type.
PASSKEY		Hexadecimal	It specifies the passkey to be entered or displayed.

7.2.9. Bond List - +BBNDLIST

Description

This command is used to display information about the bonded devices. Each entry in the bonded-device list contains the Bluetooth address, Bluetooth address type (t2-BLE public Address, t3-BLE Random address) and device role (C-Central, P-Peripheral).

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BBNDLIST

Response

+BBNDLIST:<BD Address>,<BD Address Type>,<Device Role>

Response Parameters Description

Parameter	Range	Type	Description
BD Address		String	It specifies the Bluetooth device of own device address.
BD Address Type		String	It specifies the Bluetooth device address type.
Device Role		String	It specifies the role of the device like C- device

			acts as a Central, P-device act as a Peripheral.
--	--	--	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BBNDLIST
+BBNDLIST:"008025D1D764","t2","C"
OK
```

7.2.10. Bond Delete - +BBNDDEL

Description

This command is used to delete the stored bonding information.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BBNDDEL=[<BD Address>]
```

Parameters Description

Parameter	Value	Format	Description
BD Address	Range: 1-48 Default:	String	It specifies the bond of device address or all the stored bond information to be deleted. Bluetooth Address - Delete the bond of the device with specified address from the bonded-device list, if no input is given then it will delete all bonded devices from the bonded-device list.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BBNDDEL
OK
AT+BBNDDEL="0080254800DA"
OK
```

7.2.11. BLE Secure Simple Pairing PIN (SSP-PIN) - +BSSPPIN

Description

This command is used generate SSPPIN during authentication.

If an authentication is initiated, depending on the I/O capabilities (AT+BIOCAP) the AT interface generates an event SSPPIN and asks the user for the SSP passkey.

```
Asynchronous Event: +SSPPIN:<Bluetooth address>,<,address type><?>
```

The user must answer this request with the SSP passkey displayed on the remote device. The passkey generated by the remote device is a six-digit pin which the user cannot modify.

Pre-requisites

None

Syntax

AT+BSSPPIN=<Bluetooth Address>,<Bluetooth Address Type>,<SSP Passkey>

Parameters Description

Parameter	Value	Format	Description
Bluetooth Address	Range: 1-48	String	It specifies the remote Bluetooth address.
Bluetooth Address Type	Range: 1-2	String	It specifies the remote Bluetooth address type, where: t2 - public address, t3 - random address.
SSP Passkey	Range: "0-999999"	Integer	It specifies the SSP passkey displayed on the remote device.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BSSPPIN="00802507C08D","t2",314546

OK

7.2.12. BLE FixPin - +BFXPIN

Description

This command is used to generate a fix pin that is used in the security procedure.

Pre-requisites

Issue the command AT+BI=1 before using the fix pin.

Syntax

AT+BFXPIN=[<Fix Pin>]

Parameters Description

Parameter	Value	Format	Description
Fix Pin	Range: 1-6 Default:	String	It specifies the length of the fix pin. If the value of the pin is not set to any 6-digit pin, then the 6-digit pin is set for the value "0" which is generated randomly. The 6-digit pin value "0" is "000000" which is default.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BFIXPIN="123456"
OK
AT+BFIXPIN
OK
```

Following command is used to get the set fixpin:

Syntax

```
AT+BFIXPIN?
```

Response

```
+BFIXPIN:<Fixpin>
```

Response Parameters Description

Parameter	Range	Type	Description
Fixpin		String	It specifies the 6-digit pin.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BFIXPIN?
+BFIXPIN:"123456"
OK
```

7.2.13. BLE Secure Simple Pairing Confirmation (SSP-CONF) - +BSSPCONF

Description

This command is used to confirm the Security Pairing of a device. The user must confirm the passkey - if no confirmation is sent by the user within the bonding time (which is approximately 30 seconds) then the pairing is rejected.

Pre-requisites

If a pairing is initiated and LE secure connection is supported, depending on the security settings AT interface generates an event SSPCONF and asks the user for confirmation.

Asynchronous Event: +SSPCONF:<Bluetooth address>,<address type>,<passkey><?>

Syntax

```
AT+BSSPCONF=<Bluetooth Address>,<Bluetooth Address Type>,<Passkey Confirmation>
```

Parameters Description

Parameter	Value	Format	Description
Bluetooth Address	Range: 1-48	String	It specifies the remote Bluetooth address.

Bluetooth Address Type	Range: 0-2	String	It specifies the remote Bluetooth address type, where: t2- public address, t3- random address.
Passkey Confirmation	Range: 0-1	Integer	It specifies the confirmation request of the passkey, where: 0 - Reject passkey confirmation request, 1 - Accept passkey confirmation request.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BSSPCONF="00802507C08D","t2",1
OK
```

7.2.14. BLE Product ID - +BPNPPID

Description

This command is used to set product ID provided in the device information service (DIS). To activate a new PNPPID value, it is necessary to store the settings and perform a reset.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BPNPPID=<Product ID>
```

Parameters Description

Parameter	Value	Format	Description
Product ID	Range: 0X0-0XFFFF	Hexadecimal	It specifies the value of the product ID to be set which is a 16-bit hex value.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To set the PnP Product ID to 0x1234.
AT+BPNPPID=1234
OK
```

Following command is used to get the status of the product ID in the device information service:

Syntax

```
AT+BPNPPID?
```

Response

```
+BPNPPID:<PnP Product ID>
```

Response Parameters Description

Parameter	Range	Type	Description
PnP Product ID		Hexadecimal	It specifies the Product ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+BPnPPID?
+BPnPPID:B01A
OK
```

7.2.15. BLE Product Version ID - +BPnPPVER

Description

This command is used to set the product version provided in the device information service (DIS). To activate a new PnPPVER value, it is necessary to store the settings and perform a reset.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BPnPPVER=<Product Version>

Parameters Description

Parameter	Value	Format	Description
Product Version	Range: 0X0-0XFFFF	Hexadecimal	It specifies the version of the product to be set which is a 16-bit hex value. For example: - 0x0100 for firmware version 1.00.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To set the PnP Product Version to 0x0100.
AT+BPnPPVER=0100
OK
```

Following command is used to get the status of the product version in the device information service:

Syntax

AT+BPnPPVER?

Response

+BPnPPVER:<PnP Product Version>

Response Parameters Description

Parameter	Range	Type	Description
-----------	-------	------	-------------

PnP Product Version		Hexadecimal	It specifies the Product version.
---------------------	--	-------------	-----------------------------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+BPnPPVER?
+BPnPPVER:700
OK
```

7.2.16. BLE Vendor ID - +BPnPVID

Description

This command is used to set the vendor ID provided in the device information service (DIS). To activate a new PNPVID value, it is necessary to store the settings and perform a reset.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BPnPVID=<Vendor ID>
```

Parameters Description

Parameter	Value	Format	Description
Vendor ID	Range: 0X0-0XFFFF	Hexadecimal	It specifies the value set as the vendor ID to be set which is a 16-bit hex value. Telit vendor ID is 0x008F which is default.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To set the PnP vendor ID to 0x7890.
AT+BPnPVID=7890
OK
```

Following command is used to get the status of the vendor ID in the device information service:

Syntax

```
AT+BPnPVID?
```

Response

```
+BPnPVID:<PnP Vendor ID>
```

Response Parameters Description

Parameter	Range	Type	Description
PnP Vendor ID		Hexadecimal	It specifies the Vendor ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+BPNPVID?
+BPNPVID:8F
OK
```

7.2.17. BLE Source Vendor ID - +BPNPVSRC

Description

This command is used to set the vendor ID source provided in the device information service (DIS). To activate a new PNPVID value, it is necessary to store the settings and perform a reset.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BPNPVSRC=<Vendor ID Source>
```

Parameters Description

Parameter	Value	Format	Description
Vendor ID Source	Range: 1-2	Integer	It specifies the value of the vendor ID source to be set, where: 1 - Bluetooth SIG assigned company ID, 2 - USB assigned company ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To set the PnP vendor ID source to USB assigned company ID.
AT+BPNPVSRC=2
OK
```

Following command is used to get the status of the vendor ID source in the device information service:

Syntax

```
AT+BPNPVSRC?
```

Response

```
+BPNPVSRC:<PnP Vendor ID Source>
```

Response Parameters Description

Parameter	Range	Type	Description
PnP Vendor ID Source		Integer	It specifies the Vendor ID source.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+BPNPVSRV?
+BPNPVSRV:1
OK
```

7.2.18. BLE Terminal Input/Output - +BTIO

Description

This command controls the mode of terminal I/O service.

Note: In AT+BADVE=0 command, TIO service is enabled only if TIO mode is set to 1 using AT+BTIO=1 command.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BTIO=<TIO Mode>

Parameters Description

Parameter	Value	Format	Description
TIO Mode	Range: 0-1	Integer	It specifies the parameter used to set the mode of TIO service, where: 0 - Disables Terminal I/O service (no advertising, no characteristics) 1 - Enables Terminal I/O service, no security.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To start TIO service:
AT+BTIO=1
OK

Following command is used to get the TIO mode:

Syntax

AT+BTIO?

Response

+BTIO:<TIO Mode>

Response Parameters Description

Parameter	Range	Type	Description
TIO Mode		Integer	It specifies the TIO mode.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+BTIO?
+BTIO:0
OK
```

7.2.19. BLE Terminal Input/Output Data Mode - +BTIODATAMODE

Description

This command is used to switch to Data mode from AT command mode when TIO connection is active.

Note: There are 2 ways to switch to AT command mode from TIO data mode:

- a) When existing TIO connection is terminated.
- b) When the pattern <1 second delay>+++<1 second delay> is entered in TIO data mode.

Pre-requisites

Syntax

AT+BTIODATAMODE

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
To start TIO Data mode:
AT+BTIODATAMODE
OK
```

7.2.20. BLE Advertise Data - +BADDATA

Description

This command is used to setup the advertising data for a customized advertising.

Pre-requisites

AT+BI=1 command should be issued, and customized advertising data should be enabled using AT+BADVE command.

Syntax

AT+BADDATA=<Advertising Data>

Parameters Description

Parameter	Value	Format	Description
Advertising Data	Range: 0-32	String	It specifies the customized advertising data. <value1> .. <valuek> Where: <valuek> represents an octet in hexadecimal format, k <= 31.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set flags and UUID of battery service.

AT+BADVDATA="02010603020F18"

OK

Following command is used to get the value of customized advertising data:

Syntax

AT+BADDATA?

Response

+BADVDATA:<Advertising Data>

Response Parameters Description

Parameter	Range	Type	Description
Advertising Data		String	It specifies the Advertising data set by the user.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BADVDATA?

+BADVDATA:"02010603020F18"

OK

7.2.21. BLE Advertise Enable - +BADVE

Description

This command is used to control the advertising behavior.

Note: AT+BADVE=0 starts TIO service only if TIO mode is enabled using AT+BTIO command.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BADVE=<Advertising>

Parameters Description

Parameter	Value	Format	Description
Advertising	Range: 0-3	Integer	It specifies the behavior of advertising, where: 0 - Advertising is ON with Customized advertising DISABLED and TIO service being ENABLED 1 - Advertising is ON with Customized advertising being ENABLED, 2 - Reserved,

			3 - Advertising is OFF.
--	--	--	-------------------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To stop the advertisement.

AT+BADVE=3

OK

To start the TIO service.

AT+BADVE=0

OK

Following command is used to get the status of advertising:

Syntax

AT+BADVE?

Response

+BADVE:<Advertising>

Response Parameters Description

Parameter	Range	Type	Description
Advertising		Integer	It specifies the status of Advertising.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BADVE?

+BADVE:1

OK

7.2.22. BLE Maximum Advertising Interval - +BADVINTMAX

Description

This command is used to configure the maximum advertising interval for a Bluetooth Low Energy peripheral.

The maximum advertising interval should be greater than minimum advertising interval

Pre-requisites

None.

Syntax

AT+BADVINTMAX=<Maximum Advertising Interval>

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

Maximum Advertising Interval	Range: 20-10240	Integer	It specifies maximum interval used for advertising (in milliseconds) in a Bluetooth Low Energy peripheral, the default interval is 1280ms.
------------------------------	-----------------	---------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set Maximum Advertising Interval to 1280 msec.

AT+BADVINTMAX=1280

OK

Following command is used to get the value of the maximum advertising interval:

Syntax

AT+BADVINTMAX?

Response

+BADVINTMAX:<Maximum Advertising Interval>

Response Parameters Description

Parameter	Range	Type	Description
Maximum Advertising Interval		Integer	It specifies the maximum advertising interval value.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BADVINTMAX?

+BADVINTMAX:200

OK

7.2.23. BLE Minimum Advertising Interval - +BADVINTMIN

Description

This command is used to configure the minimum advertising interval for a Bluetooth Low Energy peripheral.

Pre-requisites

Based on the value set for the maximum advertising interval, the minimum advertising interval range is calculated.

Syntax

AT+BADVINTMIN=<Minimum Advertising Interval>

Parameters Description

Parameter	Value	Format	Description
Minimum	Range: 20-	Integer	It specifies minimum interval used for advertising

Advertising Interval	10240		(in milliseconds) in a Bluetooth Low Energy peripheral.
----------------------	-------	--	---

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set Minimum Advertising Interval to 200 msec.

AT+BADVINTMIN=200

OK

Following command is used to get the value of minimum advertising interval:

Syntax

AT+BADVINTMIN?

Response

+BADVINTMIN:<Minimum Advertising Interval>

Response Parameters Description

Parameter	Range	Type	Description
Minimum Advertising Interval		Integer	It specifies the value of minimum advertising interval.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BADVINTMIN?

+BADVINTMIN:100

OK

7.2.24. BLE Maximum Connection Interval - +BCONINTMAX

Description

This command is used to configure the maximum connection interval for a Bluetooth Low Energy connection.

Pre-requisites

None.

Syntax

AT+BCONINTMAX=<Maximum Connection Interval>

Parameters Description

Parameter	Value	Format	Description
Maximum Connection Interval	Range: 8-4000	Integer	It specifies the maximum connection interval for a Bluetooth Low Energy connection in milliseconds. Note: It is not possible to support multiple

			connection for a short connection interval. Since there is no space for the connection intervals. By default, the connection interval is 400msec.
--	--	--	---

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set Maximum connection Interval to 100 msec.

AT+BCONINTMAX=100

OK

Following command is used to get the status of the maximum connection interval:

Syntax

AT+BCONINTMAX?

Response

+BCONINTMAX:<Maximum Connection Interval>

Response Parameters Description

Parameter	Range	Type	Description
Maximum Connection Interval		Integer	It specifies the maximum connection interval.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

at+BCONINTMAX?

+BCONINTMAX:40

OK

7.2.25. BLE Minimum Connection Interval - +BCONINTMIN

Description

This command is used to configure the minimum connection interval for a Bluetooth Low Energy connection.

Pre-requisites

None.

Syntax

AT+BCONINTMIN=<Minimum Connection Interval>

Parameters Description

Parameter	Value	Format	Description
Minimum Connection Interval	Range: 8-4000	Integer	It specifies the minimum connection interval for a Bluetooth Low Energy connection in milliseconds. Note: It is not possible to support multiple

			connection for a short connection interval. Since there is no space for the connection intervals. By default, the connection interval is 400msec.
--	--	--	---

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set Minimum connection Interval to 600 msec.

`AT+BCONINTMIN=600`

`OK`

Following command is used to get the status of the minimum connection interval:

Syntax

`AT+BCONINTMIN?`

Response

`+BCONINTMIN:<Minimum Connection Interval>`

Response Parameters Description

Parameter	Range	Type	Description
Minimum Connection Interval		Integer	It specifies the minimum connection interval.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

`at+BCONINTMIN?`

`+BCONINTMIN:400`

`OK`

7.2.26. BLE Slave Latency - +BSLAVELAT

Description

This command is used to configure the slave latency during connection interval in a Bluetooth Low Energy connection.

Pre-requisites

None.

Syntax

`AT+BSLAVELAT=<Slave Latency>`

Parameters Description

Parameter	Value	Format	Description
Slave Latency	Range: 0-200	Integer	It specifies the slave latency in the connection intervals, in a Bluetooth Low Energy connection. The default value 0 uses no slave latency.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set slave latency to default (Use no slave latency).

AT+BSLAVELAT=0

OK

To set slave latency to 5 connection intervals.

AT+BSLAVELAT=5

OK

Following command is used to get the status of the slave latency:

Syntax

AT+BSLAVELAT?

Response

+BSLAVELAT:<Slave Latency>

Response Parameters Description

Parameter	Range	Type	Description
Slave Latency		Integer	It specifies the slave latency.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BSLAVELAT?

+BSLAVELAT:0

OK

7.2.27. BLE Service Discovery - +BSRVD

Description

This command is used to discover the services and characteristics.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BSRVD=<CONNECTION HANDLE>,[<UUID OF SERVICE>,<UUID TYPE>]

Parameters Description

Parameter	Value	Format	Description
CONNECTION HANDLE	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the connection handle returned at the time of BLE connect command.

UUID OF SERVICE	Range: 1-256 Default:	String	It specifies the UUID of the service for discovery.
UUID TYPE	Range: 0-2 Default:	Integer	It specifies the type of the UUID service for discovery, where: 0- 16-bit UUID. 1- 128-bit UUID. 2- 32-bit UUID.

Response

+BSRVD:<UUID>

Response Parameters Description

Parameter	Range	Type	Description
UUID		String	Specifies the UUID of the service.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BSRVD=1
+BSRVD:"UUID:AB12"
OK
AT+BSRVD=1,"AB12"
+BSRVD:"UUID:AB12"
CHARUUID:12FE
CHARHNDL:2D
OK
```

Note: If the connection handle is provided it will display all available services of the device. If the same command is executed with connection handle and UUID, it will display the characteristics and properties of the UUID.

7.2.28. BLE Read - +BREAD

Description

This command reads the characteristics value of a service.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BREAD=<Connection Handle>,<Characteristic Handle>

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

Connection Handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the connection handle returned during BLE connect command.
Characteristic Handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the characteristic handle returned during service discovery.

Response

+BREAD:<CONNHNDL>,<CHARHNDL>,<HEXDATA>

Response Parameters Description

Parameter	Range	Type	Description
CONNHNDL		Hexadecimal	It specifies the Connection handle of the device, once the connection with remote device successful.
CHARHNDL		Hexadecimal	It specifies the characteristic handle of the device, once the characteristic of service discovered.
HEXDATA		String	It specifies the Read data value of the characteristic.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BREAD=1,2B
+BREAD:1,2B,"6162"
OK
```

7.2.29. BLE Write - +BWRITE

Description

This command is used to write the characteristics value of a service.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BWRITE=<Connection Handle>,<Characteristic Handle>,<Hex Data>

Parameters Description

Parameter	Value	Format	Description
Connection Handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the connection handle returned at the time of BLE connect command.
Characteristic Handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the Characteristic handle returned using service discovery command (AT+BSRVD).
Hex Data	Range: 0-20	String	It specifies ASCII coded byte stream as hexadecimal values. For example: 6162 for a 2-byte value.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+BWRITE=1,2B,"6162"

OK

7.2.30. BLE Client Character Configuration - +BCCCD

Description

This command enables or disables the notifications and indications for the characteristic feature.

Pre-requisites

None.

Syntax

AT+BCCCD=<Connection handle>,<Characteristic handle>,<CCCD>

Parameters Description

Parameter	Value	Format	Description
Connection handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the return value of Connection handle during BLE connect.
Characteristic handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the return value of the Characteristic handle during BLE Service discovery.
CCCD	Range: 0-2	Hexadecimal	It specifies the state of the Client Characteristic Configuration Descriptor, where: 0-Disables CCCD, 1-Enables CCCD notifications, 2-Enables CCCD indications.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To enable notifications:
 AT+BCCCD=1,2b,1
 OK

7.2.31. BLE Attribute Server - +BATTRIB

Description

This command is used to define the attributes of one or more services in the GATT server. The maximum number of services and characteristics depends on the features being used.

Note: Current release supports 5 services with maximum number of possible characteristics limited to 8 in each service.

Pre-requisites

AT+BI=1 command should be issued. BLE stack should be initialized.

Syntax

AT+BATTRIB=<Type>

Parameters Description

Parameter	Value	Format	Description
Type	Range:	RAW Data	It specifies the type of services or characteristics to be used, where: 1). "pserv" <type>="pserv". <par1>=primary service UUID (MANDATORY). Ex: at+battrib="PSERV","uuid=12AA" 2). "char" <type>="char". <par1>=properties(MANDATORY). 'properties' can be 02(Read), 04(Write without response), 08(Write), 10(Notify), 20(Indicate). The values can be combined, for example read & notify result in 12. <par2>=characteristic UUID(MANDATORY). Ex: at+battrib="char","prop=1A","uuid=12A1" 3) "charval" <type>="charval". <par1>=perm (MANDATORY). 'perm' is 16-bit hexadecimal value that decodes the access permissions and authentication requirements. Based on 'perm' value, read and write permissions of the characteristic attribute is handled (irrespective of

			<p>read and write permissions of 'properties' in AT+BTTRIB="char",...)</p> <p>In 16 bits of 'perm', bits 0-3 represents read permissions; bits 4-7 represents write permissions; bits 8-15 are reserved.</p> <p>Read permissions can be: 0(Read not permitted), 1(Read permitted), 2(Read with encryption permitted), 3(Read with encryption and authentication permitted)</p> <p>Write permissions can be: 0(Write not permitted), 1(Write permitted), 2(Write with encryption permitted), 3(Write with encryption and authentication permitted)</p> <p>For example,</p> <p>'perm' value for read-write is 0011, 'perm' value for read-only with encryption is 0002</p> <p><par2>=valueLength(MANDATORY).</p> <p>length range is 1-20. If length=0, the value can be between 1 to 20 ASCII coded byte stream as hexadecimal values.</p> <p><par3>=value (OPTIONAL).</p> <p>Value is optional only when length=0. If 0 < length <= 20, value is ASCII coded byte stream as hexadecimal values</p> <p>This command returns 'CharactersticID' used for service data exchange.</p> <p>Ex:at+battrib="charval","perm=0011","len=1","val=59" 4) "complete"</p> <p><type>="complete".</p> <p>Used to signal that all attribute definitions have been sent to the controller. This command returns 'ServiceID' used for service data exchange.</p> <p>Ex: at+battrib="complete"</p>
--	--	--	--

Response

+BATTRIB:<Identifier>

Response Parameters Description

Parameter	Range	Type	Description
Identifier	CharID, ServiceID	String	It specifies Hex value of Characteristic ID or Service ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To add a new service:

```
AT+BATTRIB="pserv","uuid=12AA"
```

OK

```
AT+BATTRIB="char","prop=1A","uuid=12A1"
```

OK

```
AT+BATTRIB="charval","perm=0011","len=1","val=59"
```

```
+BATTRIB:"CHARID:2"
```

OK

where "CHARID:2" is CharacteristicID with Hex value '2'

```
AT+BATTRIB="complete"
```

```
+BATTRIB:"SRVID:0"
```

OK

where "SRVID:0" is ServiceID with Hex value 0

Asynchronous Response

```
+BATTRIB:<Characteristic Value details>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Characteristic Value details		SRVID:Service ID,CHARID:Characteristic ID,HEXDATA:Characteristic Value	It specifies the details of changed Characteristic.

7.2.32. BLE Server Data Exchange - +BSRVDATAEX

Description

This command sets new data in GATT server characteristic, where:

Channels created during GATT server definition using the command AT+BATTRIB.

Data defined for characteristics is through respective channels. If a characteristic has a length of 4, 4 bytes of hex data (ASCII coded byte stream) is sent. The variable length characteristic is defined by length 0.

All data sizes between 1 and 20 are allowed.

This command is also used to read the value of GATT server characteristic, when the data of characteristic is "?"

Pre-requisites

Attribute service/services should be created using AT+BATTRIB command.

Syntax

AT+BSRVDATAEX=<Service ID>,<Channel ID>,<Hex Data>

Parameters Description

Parameter	Value	Format	Description
Service ID	Range:	Hexadecimal	It specifies the Service identifier returned from the command AT+BATTRIB="COMPLETE".
Channel ID	Range:	Hexadecimal	It specifies the Channel identifier returned from the command AT+BATTRIB="CHARVAL","...".
Hex Data	Range:	String	It specifies the ASCII coded byte stream as hexadecimal values. For example: 4546 for a 2-byte value. It is also used to read the value of characteristic when ASCII coded byte stream is "?"

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To set 2-byte value "4546" to GATT server characteristic with channel 0x2 for service with *serviceld 0*

AT+BSRVDATAEX=0,2,"4546"

OK

To read the value of GATT server characteristic with channel 0x2 for service with *serviceld 0*

AT+BSRVDATAEX=0,2,"?"

+BSRVDATAEX: 0,2,4556

7.2.33. BLE Transmission Test - +BBPWRTXT

Description

This command is used to perform a TX Test.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BBPWRTXT=<Frequency>,<Data Length>,<Data Type>

Parameters Description

Parameter	Value	Format	Description
Frequency	Range: 0x0-0x27	Hexadecimal	It specifies the frequency to transmit packets.
Data Length	Range: 0x0-0x25	Hexadecimal	It specifies the length (in bytes) of the payload data in each packet.

Data Type	Range: 0x0-0x7	Hexadecimal	It specifies the test pattern of the transmission.
-----------	----------------	-------------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BPWRTXTEST=1F,1A,5
OK
```

7.2.34. BLE Reception Test - +BBPWRRXTEST

Description

This command is used to perform a RX Test.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

```
AT+BBPWRRXTEST=<Frequency>
```

Parameters Description

Parameter	Value	Format	Description
Frequency	Range: 0x0-0x27	Hexadecimal	It specifies the frequency to receive packets.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BPWRRXTEST=1F
OK
```

7.2.35. BLE Set Transmission Power - +BTXPOWERSET

Description

This command is used to set transmission power.

Pre-requisites

AT+BI=1 command should be issued..

Syntax

```
AT+BTXPOWERSET=<Type>,<Value>
```

Parameters Description

Parameter	Value	Format	Description
Type	Range: 0-1	Integer	It indicates the function should set the connection power or advertise power, where:

			1-Connection power, 0-Advertising power.
Value	Range: 0-255	Integer	It specifies the value of transmission power to be set.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To initialize BLE:
 AT+BTXPOWERSET=1,100
 OK

7.2.36. BLE Get Transmission Power - +BTXPOWERGET

Description

This command is used to get transmission power.

Pre-requisites

AT+BI=1 command should be issued..

Syntax

AT+BTXPOWERGET=<Type>

Parameters Description

Parameter	Value	Format	Description
Type	Range: 0-1	Integer	It specifies the function should get the connection power or advertise power, where: 1-Connection power, 0-Advertising power.

Response

+BTXPOWERGET:<POWER>

Response Parameters Description

Parameter	Range	Type	Description
POWER		Integer	It specifies the power number.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To initialize BLE:
 AT+BTXPOWERGET=1

```
+BTXPOWERGET:100
OK
```

7.2.37. BLE Power Measurement during Scan - +BTXPWMSCAN

Description

This command is used to perform a TX power measurement during scanning.

Note: Scan results are not displayed.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BTXPWMSCAN=[<Bluetooth Remote Address>]

Parameters Description

Parameter	Value	Format	Description
Bluetooth Remote Address	Range: 1-48 Default:	String	It specifies the Bluetooth remote address to be scanned.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BTXPWMSCAN
OK
```

7.2.38. BLE Power Measurement during Write - +BTXPWMWRITE

Description

This command is used to perform power measurement while writing the characteristics value of a service.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BTXPWMWRITE=<Connection Handle>,<Characteristic Handle>,<Hex Data>,[<Timeout>,<Repetition>,<Debug flag>]

Parameters Description

Parameter	Value	Format	Description
Connection Handle	Range: 0x1-0xFFFF	Hexadecimal	It specifies the connection handle returned during BLE connect command.
Characteristic Handle	Range: "0x1-0xFFFF"	Hexadecimal	It specifies the Characteristic handle returned using service discovery command (AT+BSRVD).

Hex Data	Range: 0-20	String	It specifies ASCII coded byte stream as hexadecimal values. For example: 6162 for a 2-byte value.
Timeout	Range: 1-100000 Default: 1	Integer	It specifies the timeout in milliseconds.
Repetition	Range: 1-100 Default: 1	Integer	It specifies the number of repetitions.
Debug flag	Range: 0,1 Default: 1	Integer	It specifies whether to enable or disable debugging, where: 0-Disable, 1-Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+BTXPWMWRITE=1,20,"0x0987",5,5,1
OK
```

8. NETWORK PROTOCOL

8.1. Caller Identification (CID)

8.1.1. Get CID Information - +NCIDI

Description

This command is used to get the CID information.

Pre-requisites

L2 -L3 connections should be established.

Syntax

AT+NCIDI=[<CID>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15, 255 Default: 255	Integer	It specifies the CID provided for socket/network commands.

Response

+NCIDI:<CID>,<CID type>,<Socket family>,<Remote IP>,<Local port>,<Remote port>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number.
CID type	N/A	UNKNOWN, RAW, UDP, TCP, TCP CLIENT, TCP SERVER, TLS CLIENT, TLS SERVER, DTLS CLIENT, DTLS SERVER, HTTP CLIENT, HTTP CLIENT WITH SSL, HTTP SERVER, HTTP SERVER WITH SSL, MQTT, WEBSOCKET CLIENT	It specifies the CID type.
Socket family	N/A	Unspecified, IPv4, IPv6	It specifies the socket family.
Remote IP	N/A	IP Address	It specifies the remote IP address in case of a connection oriented protocol, example-TCP.

Local port	0-65536	Integer	It specifies the socket local port, where: 0-WebSocket.
Remote port	0-65536	Integer	It specifies the remote port in case of a connection oriented protocol, example-TCP.

Note:

If the CID is 255 then it sends NCIDI response for all active CIDs.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:0
OK
AT+NCIDI=0
+NCIDI:0,TCP-SERVER,IPv4,192.168.120.3,8344,8355
OK
```

8.1.2. CID Status Information - +NCIDS

Description

This command is used to get status information of CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+NCIDS=[<CID>,<RST flag>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15, 255 Default: 255	Integer	It specifies the CID provided by issuing socket/network commands.
RST flag	Range: 0-1 Default: 0	Integer	It specifies the change to the counters, where: 0 - doesn't reset the counters, 1 - resets the counters.

Response

```
+NCIDS:<CID>,<CID status>,<Number of bytes sent>,<Number of bytes received>
```

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies CID number.
CID status	N/A	NA, Connected, Not Connected	It specifies the connection status of the socket.
TtISentBytes	0-4294967295	Integer	It specifies the total no of bytes sent from a CID.
TtIRxedBytes	0-4294967295	Integer	It specifies the total received bytes from a CID.

Note:

If the CID is 255, it sends NCIDS response for all active CIDs.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:0
OK
AT+NCIDI=0
+NCIDI:0,TCP-SERVER,IPv4,192.168.120.3,8344,8355
OK
AT+NCIDS=0
+NCIDS:0,CONNECTED,1000,2000
OK
```

8.2. Ping - +NPING

Description

This command is used to test the accessibility of a host on an Internet Protocol network.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+NPING=<IP address>,[<Payload size>,<Count>]
```

Parameters Description

Parameter	Value	Format	Description
IP address	Range: N/A	IP Address	It specifies the IP address to ping.
Payload size	Range: 1-1576	Integer	It specifies the size of each ping request packet

	Default: 64		Payload.
Count	Range: 1-65535 Default: 1	Integer	It specifies the number of pings.

Response

+NPING:<IP>,<Bytes>,<Time>

Response Parameters Description

Parameter	Range	Type	Description
Host IP	N/A	IP Address	It specifies the pinged IP address.
Bytes	0-4294967295	Integer	It specifies the number of bytes received in ping response.
Time	0-4294967295	Integer	It specifies the time taken to get ping response in milli seconds.
Ping status	N/A	status success, invalid IP address, Request timed out.	It specifies the ping status.

Note:

It specifies the response that is 'count' number of times.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+nping=192.168.1.142,1576,3
+NPING:192.168.1.142,1576,60,SUCCESS
+NPING:192.168.1.142,1576,60,SUCCESS
+NPING:192.168.1.142,1576,60,SUCCESS
OK
```

8.3. Ping Status - +NPINGSTATS

Description

This command is used to print the statistics of the previous ping request.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NPINGSTATS

Response

+NPINGSTATS:<Host IP>,<Packets sent>,<Packets received>,<Lost percent>,<Minimum time>,<Maximum time>,<Average time>

Response Parameters Description

Parameter	Range	Type	Description
Host IP	N/A	IP Address	It specifies the pinged IP address.
Packets sent	0-4294967295	Integer	It specifies the number of ping request sent.
Packets received	0-4294967295	Integer	It specifies the number of ping response received.
Lost percent	0-4294967295	Integer	It specifies the lost percentage of ping response received.
Minimum time	0-4294967295	Integer	It specifies the minimum time taken to receive ping response.
Maximum time	0-4294967295	Integer	It specifies the maximum time taken to receive ping response.
Average time	0-4294967295	Integer	It specifies the average time (in ms) taken to receive ping response.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NPING=192.168.120.3,1576,3
OK
+NPING:192.168.120.3,1576,31
+NPING:192.168.120.3,1576,29
+NPING:192.168.120.3,1576,33
OK
AT+NPINGSTATS
+NPINGSTATS:192.168.120.3,10,15,0,5,6,3
```

8.4. Socket

Socket operation supports the exchange of data between two network sockets. A Network socket is one end of the communication flow between two programs in a network and are of two types, namely:

- TCP or Transmission Control Protocol: - It is a connection-oriented protocol, where the connection is set up and then the data is sent and received.
- UDP or User Datagram Protocol: - It is a connectionless protocol, where a host can send a message without setting up a connection with the recipient.

To perform Socket operation, the device must be associated to an Access Point - initialize the network interface (AT+WNI) and then connect to the configured network (AT+WNCN).

Different types of sockets are:

1. TCP server
2. TCP client
3. UDP server
4. UDP client

Following are the AT commands for different Socket:

1. TCP server

AT+SC= Family, Type, Protocol

AT+SB=CID, IPaddr, port

AT+SL=CID, Backlog

It enables sever listening for connections on a CID, if any response as '+SL: CID' is received then the below command can be issued to accept the client's connection.

AT+SA=CID

2. TCP client

AT+SC= Family, Type, Protocol

AT+SCO=CID, ServerIP, Server_port

3. UDP server

AT+SC= Family, Type, Protocol

AT+SB=CID, IP addr, port

4. UDP client

AT+SC= Family, Type, Protocol

Data exchange between two Network sockets can be done, by using the CID obtained from the above commands.

Data Send

AT+SN

Data Receive

AT+SRR

AT+SR

Following are the AT commands related to Sockets:

1. AT+SCL: - To close any socket
2. AT+SSOPT: - To set any choice, explicitly for any socket
3. AT+SGOPT: - To get any choice, explicitly for any socket
4. AT+NCIDI: - To get CID information of any socket
5. AT+NCIDS: - To get CID status of any socket

8.4.1. Socket Create - +SC

Description

This command is used to create a socket with CID entry, currently it supports a maximum of 16 general sockets(TCP and UDP).

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SC=<Family>,<Type>,[<Protocol>]

Parameters Description

Parameter	Value	Format	Description
Family	Range: 2-5	Integer	It specifies communications domain in which a socket is to be created, 2 - (IPv4), 3 - (IPv6), 4 - (IPv4 and IPv6), 5 - (packet).
Type	Range: 1-3	Integer	It specifies the type of socket to be created, where: 1 - SOCK_STREAM, 2 - SOCK_DGRAM, 3 - SOCK_RAW (currently not supported).
Protocol	Range: 0-255, 1536-2147483647 Default: 0	Integer	It specifies the protocol to be used in the socket, currently the module supports 0 only. The protocol to be used is based on the socket type. Ex: For TCP protocol, select Type as 1 and Protocol as 0 For UDP protocol, select Type as 2 and Protocol as 0

Response

+SC:<CID>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the new CID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+SC=2,2,0
+SC:0

OK

8.4.2. Socket Bind - +SB

Description

This command is used to bind a port to the socket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SB=<CID>,[<IP address>],<Port>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC command.
IP address	Range: N/A Default:	IP Address	It specifies the local IP address to bind, if it is not given it binds to all interfaces available
Port	Range: 1-65535	Integer	It specifies the local port number to bind.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:2
OK
AT+SB=2,192.168.16.120,8355
OK
```

8.4.3. Socket Connect - +SCO

Description

This command is used to connect to a TCP server.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SCO=<CID>,<Server IP>,<Server port>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC command.

Server IP	Range: N/A	IP Address	It specifies the IP address of the server to connect.
Server port	Range: 0-65535	Integer	It specifies the port number of the server to connect.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:0
OK
AT+SCO=0,192.168.140.3,8355
OK
```

8.4.4. Socket Listen - +SL

Description

This command is used to listen to a socket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+SL=<CID>,[<Backlog>,<Auto accept>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC command.
Backlog	Range: 0-15 Default: 0	Integer	It specifies the maximum length, to which the queue of pending connection to be handled may grow. 0 - it accepts until the memory available.
Auto accept	Range: 0-1 Default: 0	Integer	It specifies the state of auto accept - to be enabled or disabled. If auto accept is enabled 'AT+SA' command response would automatically call the client requests connection. 0 - Disable, 1 - Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:0
OK
AT+SB=0,192.168.16.120,8355
OK
AT+SL=0
OK
+SL:0
```

Asynchronous Response

```
+SL:<CID>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number which has connection request.

8.4.5. Set Socket Option - +SSOPT

Description

This command is used to set a specified socket option.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+SSOPT=<CID>,<Option name>,[<Option value>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.
Option name	Range: 0-50	Integer	It specifies the name of the option: 3 - Allows local address reuse, always set 4 - Keep connections alive, not enabled by default 15 - User access to the IP header for SOCK_RAW 16 - Suppress slow start on this socket 27 - TCP max segment size (MSS), maximum supported is 1452. 30 - Return my IP address /** At IP 'level'. */

			37 - IP header is included with the data 38 - Add an IPv4 group membership 39 - Drops an IPv4 group membership /** At IP OPTIONS 'level'. */ 46 - IPv4 type of service and precedence 47 - IPv4 time to live
Option value	Range: N/A Default:	String	It specifies the value of the option to be set.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SSOPT=0,27,"1024"
```

OK

8.4.6. Get Socket Option - +SGOPT

Description

This command is used to get the specified socket option.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+SGOPT=<CID>,<Option name>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.
Option name	Range: 0-50	Integer	It specifies the name of the option: 3 - Allows local address reuse, always set 4 - Keep connections alive, not enabled by default 15 - User access to the IP header for SOCK_RAW 16 - Suppress slow start on this socket 24 - Get error status and clear 27 - TCP max segment size (MSS), maximum supported is 1452. 30 - Return my IP address /** At IP 'level'. */ 37 - IP header is included with the data 38 - Add an IPv4 group membership

			39 - Drops an IPv4 group membership /** At IP OPTIONS 'level'. */ 46 - IPv4 type of service and precedence 47 - IPv4 time to live
--	--	--	--

Response

+SGOPT:<Option value>

Response Parameters Description

Parameter	Range	Type	Description
Option value	N/A	String	It specifies the requested optional value.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+SGOPT=0,19

+SGOPT:1462

OK

8.4.7. Socket Accept - +SA

Description

This command is used to accept the client connection and add the CID.

Note: TCP socket accept is as per BSD standards. Since it accepts the first incoming connection from the pending queue, user is required to call accept for all incoming connection till accept fails (accept fails-if there is no pending connection). After that only +SL indication is given to the new clients.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SA=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+SC command.

Response

+SA:<Client CID>,<Client IP>,<Client port>

Response Parameters Description

Parameter	Range	Type	Description
Client CID	0-15	Integer	It specifies the new client CID.
Client IP	N/A	IP Address	It specifies the new client IP.
Client port	0-65535	Integer	It specifies the new client port.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SC=2,1,0
+SC:0
OK
AT+SB=0,,8355
OK
AT+SL=0
OK
+SL=0
AT+SA=0
+SA:1,192.168.1.120,8377
OK
```

8.4.8. Socket Send - +SN

Description

This command is used to send the data to a specified IP address.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SN=<CID>,[<Destination IP address>,<Port>],<Data length>,<Data>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.
Destination IP address	Range: Default:	IP Address	It specifies the IP address of the destination to send the data. In case of TCP, destination IP address is ignored.

Port	Range: 0-65535 Default:	Integer	it specifies the port number of the destination address to send the data. In case of TCP, port number is ignored.
Data length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295	Binary Data	It specifies the data to be sent.

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number on which data sent has failed.
Length	0-4294967295	Integer	It specifies the data length sent in bytes.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To send the data through created socket:

```
AT+SC=2,2,0
+SC:0
OK
AT+SN=0,192.168.140.3,8355,100,0123456789
OK
AT+SN=0,192.168.140.3,8355,100,0123456789
OK
AT+SN=0,192.168.140.3,8355,100,0123456789
+SN=0,20
ERROR
```

8.4.9. Socket Receive Ready - +SRR

Description

This command is used to enable the data reception on a given CID at application level and indicates the accessibility of the data on the specified CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SRR=<CID>,[<Auto receive>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.
Auto receive	Range: 0-1 Default: 0	Integer	It specifies the state of auto receive to be enabled or disabled. If auto receive is enabled, then AT+SR command response would automatically called - once data receive happens but no AT+SRR response is sent. 0 - Disable, 1 - Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To receive the data through created socket:

AT+SC=2,2,0

+SC:0

OK

AT+SB=0,192.168.16.120,8355

OK

AT+SRR=0

OK

+SRR:0,RIP,RP,length

Asynchronous Response

+SRR:<CID>,<RIP>,<RP>,<length>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number which has the updated data received.
RIP	N/A	IP Address	remote It specifies the IP address from which data is received.
RP	0-65536	Integer	It specifies the remote port from which data is received.
Length	0-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before

			sending the data.
--	--	--	-------------------

8.4.10. Socket Receive - +SR

Description

This command is used to receive the data from any CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+SR=<CID>,<Length>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.
Length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.

Response

+SR:<CID>,<RIP>,<RP>,<Total length>,<Present length>, <Data>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies closed CID number.
RIP	N/A	IP Address	It specifies the receive IP address.
RP	0-65536	Integer	It specifies the received remote port.
Total length	0-4294967295	Integer	It specifies the requested data length.
Present length	0-4294967295	Integer	It specifies the received data length in current response.
Data	N/A	String	It specifies the data received.

Note:

For bulk data reception there would be multiple responses.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To receive data through a created socket:

```
AT+SC=2,2,0
+SC:0
OK
AT+SB=2,192.168.16.120,8355
OK
AT+SRR=0
OK
+SRR:0,192.168.120.6,8377,5
AT+SR=0,5
+SR:192.168.120.6,8377,5,5,12345
OK
+SRR:0,192.168.120.6,8377,5
AT+SR=0,6
+SR:192.168.120.6,8377,6,5,12345
OK
```

8.4.11. Get Socket Error - +SGERR

Description

This command is used to get the specific socket error number.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+SGERR=<CID>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.

Response

```
+SGERR:<Error number>
```

Response Parameters Description

Parameter	Range	Type	Description
Error number	-1,0-4294967295	Integer	It specifies the Error number.

Note:

Err no	Error description
-----	-----
-1	SOCKET ERROR
0	SOCKET NO ERROR
1	No buffer space is available.
2	Operation timed out.
3	Socket is already connected.
4	Operation is not supported.
5	Software caused a connection abort.
6	The socket is marked nonblocking and the requested operation would block.
7	Connection was refused.
8	Connection was reset by a peer.
9	Socket is not connected.
9	An invalid descriptor was specified.
10	Operation is already in progress.
11	Invalid argument was passed.
12	Message is too long.
13	Local ends have been shut down on a connection-oriented socket.
14	Destination address is required.
15	Cannot send after a socket shutdown.
16	Protocol is not available.
17	Out of band.
18	No memory is available.
19	Cannot assign the requested address.
20	Address is already in use.
21	Address family is not supported by the protocol family.
22	Operation is now in progress.
23	Lower layer (IP) error.
24	Socket operation is on a non-socket.

- 27 I/O error.
- 28 Too many references.
- 29 Bad address.
- 30 Network is unreachable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+SGERR=0
+SGERR:10
OK
```

8.4.12. Socket Throughput Test - +STPTEST

Description

This command is used to start/stop the throughput test.

Pre-requisites

L2, L3 and L4 connections must be established. UDP/TCP socket must be created and TCP connection must be established, before issuing this command.

Syntax

AT+STPTEST=<CID>,<Mode>,[<Iterations>,<Packet size>,<Delay>,<Packets for delay>,<Destination IP address>,<Destination Port>,<Test Duration>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+SC and AT+SA command.
Mode	Range: 0-2	Integer	It specifies the mode of test, where: 0 - to Terminate throughput test 1 - TX (TCP/UDP depends on the socket type) 2 - Rx (TCP/UDP depends on the socket type)
Iterations	Range: 1-2500000 Default: 10000	Integer	It specifies the number of times the test is repeated.
Packet size	Range: 1-1536 Default: 1452	Integer	It specifies the size of the packet sent.
Delay	Range: 0-10000000 Default: 2	Integer	It specifies the delay (in milliseconds) after sending some packets specified in the parameter-packets for delay.
Packets for	Range: 1-100	Integer	It specifies the number of packets to be sent before

delay	Default: 5		each delay.
Destination IP address	Range: 1-1000 Default:	IP Address	It specifies the IP address of the destination to send the data. In case of TCP, destination IP address is not required.
Destination Port	Range: 0-65535 Default:	Integer	It specifies the port number of the destination address to send the data. In case of TCP, port number is not required.
Test Duration	Range: 0-4294967295 Default: 0	Integer	It specifies the duration of the test in milli seconds.

Response

+STPTTEST: <WLAN Tx Success>,<WLAN Tx Failure>,<Packets sent>,<Bytes sent>,<Packets Lost>,<Total Time>,<Throughput>

Response Parameters Description

Parameter	Range	Type	Description
WLAN Tx Success	0-4294967295	Integer	It specifies the number of packets sent successfully at WLAN level.
WLAN Tx Failure	0-4294967295	Integer	It specifies the number of packets failed at WLAN level.
Packets sent	0-4294967295	Integer	It specifies the number of packets sent at app level.
Bytes sent	0-4294967295	Integer	It specifies the number of bytes sent at app level.
Packets Lost	0-4294967295	Integer	It specifies the number of packets sending failed at app level.
Total Time	0-4294967295	Integer	It specifies the total time taken for the throughput calculation process in ms.
Throughput	0-4294967295	Integer	It specifies the throughput in KBPS.

Note:

- 1). Command response is optional based on the mode.

2). During any throughput test, AT commands AT+SRR, AT+SR and AT+SN does not work.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+STPTEST=0,1,100000,1460
+STPTEST: 100000,0,100000,146000000,0,16000000,16000
```

OK

Asynchronous Response

+STPTESTSTAT: <Packets received>,<Packets lost>,<Bytes received>,<Total time >,<Throughput >

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Packets received	0-4294967295	Integer	It specifies the number of packets received.
Bytes received	0-4294967295	Integer	It specifies the number of bytes received.
Total time	0-4294967295	Integer	It specifies the total time taken for the throughput calculation process in ms.
Throughput	0-4294967295	Integer	It specifies the throughput in KBPS.

8.4.13. Socket Throughput Test Statistics - +STPTESTSTAT

Description

This command is used to print the throughput test result on DUT.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+STPTESTSTAT=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.

Response

+STPTESTSTAT: <Packets received>,<Bytes received>,<Total time >,<Throughput >

Response Parameters Description

Parameter	Range	Type	Description
Packets received	0-4294967295	Integer	It specifies the number of packets received.
Bytes received	0-4294967295	Integer	It specifies the number of bytes received.
Total time	0-4294967295	Integer	It specifies the total time taken for the throughput calculation process in ms.
Throughput	0-4294967295	Integer	It specifies the throughput in KBPS.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+STPTESTSTAT=0
+STPTESTSTAT:100000,0,146000000,463,23000
```

OK

8.4.14. Socket Close - +SCL

Description

This command is used to close the socket and clear the CID entry.

Pre-requisites

L2 - L3 connections should be established and a socket must be created.

Syntax

AT+SCL=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+SC and AT+SA command.

Example

```
AT+SCL=0
OK
```

Asynchronous Response

+SCL:<CID>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies closed CID number.

8.5. Secure Socket Layer (SSL)/ Transport Layer Security (TLS)

SSL supports client, server and certificate operations. Initialize, configure, receive ready, read/write and close operations are same in both client and server modes of SSL.

Following is the sequential execution of the AT commands:

Server mode:

- AT+NSSLINIT
- AT+NSSLCFG
- AT+NSSLB
- AT+NSSL
- AT+NSSLA
- AT+NSSLRR
- AT+NSSLRD
- AT+NSSLWR
- AT+NSSLCL

Client mode:

- AT+NSSLINIT
- AT+NSSLCFG
- AT+NSSLCO
- AT+NSSLRR
- AT+NSSLRD
- AT+NSSLWR
- AT+NSSLCL

Certificate management:

- AT+NSSLCERTSTORE
- AT+NSSLCERTLIST
- AT+NSSLCERTDELETE

Note:

Before initializing SSL, IP configuration and L2/L3 connection must be established.

Steps to set up SSL connection in Client mode:

1. Store the certificate to set up connection with certificate validation.
AT+NSSLCERTSTORE=1,1,"client",820,<send File>
AT+NSSLCERTSTORE=1,2,"client",893,<send File>
2. Initialize SSL as client.
AT+NSSLINT=1
3. Response for the above command, displays the CID:
+NSSLINIT:0
4. Configure the SSL using CID obtained from initialization. Following is the cipher configuration:
AT+NSSLCFG=0,2,"Client"

5. Connect to the HTTP server, specify the server IP address and the port number in the command. Also use the CID obtained from the initialization step:

```
AT+NSSLCO=0,192.168.25.103,9500
```

6. Once the connection is set up, exchange data from the node and the server using read/write commands. It is mandatory to issue read request to get the notification of incoming data from the server. So, it must be issued before the client reads any data upon connection:

```
AT+NSSLRR=0
```

This command would further notify incoming data with the length and CID:

```
+NSSLRR: 0,,10
```

7. Read the incoming data:

```
AT+NSSLRD=0,10
```

This command would display the data received:

```
+NSSLRD:192.168.25.103,9500,10,10, Helloworld
```

8. Send the data using the CID obtained after the connection, IP address and the port number of the server:

```
AT+NSSLWR=0,192.168.25.103,9500,10,Helloworld
```

This command would display the length of the data sent:

```
+NSSLWR:0,10
```

9. Close the connection with the remote server using it's CID:

```
AT+NSSLCL=0
```

Steps to set up SSL connection in Server mode:

1. Store the certificate to establish connection with certificate validation.

```
AT+NSSLCERTSTORE=1,1,"server",820,<send File>
```

```
AT+NSSLCERTSTORE =1,2,"server",891,<send File>
```

2. Initialize SSL as server.

```
AT+NSSLINT=0
```

3. Response for the above command, displays the CID:

```
+NSSLINIT:0
```

4. Configure the SSL using CID obtained from initialization, certificate configuration is as shown below:

```
AT+NSSLCFG=0,3,"server"
```

5. Bind the server to a socket and give the IP address of the module:

```
AT+NSSLB=0,192.168.25.101,9500
```

6. Listen to the incoming connection:

```
AT+NSSL=0
```

This command would notify the incoming client connection:

```
+NSSL:0
```

7. Once the notification is received, accept the incoming client connection:

```
AT+NSSLA=0
```

The command would display the details of the client along with the CID:

```
+NSSLA:0,42B9:D898:42B7:D31B:E72D:E9F0:4FD0:F850,17279833
```

```
+NSSLA:1,192.168.25.103,10190
```

Where,

1- is the CID of the accepted client and is unique for each client

8. Once the connection is set up, exchange data from the node and the server using read/write commands. It is mandatory to issue read request to get the notification of incoming data from the server. So, it must be issued before the client reads any data upon connection:

```
AT+NSSLRR=1
```

This command would further notify incoming data with the length and CID:

```
+NSSLRR:1,,10
```

9. Read the incoming data:

```
AT+NSSLRD=1,10
```

This command would display the data received:

```
+NSSLRD:192.168.25.103,0,10,10,HelloWorld
```

10. Send the data using the CID obtained after the connection, IP address and the port number of the server:

```
AT+NSSLWR=1,192.168.25.103,9500,10,HelloWorld
```

This command would display the length of the data sent:

```
+NSSLWR:1,10
```

11. Close the connection with the remote server using it's CID:

```
AT+NSSLCL=1
```

Steps to set up SSL connection in Client mode without certificates:

```
AT+NSSLINIT=1
```

```
AT+NSSLCO=0,192.168.25.103,9500
```

```
AT+NSSLRR=0
```

```
AT+NSSLRD=0,10
```

```
AT+NSSLWR=0,192.168.25.103,9500,10,HelloWorld
```

```
AT+NSSLCL=0
```

Steps to set up SSL connection in Client mode with certificates:

```
AT+NSSLCERTSTORE=1,1,"client",820,<send File>
```

```
AT+NSSLCERTSTORE=1,2,"client",893,<send File>
```

```
AT_NSSLINIT=1
```

```
AT+NSSLCFG=0,3,"client"
```

```
AT+NSSCO=0,192.168.25.103,9500
```

```
AT+NSSLWR=0,192.168.25.103,9500,10,HelloWorld
```

```
AT+NSSLRR=0
```

```
AT+NSSLRD=0,10
```

```
AT+NSSLCL=0
```

8.5.1. SSL Initialize - +NSSLINIT

Description

This command is used to initialize the SSL module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSSLINIT=<Role>

Parameters Description

Parameter	Value	Format	Description
Role	Range: 0-1	Integer	It specifies the role of SSL, where: 0 - Server, 1 - Client.

Response

+NSSLINIT:<CID>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies SSL connection ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NSSLinit=1
+NSSLINIT:0

8.5.2. SSL Configure - +NSSLCFG

Description

This command is used to configure SSL connection.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSSLCFG=<CID>,<Configuration ID>,<Configuration value>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.
Configuration ID	Range: 1-9	Integer	It specifies the configuration ID available in the below list of configurations:

			<p>0 - Invalid configuration parameter 1 - To set SSL Protocol Version 2 - To set SSL CA Certificate 3 - To set SSL Certificate 4 - To set Cipher Information 5 - To set the Tx Max Fragment Length (Not supported) 6 - To set the SNI 7 - To set the Domain 8 - To set the Max Fragment Length 9 - To enable/disable server validation 10 - To enable/disable time validation PARAM-DESCRIPTION></p>
Configuration value	Range: 1-64	String	<p>It specifies value to the configuration provided in configuration ID. CONF_ID :CONF_VAL 0 - Invalid 1 - Values for CONF_VAL: 0: TLS Version 1.0 1: TLS Version 1_1 2: TLS Version 1_2 3: DTLS Version 1.0 4: DTLS Version 1_2 2 - SSL CAcertificate Name 3 - SSL Certificate Name 4 - Cipher Value bitmap where the bits values as below, : Bit 1: Cipher TLS_PSK_WITH_RC4_128_SHA. Bit 2: Cipher TLS_PSK_WITH_3DES_EDE_CBC_SHA Bit 3: Cipher TLS_PSK_WITH_AES_128_CBC_SHA Bit 4: Cipher TLS_PSK_WITH_AES_256_CBC_SHA Bit 5: Cipher TLS_PSK_WITH_AES_128_GCM_SHA256 Bit 6: Cipher TLS_PSK_WITH_AES_256_GCM_SHA384 Bit 7: Cipher TLS_PSK_WITH_AES_128_CBC_SHA256 Bit 8: Cipher TLS_PSK_WITH_AES_256_CBC_SHA384 Bit 9: Cipher TLS_RSA_WITH_AES_128_CBC_SHA Bit 10: Cipher TLS_DHE_RSA_WITH_AES_128_CBC_SHA Bit 11: Cipher TLS_RSA_WITH_AES_256_CBC_SHA Bit 12: Cipher TLS_DHE_RSA_WITH_AES_256_CBC_SHA Bit 13: Cipher TLS_RSA_WITH_AES_128_CBC_SHA256 Bit 14: Cipher TLS_RSA_WITH_AES_256_CBC_SHA256 Bit 15: Cipher</p>

			<p>TLS_DHE_RSA_WITH_AES_128_CBC_SHA256</p> <p>Bit 16: Cipher TLS_DHE_RSA_WITH_AES_256_CBC_SHA256</p> <p>Bit 17: Cipher TLS_RSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 18: Cipher TLS_RSA_WITH_AES_256_GCM_SHA384</p> <p>Bit 19: Cipher TLS_DHE_RSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 20: Cipher TLS_DHE_RSA_WITH_AES_256_GCM_SHA384</p> <p>Bit 21: Cipher TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA</p> <p>Bit 22: Cipher TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA</p> <p>Bit 23: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA</p> <p>Bit 24: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA</p> <p>Bit 25: Cipher TLS_ECDH_RSA_WITH_AES_128_CBC_SHA</p> <p>Bit 26: Cipher TLS_ECDH_RSA_WITH_AES_256_CBC_SHA</p> <p>Bit 27: Cipher TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA</p> <p>Bit 28: Cipher TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA</p> <p>Bit 29: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256</p> <p>Bit 30: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384</p> <p>Bit 31: Cipher TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256</p> <p>Bit 32: Cipher TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384</p> <p>Bit 33: Cipher TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256</p> <p>Bit 34: Cipher TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384</p> <p>Bit 35: Cipher TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256</p> <p>Bit 36: Cipher TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384</p> <p>Bit 37: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 38: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384</p> <p>Bit 39: Cipher TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 40: Cipher TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384</p>
--	--	--	---

			<p>Bit 41: Cipher TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 42: Cipher TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384</p> <p>Bit 43: Cipher TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256</p> <p>Bit 44: Cipher TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384</p> <p>Bit 45: Cipher TLS_RSA_WITH_AES_128_CCM</p> <p>Bit 46: Cipher TLS_RSA_WITH_AES_256_CCM</p> <p>Bit 47: Cipher TLS_DHE_RSA_WITH_AES_128_CCM</p> <p>Bit 48: Cipher TLS_DHE_RSA_WITH_AES_256_CCM</p> <p>Bit 49: Cipher TLS_RSA_WITH_AES_128_CCM_8</p> <p>Bit 50: Cipher TLS_RSA_WITH_AES_256_CCM_8</p> <p>Bit 51: Cipher TLS_DHE_RSA_WITH_AES_128_CCM_8</p> <p>Bit 52: Cipher TLS_DHE_RSA_WITH_AES_256_CCM_8</p> <p>Bit 53: Cipher TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256</p> <p>Bit 54: Cipher TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256</p> <p>Bit 55: Cipher TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256</p> <p>Default: ALL Ciphers are enabled</p> <p>5 - Set the Tx Max Fragment Length</p> <p>0 : 16384</p> <p>1 : 512</p> <p>2 : 1024</p> <p>3 : 2048</p> <p>4 : 4096 (default value)</p> <p>6 - To Set the SNI</p> <p>7 - Domain name in String format</p> <p>8 - Set the Max Fragment Length</p> <p>0 : 16384 (default value)</p> <p>1 : 512</p> <p>2 : 1024</p> <p>3 : 2048</p> <p>4 : 4096</p> <p>9 - To enable/disable server validation</p> <p>0: Disables server validation</p> <p>1: Enables server validation (Default)</p> <p>10 - To enable/disable time validation</p> <p>0: Disables time validation</p>
--	--	--	--

			1: Enables time validation (Default)
--	--	--	--------------------------------------

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

1. To Set TLS version to TLS1.2

AT+NSSSLCFG= 0, 1, "2"

OK

2. To Set CA Certificate to "apache_cacert"

AT+NSSSLCFG= 0, 2, "apache_cacert"

OK

3. To Set Server/Client Certificate to "ccert"

AT+NSSSLCFG= 0, 3, "ccert"

OK

4. To set Cipher Suite to "TLS_PSK_WITH_AES_128_GCM_SHA256".

cipherval in Binary: 010000

cipherval in hex: 0x10

(Note: Donot append "0x" while giving cipherval)

AT+NSSSLCFG= 0, 4, "10"

OK

To set Cipher Suite to

Bit 5 : "TLS_PSK_WITH_AES_128_GCM_SHA256".

Bit 9: Cipher TLS_RSA_WITH_AES_128_CBC_SHA

Bit 21: Cipher TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA

cipherval in Binary: 1 0000 0000 0001 0001 0000

cipherval in hex: 0x100110

AT+NSSSLCFG= 0, 4, "100110"

OK

8.5.3. SSL Connect - +NSSLCO

Description

This command is used to connect to an SSL server.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSSLCO=<CID>,<Server IP>,<Server port>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.
Server IP	Range: 7-40	IP Address	It specifies the IP address of the server to connect.
Server port	Range: 0-65535	Integer	It specifies the port number of the SSL server to connect.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLCO=0,192.168.140.3,8355
OK
```

8.5.4. SSL Bind - +NSSLB

Description

This command is used to bind server port to a socket.

Pre-requisites

L2 - L3 connections should be established and SSL certificate must be configured.

Syntax

AT+NSSLB=<CID>,[<Local IP>],<Local port>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.
Local IP	Range: 7-40 Default: 0.0.0.0	IP Address	It specifies the local IP address to bind.
Local port	Range: 0-65535	Integer	It specifies the local port number to bind.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLB=0,192.168.120.5,8355
```

OK

8.5.5. SSL Listen - +NSSLL

Description

This command is used to listen to an SSL socket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSSLL=<CID>,[<Backlog>,<Auto accept>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.
Backlog	Range: 0-15 Default: 0	Integer	It specifies the maximum length, to which the queue of the pending connections handling may grow.
Auto accept	Range: 0-1 Default: 0	Integer	It specifies the state of auto accept - to be enabled or disabled. If auto accept is enabled 'AT+NSSLA' command response would automatically call the client requests connection. 0 - Disable, 1 - Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

at+nssl=0,2

OK

+nssl=0

Asynchronous Response

+NSSLL:<cid>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the connection ID where the request is received.

8.5.6. SSL Accept - +NSSLA

Description

This command is used to accept client connection identified by CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSSLA=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.

Response

+NSSLACCEPT:<Client CID>,<Client IP>,<Client port>

Response Parameters Description

Parameter	Range	Type	Description
Client CID	0-15	Integer	It specifies the new client connection ID.
Client IP	7-32	IP Address	It specifies the client IP.
Client port	0-65535	Integer	It specifies the client port.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLA=0
+NSSLA:1,192.168.12.130,4080
OK
```

8.5.7. SSL Receive Ready - +NSSLRR

Description

This command is used to receive data from any client device.

Pre-requisites

Before issuing this command, SSL connection must be established.

Syntax

AT+NSSLRR=<CID>,[<Auto receive>]

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.
Auto receive	Range: 0-1 Default: 0	Integer	It specifies the state of auto receive to be enabled or disabled. If auto receive is enabled, then AT+NSSLRD command response would automatically called - once data receive happens but no AT+NSSLRR response is sent. 0 - Disable, 1 - Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+nsslrr=0
OK
+nsslrr:0,192.168.120.4,8747
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies Connection ID.
RIP	6-20	IP Address	It specifies Remote IP Address.
RP	0-65535	Integer	It specifies remote port.
Length	0-65535	Integer	It specifies the received data length.

8.5.8. SSL Receive - +NSSLRD

Description

This command is used to read the SSL data from any client device.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+NSSLRD=<CID>,<Length>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+NSSLINIT command.

Length	Range: 1-1460	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
--------	---------------	---------	---

Response

+NSSLRD:<Remote IP>,<RP>,<DATA>

Response Parameters Description

Parameter	Range	Type	Description
RIP	7-32	IP Address	It specifies the remote IP of the SSL connection.
RP	0-65535	Integer	it specifies the remote port.
Requested length	0-1460	Integer	It specifies the length requested by user
Available length	0-1460	Integer	It specifies the length of data following
data	0-1460	Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLRD=0,10
+NSSLRD:192.168.12.109,8366,20,10,HelloWorld
OK
```

8.5.9. SSL Write - +NSSLWR

Description

This command is used to send the data to SSL connection.

Pre-requisites

Before issuing this command, AT+NSSLRD and AT+NSSLCO should be issued.

Syntax

AT+NSSLWR=<CID>,[<Destination>,<Port>,<Data length>,<Data>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+NSSLINIT command.
Destination	Range: 7-40	IP Address	It specifies the IP address of the destination to send

	Default: 0.0.0.0		data.
Port	Range: 0-65535 Default: 0	Integer	It specifies the port number of the destination to send data.
Data length	Range: 1-4294967295 Default: Welcome to Telit	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295 Default: Welcome to Telit	Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLWR=0,192.168.120.3,8355,10,0123456789
OK
```

8.5.10. SSL Close - +NSSLCL

Description

This command is used to close SSL connection.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+NSSLCL=<CID>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NSSLINIT command.

Response

```
+NSSLCL: <cid>
```

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLCL=0
OK
```

Asynchronous Response

```
+NSSLCL:<cid>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies SSL connection Id.

8.5.11. SSL Certificate List - +NSSLCERTLIST

Description

This command is used to list certificates or list of CA data available in nonvolatile memory.

Pre-requisites

This command can be issued at any time independent of any other operations.

Syntax

```
AT+NSSLCERTLIST=<Certificate type>
```

Parameters Description

Parameter	Value	Format	Description
Certificate type	Range: 0-1	Integer	It specifies the type of the certificate. 0 - CA Certificates, 1 - Client/Server Certificates.

Response

```
+NSSLCERTLIST: <Type> <Name>
```

Response Parameters Description

Parameter	Range	Type	Description
Type		String	It specifies the type of the certificate.
Name		String	It specifies the name of the certificate.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSSLCERTLIST=0/1/2
OK
```

8.5.12. SSL Certificate Store - +NSSLCERTSTORE

Description

This command is used to store a certificate/CA list data in nonvolatile memory.

Pre-requisites

This command can be issued at any time independent of any other operations.

Syntax

```
AT+NSSLCERTSTORE=<Certificate type>,<Sequence>,<Format>,<Name>,<Data length>,<Data>
```

Parameters Description

Parameter	Value	Format	Description
Certificate type	Range: 0-1	Integer	It specifies the type of the certificate. 0 - CA Certificates, 1 - Client/Server Certificates.
Sequence	Range: 0-1	Integer	If the certificate type is 0 i.e. CA, then number of certificates in sequence is 1-10. If the certificate type is 1 i.e. Client/Server certificate, then number of certificate in sequence is 1-SSL cert,2-SSL key.
Format	Range: 0-1	Integer	It specifies the format of the CA/Certificate/Key, where: 0 : DER, Note: only PKCS8 key is supported for DER format. 1 : PEM.
Name	Range: 1-50	String	It specifies the name of the certificate. While loading certificate and key file separately, the name should be same in both the commands.
Data length	Range: 1-64000	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-64000	Binary Data	It specifies the certificate data to be store.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
at+nsslcertstore=1,1,1,"client",820,<send file>
OK
at+nsslcertstore=1,2,1,"client",893, <send file>
```

OK

8.5.13. SSL Certificate Deletion - +NSSLCERTDELETE

Description

This command is used to delete a certificate or CA list data in nonvolatile memory.

Pre-requisites

This command can be issued at any time independent of any other operations.

Syntax

AT+NSSLCERTDELETE=<Certificate type>,<Name>

Parameters Description

Parameter	Value	Format	Description
Certificate type	Range: 0-1	Integer	It specifies the type of the certificate. 0 - CA Certificates, 1 - Client/Server Certificates.
Name	Range: 1-50	String	It specifies the name of the certificate.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

at+nsslcertstore=1,1,"client",820,

OK

at+nsslcertstore=1,2,"client",893,

OK

at+NSSLCERTDELETE=1,"client"

OK

8.6. Simple Network Time Protocol (SNTP) Settings

It synchronizes the computer clocks in a Network. It is used to start the SNTP client in a device, configure SNTP sever address and synchronize.

To perform SNTP operation, device must be associated to an AP using AT+WNCN command and after initializing WLAN network interface (using AT+WNI command).

8.6.1. SNTP Configure - +NSNTPCFG

Description

This command is used to configure the server in SNTP module.

Pre-requisites

L2 - L3 connections should be established and AT+NSNTPSTART command should be issued.

Syntax

AT+NSNTPCFG=<IP address>,<ID>

Parameters Description

Parameter	Value	Format	Description
IP address	Range: 1-128	String	It specifies IP address of the server to be set.
ID	Range: 0,1	Integer	It specifies the ID of the server to be configured.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NSNTPCFG=13.123.4.100,0

OK

Following command is used to get configuration of the server in SNTP module

Syntax

AT+NSNTPCFG?

Response

+NSNTPCFG:<Server ID>,<Address>,<Status>

Response Parameters Description

Parameter	Range	Type	Description
Server ID	0-1	Integer	It specifies the ID of the server.
Address	0-15	String	It specifies the IP address of server.
Status	N/A	KOD, NORESP	It specifies the status of the server.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NSNTPCFG?

+NSNTPCFG:"13.123.4.100",

OK

8.6.2. SNTP Start - +NSNTPSTART

Description

This command is used to start the SNTP module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NSNTPSTART=[<Interval>]

Parameters Description

Parameter	Value	Format	Description
Interval	Range: 0-3600 Default: 15	Integer	It specifies the interval of time sync in seconds. If the interval is 0, then the time sync is once else the time sync is for the given period.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSNTPSTART
OK
```

Following command is used to get the status of SNTP module.

Syntax

AT+NSNTPSTART?

Response

+NSNTPSTART:<Status>

Response Parameters Description

Parameter	Range	Type	Description
Status	N/A	started, not started	It displays the status of the SNTP module.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSNTPSTART?
+NSNTPSTART:started
OK
```

8.6.3. SNTP Stop - +NSNTPSTOP

Description

This command is used to stop the SNTP module.

Pre-requisites

L2 - L3 connections should be established and SNTP module should be started.

Syntax

AT+NSNTPSTOP

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NSNTPSTOP
OK
```

8.7. Domain Name System (DNS)

8.7.1. DNS Client

To perform DNS client operation, the device must be associated to an AP - initialize the network interface (AT+WNI) and then connect to the configured network (AT+WNCN).

Following is the sequential execution of the AT commands:

1. AT+NDNSCSRVIP
2. AT+NDNSCRURL

8.7.1.1. DNS Resolve URL - +NDNSCRURL

Description

This command is used to resolve the URL in DNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NDNSCSRVIP command should be issued.

Syntax

AT+NDNSCRURL=<URL>,<IP version>

Parameters Description

Parameter	Value	Format	Description
URL	Range: 0-128	String	It specifies the URL to be resolved.
IP version	Range: 4,6 Default: 4	Integer	It specifies whether URL's IPv4 address must be resolved or IPv6 address.

Response

+NDNSCRURL:<IP Address>

Response Parameters Description

Parameter	Range	Type	Description
IP Address		String	It specifies the IP address in the sting format.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NDNSCRURL="www.telit.com"
+NDNSCRURL:"35.202.235.194"
```

OK

8.7.1.2. DNS Set Server IP Address - +NDNSCSRVIP

Description

This command is used to set the server IP address in DNS module. When this command is issued, DNS client module automatically gets started in the device.

Pre-requisites

L2 - L3 connection should be established.

Syntax

AT+NDNSCSRVIP=<IP address>,[<ID>]

Parameters Description

Parameter	Value	Format	Description
IP address	Range: 7-15	IP Address	It specifies IP address of the server to be set.
ID	Range: 0x0,0x1 Default: N/A	Hexadecimal	It specifies the ID of server IP address to be set, where: 0 - Primary ID, 1 - Secondary ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NDNSCSRVIP=8.8.8.8,0

OK

Following command is used to get the server IP address in DNS module

Syntax

AT+NDNSCSRVIP?

Response

+NDNSCSRVIP:<Server IP>

Response Parameters Description

Parameter	Range	Type	Description
Server IP		IP Address	It specifies the server IP address registered to DNS client.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NDNSCSRVIP?

+NDNSCSRVIP:8.8.8.8OK

8.7.2. DNS Server

To perform DNS server operation, the device must be associated to an AP - initialize the network interface (AT+WNI) and then connect to the configured network (AT+WNCN).

Following is the sequential execution of the AT commands:

1. AT+NDNSSSTART
2. AT+NDNSSSTOP
3. AT+NDNSSADDDHOST

8.7.2.1. DNS Host Addition - +NDNSSADDDHOST

Description

This command is used to add a host in DNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NDNSCSRVIP command should be issued.

Syntax

AT+NDNSSADDDHOST=<Host Name>,<IP address>,<TTL>

Parameters Description

Parameter	Value	Format	Description
Host Name	Range: 1-128	String	It specifies the name of the host that must be added.
IP address	Range: 1-64	IP Address	It specifies the IP address that must be added.
TTL	Range: 1-1024	Integer	It specifies the Time to Live period of the host in seconds.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NDNSSADDDHOST="www.testinghost.com",192.168.146.100,600
OK
```

8.7.2.2. DNS Server Start - +NDNSSSTART

Description

This command is used to start the server in DNS module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NDNSSSTART

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NDNSSSTART
OK

Following command is used to get the status of the server in DNS module

Syntax

AT+NDNSSSTART?

Response

+NDNSSSTART:<Status>

Response Parameters Description

Parameter	Range	Type	Description
Status		STARTED, NOT STARTED	It specifies the current status of the DNS server.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NDNSSSTART?
+NDNSSSTART:STARTED
OK

8.7.2.3. DNS Server Stop - +NDNSSSTOP

Description

This command is used to stop the server in DNS module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NDNSSSTOP

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NDNSSSTOP
OK

8.7.3. DNS Service Discovery - +NDNSSD

Description

This command is used for the service discovery in DNS module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NDNSSD=<Device ID>,<Instance name>,<[IP version]>,<Timeout>

Parameters Description

Parameter	Value	Format	Description
Device ID	Range: 0,1	Integer	It specifies the ID device obtained after issuing AT+WNI command response.
Instance name	Range: 1-64	String	It specifies the service instance name to be discovered.
IP version	Range: 4,6,46 Default: 4	Integer	It specifies the IP version to be used in service discovery, where: 4-IPv4, 6-IPv6 46-Both IPv4 and IPv6.
Timeout	Range: 0-5000 Default: 5000	Integer	It specifies the period of timeout in milliseconds for handling the discovery request.

Response

+NDNSSD:<Response Type>,<Service Name>,<TTL>,<Server Name>,<Priority>,<Weight>,<Port>,<Server name in the target information>,<IPv4 Address>,<IPv6 Address>,<Text Record>, values

Response Parameters Description

Parameter	Range	Type	Description
Response Type		Integer	It specifies the type of the response.
Service Name		String	It specifies the name of the service discovered.
TTL		Integer	It specifies the time to live of the service discovered.
Server Name		String	It specifies the name of the server maintaining the service discovered.
Priority		Integer	It specifies the priority of the service.
Weight		Integer	It specifies the weight of the service.

Port		Integer	It specifies the port of the service.
Server name in the target information		String	It specifies the name of the service in the target information.
IPv4 Address		IPv4 Address	It specifies the IPv4 version of IP address.
IPv6 Address		IPv6 Address	It specifies the IPv6 version of the IP address.
Text Record		String	It specifies the text record present in the service.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NDNSSD=0,"_http._tcp.local"
+NDNSSD:12,"_http._tcp.local",10,"123456._http._tcp.local",0,0,0,,,
OK
```

8.8. Multicast Domain Name System (mDNS)

To perform mDNS operation, the device must be associated to an AP - initialize the network interface (AT+WNI) and then connect to the configured network (AT+WNCN).

Following is the sequential execution of the AT commands:

1. AT+NMDNSSTART
2. AT+NMDNSHNREG
3. AT+NMDNSSRVREG
4. AT+NMDNSUPDATETXT
5. AT+NMDNSSRVDEREG
6. AT+NMDNSSTOP

8.8.1. mDNS Start - +NMDNSSTART

Description

This command is used to start the mDNS module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+NMDNSSTART=<Mode>
```

Parameters Description

Parameter	Value	Format	Description
Mode	Range: 0-1	Integer	It specifies the mode in which WLAN interface is

			running, where: 0 - AP mode, 1 - Station mode.
--	--	--	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSTART
OK
```

Following command is used to get the status of server in mDNS module:

Syntax

```
AT+NMDNSSTART?
```

Response Parameters Description

Parameter	Range	Type	Description
Status		started, not started	It specifies the string representing the status of mDNS module.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSTART?
+NMDNSSTART:started
OK
```

8.8.2. mDNS Host Name Registration - +NMDNSHNREG

Description

This command is used to register the host name in mDNS module. mDNS supports one configured host name only, to change or set a new mDNS host name - mDNS service must be stopped and started again.

Pre-requisites

L2 - L3 connections should be established and AT+NMDNSSTART command should be issued.

Syntax

```
AT+NMDNSHNREG=<Host name>
```

Parameters Description

Parameter	Value	Format	Description
Host name	Range: 1-32	String	It specifies the name of the host to be registered.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSHNREG="Telit_Guest"
OK
```

8.8.3. mDNS Service Registration - +NMDNSSRVREG

Description

This command is used to register a service in mDNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NMDNSHNREG command should be issued.

Syntax

```
AT+NMDNSSRVREG=<Instance name>,<Protocol>,<Port>,[<Text record>]
```

Parameters Description

Parameter	Value	Format	Description
Instance name	Range: 1-32	String	It specifies the instance name of service to be registered.
Protocol	Range: 1-32	String	It specifies the protocol or the type of the service to be registered.
Port	Range: 1-9000	Integer	It specifies the port number of the service to be registered.
Text record	Range: 1-255 Default: N/A	String	It specifies the text record of the service that has to be registered and should be mentioned in "Key=Value" format. Multiple pairs of text records should be separated using a ",". The maximum number of pairs allowed is 10.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSRVREG="_QCA4020","_Myprinter._tcp.local",80,"switch=ON,light=OFF"
OK
```

8.8.4. mDNS Service De-Registration - +NMDNSSRVDEREG

Description

This command is used to de-register a service in mDNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NMDNSSRVREG command should be issued.

Syntax

```
AT+NMDNSSRVDEREG=<Service>
```

Parameters Description

Parameter	Value	Format	Description
Service	Range: 1-64	String	It specifies the instance name of the service to be de-registered.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSRVDEREG="_QCA4020._MyPrinter._tcp.local"
OK
```

8.8.5. mDNS Text Update - +NMDNSUPDATETXT

Description

This command is used to update the text record of a service in mDNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NMDNSSRVREG commands should be issued.

Syntax

```
AT+NMDNSUPDATETXT=<Service name>,<Text record>
```

Parameters Description

Parameter	Value	Format	Description
Service name	Range: 1-64	String	It specifies the name of service whose text record has be updated.
Text record	Range: 0-255	String	It specifies the text record of the service to be updated.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSUPDATETXT="_QCA4020._MyDevice._tcp.local","updated txt"
OK
```

8.8.6. mDNS Stop - +NMDNSSTOP

Description

This command is used to stop the mDNS module.

Pre-requisites

L2 - L3 connections should be established and AT+NMDNSSTART command should be issued.

Syntax

```
AT+NMDNSSTOP
```

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSTOP
OK
```

Following command is used to get the status of server stopped in mDNS module

Syntax

```
AT+NMDNSSTOP?
```

Response

```
+NMDNSSTOP:<Status>
```

Response Parameters Description

Parameter	Range	Type	Description
Status		stopped, running	It specifies the string representing the status of mDNS module.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NMDNSSTOP?
+NMDNSSTOP:STOPPED
OK
```

8.9. HTTP Client (HTTPC)

The http client module uses http communication protocol to connect to the server and to get response data. Here, the module acts as HTTP client and connects to remote HTTP server. HTTP connection can be set up with or without SSL security. Following is the sequential execution of the AT commands:

1. AT+NHTTPCINIT: To initialize HTTP client interface
2. AT+NHTTPCCFG: To configure HTTP client configurations
3. AT+NHTTPCCO: To connect the device with remote server
4. AT+NHTTPCREQ: To send GET/POST/PUT/PATCH request to the server
5. AT+NHTTPCRDRSP: To read the response from the server
6. AT+NHTTPCCL: To close the connection when not required

Note:

Before initializing HTTP client, IP configuration and L2 and L3 connection must be established.

HTTP connection can be set up with or without SSL.

Steps to establish HTTP connection without security:

1. Initialize HTTP client interface specifying the connection type (with SSL/Without SSL) in the first parameter:

```
AT+NHTTPCINIT=0,100,1024,1024
```

2. After successful initialization, a CID is displayed. Use this CID for next HTTP client and SSL configurations. The CID is as displayed below:

```
+NHTTPCINIT:0
```

3. Configure the HTTP configuration, using CID obtained from initialization:

```
AT+NHTTPCCFG=0,3,"1",""
```

4. Connect to the HTTP server, specify the server IP address and the port number in the command. Also use the CID obtained from the initialization step:

```
AT+NHTTPCCO=0,"192.168.2.223",443
```

5. Once connection is established, send the request to the server using the same CID specifying the type of request-GET/POST/PUT/PATCH in the second parameter of the command:

```
AT+NHTTPCREQ=0,1,"1kb.html"
```

6. Read the response from the server, specifying its CID and length of data to read:

```
AT+NHTTPCRDRSP=0,1015
```

7. Now close the connection with the remote server using it's CID:

```
AT+NHTTPCCL=0
```

Steps to establish HTTP connection with security:

1. To establish a connection with certificate validation, store the certificate:

```
AT+NSSLCERTSTORE=1,1,"client",820,<send File>
```

```
AT+NSSLCERTSTORE=1,2,"client",893,<send File>
```

2. Initialize SSL client interface specifying the connection type (with SSL/without SSL) in the first parameter:

```
AT+NHTTPCINIT=1,100,5001,5001
```

3. After successful initialization, a CID is displayed. Use this CID for subsequent HTTP client and SSL configurations. The CID is as displayed below:

```
+NHTTPCINIT:0
```

4. Configure:

- HTTP client configuration using CID obtained from initialization:

```
AT+NHTTPCCFG=0,3,"1",""
```

- SSL configuration using CID obtained from initialization:

```
AT+NSSLCFG=0,1,"2"
```

5. To connect to the HTTP server, specify the server IP address and the port number in the command. Also use the CID obtained from the initialization step:

```
AT+NHTTPCCO=0,"192.168.2.223",443
```

6. Once connection is set up, send the request to the server using the same CID specifying the type of request-GET/POST/PUT/PATCH in the second parameter of the command:

```
AT+NHTTPCREQ=0,1,"1kb.html"
```

7. Read the response from the server, specifying its CID and length of data to read:

```
AT+NHTTPCRDRSP=0,1015
```

8. Now, close the connection with the remote server using it's CID:

```
AT+NHTTPCCL=0
```

8.9.1. HTTP Client Initialize - +NHTTPCINIT

Description

This command is used to initialize the HTTP client.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NHTTPCINIT=[<Type>,<Timeout>,<Maximum Body Length>,<Maximum Header Length>,<Receive Buffer Length>]

Parameters Description

Parameter	Value	Format	Description
Type	Range: 0-1 Default: 0	Integer	It specifies the HTTP type, where: 0-HTTP, 1-HTTPS,
Timeout	Range: 0-4294967295 Default: 0	Integer	It specifies the connection timeout in seconds.
Maximum Body Length	Range: 0-1500 Default: 1500	Integer	It specifies the maximum length of the body in bytes.
Maximum Header Length	Range: 0-1500 Default: 1500	Integer	It specifies the maximum length of the header in bytes.
Receive Buffer Length	Range: 512-1500 Default: 1440	Integer	It specifies the maximum length of the receive buffer in bytes.

Response

+NHTTPCINIT:<CID>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the HTTP connection ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NHTTPCINIT=0, 100, 1440, 1440
+NHTTPCINIT:0

8.9.2. HTTP Client Configure - +NHTTPCCFG

Description

This command is used to configure the HTTP client connection parameters.

Pre-requisites

Before issuing this command, issue AT+NHTTPCINIT command for the specific CID.

Syntax

AT+NHTTPCCFG=<CID>,<Configuration ID>,<Configuration value>,[<Configuration value2>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NHTTPCINIT command.
Configuration ID	Range: 1-4	Integer	It specifies the ID of the configuration available, where: 1 - M2M_S2W_HTTPC_CONF_HDR 2 - M2M_S2W_HTTPC_CONF_CGI 3 - M2M_S2W_HTTPC_CONF_RSP_HDR 4 - M2M_S2W_HTTPC_CONF_CLR_ALL_HDR
Configuration value	Range: 0-32	String	It specifies the first-string value for configuration, provided in the Configuration ID.
Configuration value2	Range: 0-32 Default: N/A	String	It specifies the second-string value for configuration, provided in the Configuration ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPCINIT=0, 60, 1024, 1024
+NHTTPCINIT:0
AT+NHTTPCCFG=0,3,"1"
OK
```

8.9.3. HTTP Client Connect - +NHTTPCCO

Description

This command is to make the HTTP client connect to a specific server URL and Port.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NHTTPCCO=<CID>,<IP address>,<Port address>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+NHTTPCINIT command.
IP address	Range: 1-64	String	It specifies the host name or IP address of the server.

Port address	Range: 1-65535	Integer	It specifies the port number of the server.
--------------	----------------	---------	---

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPCCO=0,"192.168.2.223",80
OK
```

8.9.4. HTTP Client Request - +NHTTPCREQ

Description

This command is used to send the HTTP client request to the server.

Pre-requisites

Before issuing this command, HTTPC client must be initialized and connection must be established.

Syntax

```
AT+NHTTPCREQ=<CID>,<Method>,<File path>,[<Data length>,<Data>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NHTTPCINIT command.
Method	Range: 1-7	Integer	It specifies the HTTP method used as part of HTTP request, where: 1 - GET, 2 - HEAD, 3 - POST, 4 - PUT, 5 - DELETE, 6 - CONNECT, 7 - PATCH.
File path	Range: 1-1024	String	It specifies the path of the URI used while sending the HTTP request.
Data length	Range: 1-4294967295 Default: N/A	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295 Default: N/A	Binary Data	It specifies the requested data.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NHTTPCREQ=0,1,"http/1kb.html"

OK

Asynchronous Response

+NHTTPCREQ:<CID>,<Status>,<length>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It Specifies HTTP Connection ID.
Status	1-1024	Integer	It Specifies the HTTP request status.
Length	0-1500	Integer	It Specifies the length of the http data received.

8.9.5. HTTP Client Receive - +NHTTPCRDRSP

Description

This command is used to read the response received from server.

Pre-requisites

Before issuing this command, HTTPC request must be issued.

Syntax

AT+NHTTPCRDRSP=<CID>,<Length>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+NHTTPCINIT command.
Length	Range: 1-65535	Integer	It specifies the length of the data to read.

Response

+NHTTPCRDRSP:<CID>,<Length>,<Data>

Response Parameters Description

Parameter	Range	Type	Description
-----------	-------	------	-------------

CID	0-15	Integer	
Requested length	0-2048	Integer	It specifies the length requested by user
Available length	0-2048	Integer	It specifies the length of data following
Data	0-2048	Binary Data	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPCRDRSP=0, 1024
+NHTTPCRDRSP:0, 10, HelloWorld
```

8.9.6. HTTP Client Close - +NHTTPCCL

Description

This command is used to close the HTTP client connection.

Pre-requisites

Before issuing this command, HTTPC client connection has be established.

Syntax

```
AT+NHTTPCCL=<CID>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NHTTPCINIT command.

Response

```
+NHTTPCCL:<cid>
```

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPCCL=0
OK
```

Asynchronous Response

```
+NHTTPCCL:<cid>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the connection ID where the request is received.

8.10. HTTP Server (HTTPD)

It serves the data to the client using HTTP protocols.

Following are the AT commands:

1. AT+NHTTPDCFG
2. AT+NHTTPDSTART
3. AT+NHTTPDCFGURI
4. AT+NHTTPDRD
5. AT+NHTTPDSENDHDR
6. AT+NHTTPDSENDDATA

Example:

```
AT+WNI=0
AT+WNCN=1,"QCA_HTTP"
AT+NHTTPDCFG="test_server",0,8080,443,0,4,
AT+NHTTPDSTART
AT+NHTTPDCFGURI=0,"sys/test"
AT+NHTTPDRD=0,1,1,1024
AT+NHTTPDSENDHDR=0,1,200,"OK",100,"text/plain"
AT+NHTTPDSENDDATA=0,1,100
```

8.10.1. HTTP Server Configure - +NHTTPDCFG

Description

This command is used to configure HTTP server parameters.

Pre-requisites

L2 and L3 connection must be established. If SSL is to be enabled, the certificates is stored using AT+NSSLCERTSTORE command.

Syntax

AT+NHTTPDCFG=<Name>,<Mode>,<HTTP Port>,<HTTPS Port>,<Network interface>,<IP Family>,[<UserName>,<Password>]

Parameters Description

Parameter	Value	Format	Description
Name	Range: 0-32	String	It specifies the name of the HTTP server.
Mode	Range: 0-3	Integer	It specifies the mode of the server.

			0 - HTTP, 1 - HTTPS, 2 - Both HTTP and HTTPS.
HTTP Port	Range: 1-65535	Integer	It specifies the port number for HTTP.
HTTPS Port	Range: 1-65535	Integer	It specifies the port number for HTTPS.
Network interface	Range: 0-2	Integer	It specifies the interface of the network, where: 0 for AP, 1 for Station, 2 for Both.
IP Family	Range: 4,6,46	Integer	It specifies the IP version, where: 4 - IPv4, 6 - IPv6, 46 - IPv4 and IPv6.
UserName	Range: 0-32 Default: "admin"	String	It specifies the user name of the HTTP server.
Password	Range: 0-32 Default: "admin"	String	It specifies the password of the HTTP server.

Response

+NHTTPDCFG:<CID>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	it specifies the connection ID generated for further communication.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDCFG="test_server",0,8080,443,0,4,"admin","password"
+NHTTPDCFG:0
OK
```

8.10.2. HTTP Server Start - +NHTTPDSTART

Description

This command is used to start HTTP server.

Pre-requisites

L2 - L3 connections should be established and AT+NHTTPDCFG should be issued. If SSL is enabled in AT+NHTTPDCFG command, SSL certificate should be configured to corresponding CID using AT+NSSLCFG command.

Syntax

AT+NHTTPDSTART

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDSTART
OK
```

8.10.3. HTTP Server Configure URI - +NHTTPDCFGURI

Description

This command is used to configure the URI for HTTP server.

Pre-requisites

Before issuing this command, issue AT+NHTTPDSTART command.

Syntax

AT+NHTTPDCFGURI=<CID>,<URI>,[<AUTH>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-16	Integer	It specifies the CID obtained after issuing AT+NHTTPCINIT command.
URI	Range: 0-65535	String	It specifies the specific URI value.
AUTH	Range: 0-1 Default: 0	Integer	It specifies the user authentication flag for URI. This flag should be enabled only when username and password are given in AT+NHTTPDCFG command

Response

+NHTTPDCFGURI:<URIID>

Response Parameters Description

Parameter	Range	Type	Description
-----------	-------	------	-------------

URIID		Integer	
-------	--	---------	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDCFGURI=0,"sys/test"
+NHTTPDCFGURI:0
OK
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the Connection ID.
URIID	0-15	Integer	It specifies registered URI ID.
Type	0,1,3	Integer	It specifies the type of HTTP method, where: 1 - Invalid, 2 - GET, 3 - HEAD, 4 - POST, 5 - PUT, 6 - DELETE, 7 - TRACE 8 - Other methods.
Request line length	0-5000	Integer	It specifies the length of the request line present in the HTTPD request received.
Body length	0-5000	Integer	It specifies the length of body present in the HTTPD request received.

8.10.4. HTTP Server Read - +NHTTPDRD

Description

This command is used to read the request received from the client.

Pre-requisites

Before issuing this command, client request must be received.

Syntax

AT+NHTTPDRD=<CID>,<URI ID>,<Read type>,<Length>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-16	Integer	It specifies the CID obtained after issuing AT+NHTTPDCFG command.
URI ID	Range: 0-64	Integer	It specifies the URI ID obtained after issuing AT+NHTTPDCFGURI command.
Read type	Range: 0-10	Integer	It specifies the type of data to be read. 0 - for Request line, 1 - for Body.
Length	Range: 1-65535	Integer	It specifies the length of the data to be read.

Response

+NHTTPDRD:<Data>

Response Parameters Description

Parameter	Range	Type	Description
Requested length	0-5000	Integer	It specifies the length requested by user
Available length	0-5000	Integer	It specifies the length of data following
Data	0-5000	Binary Data	It specifies the data of Length bytes.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDRD=0,1,0,25
+NHTTPDRD:0,23,01234567890123456789012
OK
```

8.10.5. HTTP Server Send Data - +NHTTPDSENDDATA

Description

This command is used to send data for HTTP request from the client after sending the header.

Pre-requisites

Before issuing this command, HTTP response header should be sent using AT+NHTTPDSENDDATA command.

Syntax

AT+NHTTPDSENDDATA=<CID>,<URI ID>,[<Data length>,<Data>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NHTTPDCFG command.
URI ID	Range: 0-15	Integer	It specifies the URI ID to send the data obtained from AT+NHTTPDCFGURI command.
Data length	Range: 0-4294967295 Default:	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 0-4294967295 Default:	Binary Data	It specifies the data to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDSENDDATA=0,1,10,0123456789
OK
```

8.10.6. HTTP Server - Send Header Response - +NHTTPDSENDDHDR

Description

This command is used to send the header as HTTP server response to the request from the HTTP client.

Pre-requisites

Before issuing this command, both request line and body should be read completely using AT+NHTTPDPRD command.

Syntax

AT+NHTTPDSENDDHDR=<CID>,<URI ID>,<Status code>,[<Status text>],<Content Length>,[<Content type>,<User Header>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NHTTPDCFG command.
URI ID	Range: 0-64	Integer	It specifies the URI ID obtained after issuing AT+NHTTPDCFGURI command.
Status code	Range: 0-1000	Integer	It specifies the status code of HTTP.

			Example: 200 for OK, 401 for Bad request.
Status text	Range: 1-32 Default:	String	It specifies the optional text associated with the status code. Example: OK or Bad Request
Content Length	Range: -1-4294967295	Integer	It specifies the size of the message in bytes, where: -1 - is used for chunk data encoding.
Content type	Range: 1-64 Default:	String	It specifies the type of the content or the message. Example: text/HTML, if NULL then the content type header is not sent.
User Header	Range: 1-255 Default:	String	It specifies the optional headers to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDSENDHDR=0,1,200,"OK",100,"text/plain"
OK
```

8.10.7. HTTP Server Receive Ready - +NHTTPDURIRR

Description

This command is used to set or reset auto receive feature on a given URI.

Pre-requisites

Before issuing this command, a valid URI should be registered.

Syntax

```
AT+NHTTPDURIRR=<URI ID>,<Receive Ready>
```

Parameters Description

Parameter	Value	Format	Description
URI ID	Range: 0-64	Integer	It specifies the URI ID obtained from AT+NHTTPDCFGURI command.
Receive Ready	Range: 0-1	Integer	It specifies the receive ready event to be active or not on given URI.

Example

```
AT+NHTTPDURIRR=0,1
OK
```

8.10.8. HTTP Server Stop - +NHTTPDSTOP

Description

This command is used to stop HTTP server.

Pre-requisites

L2 - L3 connections should be established and AT+NHTTPDCFG and AT+NHTTPDSTART commands should be issued.

Syntax

```
AT+NHTTPDSTOP
```

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+NHTTPDSTOP
OK
```

8.11. Message Queuing Telemetry Transport (MQTT)

It supports the connection and exchange of data to MQTT server. Here the module acts as Client.

Following is the sequential execution of the AT commands:

- AT+NMQTTINIT: Initialises MQTT client interface and gives the CID for next MQTT connections
- AT+NMQTTCONNECT: Connects to the server using the desired configurations
- AT+NMQTTDISCONNECT: Disconnects with the server
- AT+NMQTTPUBLISH: Publishes data to the server
- AT+NMQTTTRR: Receives a request for the incoming data, when connected using the following escape sequence:
MQTTTRR:<CID>, <Data length>
- AT+NMQTTTR: Receives the incoming data and display it
- AT+NMQTTSUBSCRIBE: Subscribe to MQTT topic

Note:

Before initializing MQTT client, IP configuration and L2 and L3 connection must be established.

MQTT connection can be set up with or without SSL.

Steps to establish MQTT connection without security:

1. Initialize MQTT client interface specifying the connection type (with SSL/Without SSL) in first parameter:

```
AT+NMQTTINIT=0
```

2. After successful initialization, a CID is provided. Use this CID for next MQTT client and SSL configurations. The CID is as displayed below:

```
+NMQTTINIT:0
```

3. Connect to the HTTP server, specify the server IP address/Domain name and the port number in the command. Also use the CID obtained from the initialization step:

```
AT+NMQTTCONNECT="api-  
dev.devicewise.com",1883,"1234567890","gsDemo_lp_178fbc","1xaCL1nuYRFS6JJ8",60,10,0
```

4. To receive data from the server on any topic, user must subscribe:

```
AT+NMQTTSUBSCRIBE=0,0,10,"thing/gsDemo_lp_178fbc/property/temp1"
```

5. Once the connection is set up, exchange data from the node and the server using read/write commands. It is mandatory to issue read request to get the notification of incoming data from the server. So, it must be issued before the client reads any data upon connection:

```
AT+NMQTTTRR=0
```

This command would further notify incoming data with the length and the CID:

```
+NMQTTRR: 0,,10
```

6. Read the incoming data:

```
AT+NMQTTR=0,10
```

7. Publish the data to the server:

```
AT+NMQTTPUBLISH=0,1,0,10,"thing/gsDemo_lp_178fbc/property/temp1",5,"568.9",12
```

8. Close the connection with the remote server using it's CID:

```
AT+NMQTDISCONNECT=0
```

Steps to establish MQTT connection with security:

1. Store the certificate to establish connection with certificate validation.

```
AT+NSSLCERTSTORE=1,1,"client",820,<send File>
```

```
AT+NSSLCERTSTORE=1,2,"client",893,<send File>
```

2. Initialize MQTT client interface, specifying the connection type (with SSL/Without SSL) in the first parameter:

```
AT+NMQTTINIT=0
```

3. After successful initialization, a CID is displayed. Use this CID for next MQTT client and SSL configurations. The CID is as displayed below:

```
+NMQTTINIT:0
```

4. Configure:

- MQTT client configuration using CID obtained from initialization:

```
AT+NHTTPCCFG=0,4,"1",""
```

- SSL configuration using CID obtained from initialization:

```
AT+NSSLCFG=0,1,"2"
```

5. Connect to the HTTP server, specify the server IP address/Domain name and the port number in the command. Also use the CID obtained from the initialization step:

```
AT+NMQTCONNECT="api-  
dev.devicewise.com",1883,"1234567890","gsDemo_lp_178fbc","1xaCL1nuYRFS6JJ8",60,10,0
```

6. To receive data from the server on any topic, user must subscribe:

```
AT+NMQTTSUBSCRIBE=0,0,10,"thing/gsDemo_lp_178fbc/property/temp1"
```

7. Once the connection is set up, exchange data from the node and the server using Read/Write commands. It is mandatory to issue read request to get the notification of incoming data from the server. So, it must be issued before client reads any data on connection:

```
AT+NMQTTRR=0
```

This command would further notify incoming data with the length and CID:

```
+NMQTTRR: 0,,10
```

8. Read the incoming data:

```
AT+NMQTTR=0,10
```

9. Publish the data to the server:

```
AT+NMQTTPUBLISH=0,1,0,10,"thing/gsDemo_lp_178fbc/property/temp1",5,"568.9",12
```

10. Close the connection with the remote server using it's CID:

```
AT+NMQTDISCONNECT=0
```

8.11.1. MQTT Initialize - +NMQTTINIT

Description

This command is used to initialize MQTT connection.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NMQTTINIT=<SSL>

Parameters Description

Parameter	Value	Format	Description
SSL	Range: 0-1	Integer	It specifies the enable or disable of secured connection (SSL), where 0 - Disable, 1 - Enable.

Response

+MQTTINIT: <cid>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To initialize MQTT without SSL:

AT+NMQTTINIT=0

+NMQTTINIT:0

OK

To initialize MQTT with SSL

AT+ NMQTTINIT =1

+NMQTTINIT:0

OK

8.11.2. MQTT Client Connect - +NMQTTCONNECT

Description

This command is used to connect to an MQTT server (MQTT broker).

Pre-requisites

L2 - L3 connections should have been established and AT+NMQTTINIT command should be issued.

Syntax

AT+NMQTTCONNECT=<CID>,<HOST>,[<Port>],<Client ID>,[<User name>,<Password>,<Keepalive>,<Timeout>,<Will topic>,<Will message>,<Will QOS>,<will retain>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID of the connection returned by AT+NMQTTINIT command.
HOST	Range: N/A	String	It specifies the Fully Qualified Domain Name (FQDN) of the server (MQTT Broker) or an IP address of the server.
Port	Range: 1024-65536 Default: 1883	Integer	It specifies the port number of servers.
Client ID	Range: N/A	String	It specifies the unique Client Identifier which is a user defined string of ASCII characters. Example: QC4020_001122
User name	Range: N/A Default:	String	It specifies the user name of the MQTT broker.
Password	Range: N/A Default: N/A	String	It specifies the password to be provided to the username.
Keepalive	Range: 0-180 Default: 60	Integer	It specifies the MQTT keep alive time out in seconds that is sent to the MQTT broker.
Timeout	Range: 1-180 Default: 75	Integer	It is the maximum time (in seconds) required to connect the server.
Will topic	Range: N/A Default: N/A	String	It specifies the will topic name.
Will message	Range: N/A Default: N/A	String	It specifies the will topic message.
Will QOS	Range: 0-2 Default: 0	Integer	It specifies the will QOS
will retain	Range: 0-1 Default: 0	Integer	It specifies the will retain

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

MQTT with security disabled.


```

    AT+NMQTTINIT=0
+NMQTTINIT:0
OK
Connect to MQTT broker.
AT+NMQTTCONNECT=0,"api-
dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,
OK
MQTT with security enabled.
    AT+NMQTTINIT=1
+NMQTTINIT:0
OK
Configure all SSL parameters with ssl commands as below with same CID got in AT+NMQTTINIT
command.
at+nssslcfg=0,1,"2"
OK
at+nssslcfg=0,9,"0"
OK
Connect to MQTT broker.
AT+NMQTTCONNECT=0,"api-
dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,
OK
    
```

8.11.3. MQTT Client Publish - +NMQTTPUBLISH

Description

This command is used to send an application message to MQTT broker.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MCONNECT command should be issued.

Syntax

AT+NMQTTPUBLISH=<CID>,<QOS>,<Retain flag>,<Message ID>,<Topic>,<Data length>,<Publish data>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained from AT+NMQTTINIT command.
QOS	Range: 0-2	Integer	It specifies the level of assurance for delivery of the application message.
Retain flag	Range: 0-1	Integer	It specifies the retain flag set to, 1 - indicates the server MUST store the application message and its QoS, so that it can be delivered to future subscribers whose subscriptions matches its

			topic name. 0 - indicates the server MUST NOT store the application message and MUST NOT remove or replace any existing retained message. message
Message ID	Range: 0-65536	Integer	It specifies the ID of the message sent along with message to published.
Topic	Range: N/A	String	It specifies the endpoint to which payload data is published.
Data length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Publish data	Range: 1-4294967295	Binary Data	It specifies data to publish.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+MQTTINIT=0
+MQTTINIT:0
OK
```

Connect to MQTT broker.

```
AT+MQTTCONNECT=0,"api-dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,
OK
```

Publish data from MQTT client. Here the CID is zero,topic is thing/gainspan/property/light,QOS is 1 and data is 123.

```
AT+MQTTPUBLISH=0,1,0,1234,"thing/gainspan/property/light",3,123
OK
```

8.11.4. MQTT Client Receive Request - +MQTTRR

Description

This command is used to send receive request.

Pre-requisites

L2 - L3 connections should be established and AT+MQTTINIT, AT+MCONNECT command should be issued.

Syntax

```
AT+MQTTRR=<CID>
```

Parameters Description

Parameter	Value	Format	Description
-----------	-------	--------	-------------

CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NMQTTINIT command.
-----	-------------	---------	---

Response

+NMQTTRR:<cid>, <Data length>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID of connection handle on which the data is received.
Data length	0-1460	Integer	It specifies the length of the data received.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+NMQTTINIT=0
+NMQTTINIT:0
OK
Connect to MQTT broker.
AT+NMQTTCONNECT=0,"api-
dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,
OK
Enable the Receive request flag, here the CID is 0.
AT+NMQTTSUBSCRIBE=0,1,675,"thing/gainspan/property/light"
OK
AT+NMQTTRR=0
OK
    
```

8.11.5. MQTT Client Subscribe - +NMQTTSUBSCRIBE

Description

This command is used to subscribe to MQTT topic.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MCONNECT command should be issued.

Syntax

AT+NMQTTSUBSCRIBE=<CID>,<QOS>,<Message ID>,<Topic>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NMQTTINIT command.
QOS	Range: 0-2	Integer	It specifies level of assurance for delivery of the application message.
Message ID	Range: 0-65536	Integer	It specifies the ID of the message to be sent along with message to be published.
Topic	Range: N/A	String	It is the endpoint to which payload data is published.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+NMQTTINIT=0

+NMQTTINIT:0

OK

Connect to MQTT broker.

AT+MQTTCONNECT=0,"api-dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,

OK

Subscribe topic to receive data. Here the CID is zero,topic is thing/gainspan/property/light and QOS is 1.

AT+MQTTSUBSCRIBE=0,1,675,"thing/gainspan/property/light"

OK

8.11.6. MQTT Client Receive - +MQTTR

Description

This command is used to receive the data.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MQTTCONNECT, AT+MQTTRR commands should be issued.

Syntax

AT+MQTTR=<CID>,<Data length>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NMQTTINIT command.

Data length	Range: 1-1460	Integer	It specifies the length of the data to be received.
-------------	---------------	---------	---

Response

+NMQTTR: <CID>, <Data length>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number which has the updated data received.
Requested length	N/A	Integer	It specifies the length requested by user
Available length	N/A	Integer	It specifies the length of data following
Data length	N/A	Binary Data	It specifies the data received.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+NMQTTINIT=0
+NMQTTINIT:0
OK
Connect to MQTT broker.
AT+NMQTTCONNECT=0,"api-
dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,
OK
Enable the Receive request flag, here the CID is 0.
AT+NMQTTSUBSCRIBE=0,1,675,"thing/gainspan/property/light"
OK
AT+NMQTTRR=0
OK
+NMQTTRR:0,3
Receive data, here the CID is 0 and data length is 3.
AT+NMQTTR=0,3
OK
    
```

8.11.7. MQTT Client UnSubscribe - +NMQTTUNSUBSCRIBE

Description

This command is used to unsubscribe to MQTT topic.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MCONNECT command should be issued.

Syntax

AT+NMQTTUNSUBSCRIBE=<CID>,<Topic>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NMQTTINIT command.
Topic	Range: N/A	String	It is the topic name to unsubscribe.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

Subscribe topic to receive data. Here the CID is zero,topic is thing/gainspan/property/light and QOS is 1.

AT+NMQTTSUBSCRIBE=0,1,675,"thing/gainspan/property/light"

OK

AT+NMQTTUNSUBSCRIBE=0,"thing/gainspan/property/light"

OK

8.11.8. MQTT Client Disconnect - +NMQTTCL

Description

This command is used to close an MQTT connection.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MQTTCONNECT command should be issued.

Syntax

AT+NMQTTCL=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+NMQTTINIT command.

Example

AT+NMQTTINIT=0

+NMQTTINIT:0

OK

is *Connect to MQTT broker. Here the broker address is api-dev.devicewise.com and the app token*

F1wS6Rhvuxi432C4 and In Response, will get CID as zero.

AT+NMQTTCONNECT=0,"api-dev.devicewise.com",1883,"123456789","gainspan","F1wS6Rhvuxi432C4",180,20,

0

close the MQTT client connection, it is required to give CID as a parameter, here CID is 0.

AT+NMQTTCL=0

OK

Asynchronous Response

+NMQTTCL:<CID>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies closed CID number.

8.12. WebSocket

WebSocket is a computer communication protocol, providing full duplex channel for communication over a single TCP connection.

To perform WebSocket operation, the device must be associated to an AP using AT+WNCN command and WLAN network interface should be initialized using AT+WNI command.

WebSocket connection can be set up with or without SSL.

Steps to establish WebSocket without security:

1. AT+WEBSOCKNEW
2. AT+WEBSOCKCONF
3. AT+WEBSOCKCONN

Steps to establish WebSocket with security:

1. AT+NSSLCERTSTORE
2. AT+WEBSOCKNEW
3. AT+NSSLCFG
4. AT+WEBSOCKCONF
5. AT+WEBSOCKCONN

8.12.1. WebSocket Create - +WEBSOCKNEW

Description

This command is used to create new WebSocket and add the CID entry, presently supports a maximum of four WebSockets.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WEBSOCKNEW=[<Origin>,<Maximum received chunk size>,<Handshake Timeout>,<SSL>,<Close Timeout>,<subprotocol1>,<subprotocol2>,<subprotocol3>,<subprotocol4>]

Parameters Description

Parameter	Value	Format	Description
Origin	Range: N/A Default: N/A	String	It specifies the origin of the Client to be added in the origin header of the requested WebSocket connection.
Maximum received chunk size	Range: 1-1460 Default: 1024	Integer	It specifies the message received in the specified value. If the received message is longer than the maximum value, then the value is passed to the receivable callback in chunks.
Handshake Timeout	Range: 1-1000000 Default: 60000	Integer	It specifies the timeout period of Handshake in milliseconds.
SSL	Range: 0-1 Default: 0	Integer	It specifies the SSL flag to be enabled, where: 0 - disables SSL flag 1 - enables SSL flag.
Close Timeout	Range: 0-10000 Default: 0	Integer	It specifies the Closing timeout period in milliseconds. If the peer does not respond after initiating a close within the mentioned timeout period, then the WebSocket is forced to shut down.
subprotocol1	Range: 0-64 Default: NA	String	It specifies the subprotocol1 for WebSocket extension facility.
subprotocol2	Range: 0-64 Default: NA	String	It specifies the subprotocol2 for WebSocket extension facility.
subprotocol3	Range: 0-64 Default: NA	String	it specifies the subprotocol3 for WebSocket extension facility.
subprotocol4	Range: 0-64 Default: NA	String	It specifies the subprotocol4 for WebSocket extension facility.

Response

+WEBSOCKNEW:<CID>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the new CID number

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW="192.168.16.132",1024,60000,0,0,,,
+WEBSOCKNEW:0
OK
```

8.12.2. WebSocket Configure - +WEBSOCKCONF

Description

This command is used to configure a WebSocket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WEBSOCKCONF=<CID>,<Parameter number>,[<param1>,<param2>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKNEW command.
Parameter number	Range: 0-3	Integer	It specifies the configuration number, where: 0 - adds the HTTP headers 1 - clears the HTTP headers 2 - enables Echo mode 3 - disables Echo mode
param1	Range: N/A Default: N/A	String	It specifies the configuration value of the parameter number. Note: Param1 is valid only if the parameter number is selected 0.
param2	Range: N/A Default: N/A	String	It specifies the configuration value of the parameter number. Note: Param1 is valid only if the parameter number is selected 0.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW="192.168.16.132",1024,60000,0,0,,,
+WEBSOCKNEW:0
AT+WEBSOCKCONN=0,192.168.16.32,80,"/echo"
OK
AT+WEBSOCKCONF=0,1
OK
```

8.12.3. WebSocket Connect - +WEBSOCKETCONN

Description

This command is used to connect to the WebSocket server.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WEBSOCKETCONN=<CID>,<Server address>,<Server port>,<Resource path>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKETNEW command.
Server address	Range: N/A	String	It specifies the server IP address or host name.
Server port	Range: 0-65535	Integer	It specifies the port number of the server.
Resource path	Range: N/A	String	It specifies the path of the resource.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKETNEW="192.168.16.132",
+WEBSOCKETNEW:0
AT+WEBSOCKETCONN=0,"192.168.16.32",80,""
OK
```

8.12.4. WebSocket Send Data - +WEBSOCKETSEND

Description

This command is used to send the data to the remote device of the WebSocket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WEBSOCKETSEND=<CID>,<Data type>,<Data length>,<Data>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing

			AT+WEBSOCKNEW command.
Data type	Range: 1-2	Integer	It specifies the type of data, where: 1 - used for text data, 2 - used for binary data.
Data length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295	Binary Data	It specifies the data to be sent.

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number on which the data sent has failed.
Length	0-4294967295	Integer	It specifies the data length sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW=2,2,0
+WEBSOCKNEW:0
AT+WEBSOCKCONN=0,192.168.16.32,80,/echo
OK
AT+WEBSOCKSEND=0,0,10,0123456789
OK
```

8.12.5. WebSocket Ping - +WEBSOCKPING

Description

This command is used to send a WebSocket ping.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+WEBSOCKPING=<CID>,<Ping data>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKNEW command.

Ping data	Range: N/A	String	It specifies the payload upon ping.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW="192.168.16.132",1024,60000,0,0,,,
+WEBSOCKNEW:0
AT+WEBSOCKCONN=0,"192.168.16.32",80,""
OK
AT+WEBSOCKPING=0,"pingpayload"
OK
+WEBSOCKPING:0,10,"pongpayload"
```

Asynchronous Response

```
+WEBSOCKPING:<CID>,<Pong Length>,<Pong payload>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number on which ping response is received.
Pong Length	0-4294967295	Integer	It specifies the pong length.
Requested length	N/A	Integer	It specifies the length requested by user
Available length	N/A	Integer	It specifies the length of data following
Pong payload	N/A	Binary Data	It specifies the pong payload.

8.12.6. WebSocket Pong - +WEBSOCKPONG

Description

This command is used to send a WebSocket pong.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+WEBSOCKPONG=<CID>,<Pong payload>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKETNEW command.
Pong payload	Range: N/A	String	It specifies the payload upon pong.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKETNEW="192.168.16.132",1024,60000,0,0,,,
+WEBSOCKETNEW:0
AT+WEBSOCKETCONN=0,"192.168.16.32",80,"/"
OK
AT+WEBSOCKETPONG=0,"pongpayload"
OK
```

8.12.7. Send Data to WebSocket - +WEBSOCKETSEND

Description

This command is used to send the data to the remote device of the WebSocket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+WEBSOCKETSEND=<CID>,<Data type>,<Data length>,<Data>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKETNEW command.
Data type	Range: 1-2	Integer	It specifies the type of data, where: 1 - used for text data, 2 - used for binary data.
Data length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-4294967295	Binary Data	It specifies the data to be sent.

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number on which the data sent has failed.
Length	0-4294967295	Integer	It specifies the data length sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW=2,2,0
+WEBSOCKNEW:0
AT+WEBSOCKCONN=0,192.168.16.32,80,/echo
OK
AT+WEBSOCKSEND=0,0,10,0123456789
OK
```

8.12.8. WebSocket Receive Ready Data - +WEBSOCKRCVREADY

Description

This command is used to enable data reception on a specified CID in application layer and indicate the availability of data in the specified CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+WEBSOCKRCVREADY=<CID>,<Receive buffer size>,[<Auto receive>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKNEW command.
Receive buffer size	Range: 1-16384	Integer	It specifies the size of the buffer to hold the received data.
Auto receive	Range: 0-1 Default: 0	Integer	It specifies the state of auto receive to be enabled or disabled. (AT+WEBSOCKRCV command response would automatically call once data receive happens, if auto receive is enabled). 0 - Disable, 1 - Enable.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WEBSOCKNEW="192.168.16.132",1024,60000,0,0,,,
+WEBSOCKNEW:0
AT+WEBSOCKCONN=0,"192.168.16.32",80,""
OK
AT+WEBSOCKRECVREADY=0,1024
OK
+WEBSOCKRECVREADY:0,192.168.16.129,8082,100
```

Asynchronous Response

```
+WEBSOCKRECVREADY:<CID>,<RIP>,<RP>,<Length>
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the CID number which has data receive updates.
RIP	N/A	IP Address	It specifies the remote IP from which data is received.
RP	0-65536	Integer	It specifies the remote port from which data is received.
Length	0-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.

8.12.9. WebSocket Receive Data - +WEBSOCKRECV

Description

This command is used to receive data from any CID.

Pre-requisites

L2 - L3 connections should be established.

Syntax

```
AT+WEBSOCKRECV=<CID>,<Length>
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID value obtained after issuing AT+WEBSOCKNEW command.

Length	Range: 1-4294967295	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
--------	---------------------	---------	---

Response

+WEBSOCKRECV:<RIP>,<RP>,<Total length>,<Present length>, <Data>

Response Parameters Description

Parameter	Range	Type	Description
RIP	N/A	IP Address	It specifies the receive IP address.
RP	0-65536	Integer	It specifies the received remote port.
Total length	0-4294967295	Integer	It specifies the requested data length.
Present length	0-4294967295	Integer	It specifies the received data length in current response.
Data	N/A	String	It specifies the data to be sent.

Note:

For bulk data reception there would be multiple responses.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```

AT+WEBSOCKNEW=2,2,0
+WEBSOCKNEW:0
OK
AT+WEBSOCKCONN=0,192.168.16.32,80,/echo
OK
AT+WEBSOCKRECVREADY=0
OK
+WEBSOCKRECVREADY:0,192.168.16.129,8082,10
AT+WEBSOCKRECV=0,10
+WEBSOCKRECV:192.168.16.129,8082,10,10,0123456789
OK
+WEBSOCKRECVREADY:0,192.168.16.129,8082,10
AT+WEBSOCKRECV=0,11
+WEBSOCKRECV:192.168.16.129,8082,11,10,0123456789
    
```


OK

8.12.10. WebSocket Close - +WEBSOCKCLOSE

Description

This command is used to close the WebSocket.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WEBSOCKCLOSE=<CID>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID obtained after issuing AT+WEBSOCKNEW command.

Example

```
AT+WEBSOCKNEW=2,2,0
+WEBSOCKNEW:0
OK
AT+WEBSOCKCONN=0,192.168.16.32,80,/echo
OK
AT+WEBSOCKCLOSE=0
OK
```

Asynchronous Response

+WEBSOCKCLOSE:<CID>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	It specifies the closed CID number.

9. ADVANCED SERVICES

9.1. Provisioning

9.1.1. Web Provisioning - +WNWEBPROV

Description

This command is used to start the provisioning server.

Note: After successful provisioning, the module resets and comes up in the mode configured during the provisioning.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+WNWEBPROV=<Start>,[<Port>,<SSL>,<Server certificate>]

Parameters Description

Parameter	Value	Format	Description
Start	Range: 1-2	Integer	It indicates the provisioning server to start, where: 1 - Starts the HTTP provisioning server. For HTTP server, the user authentication is enabled by default: Username - "admin", Password - "admin". 2 - Starts the BLE provisioning server.
Port	Range: 0-9999 Default: 80	Integer	It specifies the port on which server is running.
SSL	Range: 0,1 Default: 0	Integer	It specifies the enable/disable of SSL where, 0- Disables SSL, 1- Enables SSL.
Server certificate	Range: 0-32 Default: Server certificate	String	It specifies the name of server certificate used in SSL.

Note:

- 1). AT+WNWEBPROV=1, command starts mDNS by default and two pre-defined services - one for Provisioning and the other for OTAFU. If the user tries to start the mDNS after web provisioning command then mDNS fails to start. Similarly, if mDNS is started before issuing web provisioning command then provisioning fails-as mDNS is already started.
- 2). The user should reset Network setting in option "General setting" of the IOS device, as the IOS device remembers only the first provisioned device and scans for the same name. If the IOS device is re provisioned with another Module, it fails to scan the other BLE devices.
- 3). SAFARI browser is not supported in IOS or MAC for Web provisioning.
- 4). The DNS server does not work when webprovisioning starts. If the DNS server is started before webprovisioning then it stops internally.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+WNWEBPROV=1
OK
```

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Status		Firmware Upgrade Success, Firmware Upgrade Failure	It specifies the status of the Firmware upgrade.

9.2. Firmware Upgrade

Firmware upgrade module is used to upgrade or update the device firmware. The firmware is present in two locations in the module – one in the current location and the other in trial location.

When firmware upgrade occurs, the new firmware is written in trial location. This firmware moves to current location by issuing the command for Firmware validation (AT+FUVALIDATE). If a Firmware is present in trial location, then new firmware upgrade cannot take place until the firmware present in trial location is either accepted or rejected during firmware validation.

Firmware upgrade supports both HTTP Client and over HTTP Server

To upgrade the firmware device over a URI of the HTTP client running in the device. A new HTTP client session is started and then connected to a specified server address.

To perform a firmware upgrade, the device must be associated to an AP using AT+WNCN command and WLAN network interface should be initialized using AT+WNI command.

Following is the sequential execution of the AT commands:

1. AT+FUHTTTPC

After successful firmware upgrade, user must issue:

2. AT+FUVALIDATE

Example:

```
AT+WNI=0
AT+WNCN=1,"Telit_Guest","qwerty123456"
AT+FUHTTTPCINIT=0
AT+FUHTTTPC=0,"192.168.128.144",80,"ota.bin"
AT+FUVALIDATE=0,1
```

To upgrade the device firmware over a URI of the HTTP server running in the device. A specific URI of the HTTP server (sys/fwup) is configured that is already started. A HTTP POST operation is carried out by keeping the firmware binary.

To perform a firmware upgrade, the device must be associated to an access point using AT+WNCN command and WLAN network interface should be initialized using AT+WNI command.

Following is the sequential execution of the AT commands:

1. AT+FUHTTTPD

After successful firmware upgrade, user must issue:

2. AT+FUVALIDATE

Example:

AT+WNI=0

AT+WNCN=1,"Asus_fwup",,11

AT+NHTTPDCFG="FWUP_Server",0,8080,443,0,4,"admin","admin"

AT+NHTTPDSTART

AT+FUHTTPD

When over the air firmware upgrade is performed with HTTP:

- The trail location in the memory should always be empty because whenever Firmware upgrade takes place the binary is loaded to trail location of the memory, never the current location.
- Each otafu.bin carries a header which contains certain specific configurations. For example, the configuration has length of the binary (in number or bytes).

During firmware upgrade, the system boots up, the boot loader always loads the binary from the current location (which is the current image) to the flash, during which it checks for the trail image in trail location, if empty then the image in the current location will be loaded else the current location image is erased and trail image is loaded to the current location.

Firmware upgrade can be performed in 3 ways, namely:

1. Web provisioning
2. HTTP PULL
3. HTTP PUSH

For more information to detailed use cases, refer "WL865E4-P Use Case Reference Guide".

9.2.1. HTTPC Initialize Firmware Upgrade - +FUHTTPCINIT

Description

This command is used enable or disable secured connection (SSL).

Pre-requisites

L2 - L3 connections should be established. If the firmware upgrade with HTTP client is performed along with SSL, then AT+FUHTTPCINIT should be issued to enable/disable SSL. Corresponding certificates should be stored using AT+NSSLCERTSTORE command and configured using AT+NSSLCFG command before starting the FWUP HTTP client.

Syntax

AT+FUHTTPCINIT=<SSL>

Parameters Description

Parameter	Value	Format	Description
SSL	Range: 0-1	Integer	It specifies the enable or disable of secured connection (SSL), where 0 - Disable, 1 - Enable.

Response

+FUHTTPCINIT: <cid>

Response Parameters Description

Parameter	Range	Type	Description
CID	0-15	Integer	

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

To initialize FWUP module over HTTP client without SSL:

AT+FUHTTPCINIT=0

+FUHTTPCINIT:0

OK

To initialize FWUP module over HTTP client with SSL

AT+FUHTTPCINIT=1

+FUHTTPCINIT:0

OK

9.2.2. HTTPC Firmware Upgrade - +FUHTTPC

Description

This command is used to upgrade the firmware using HTTP client that connects to the specified HTTP server to fetch file over the air and load it as trial firmware. After software reset, issue AT+FUVALIDATE to upgrade trial firmware to the current firmware or discard it.

Pre-requisites

L2 - L3 connections should be done. If the firmware upgrade with HTTP client is performed along with SSL, then AT+FUHTTPCINIT should be issued to enable/disable SSL. Corresponding certificates should be stored using AT+NSSLCERTSTORE command and configured using AT+NSSLCFG command before starting the FWUP HTTP client.

Syntax

AT+FUHTTPC=<CID>,<Server Address>,[<Server Port>],<File URI>,[<Timeout>,<UserName>,<Password>]

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-15	Integer	It specifies the CID of the connection returned by AT+FUHTTPCINIT command.
Server Address	Range: 1-63	String	It specifies the server IP address or the name.
Server Port	Range: 1-65535 Default: 80	Integer	It specifies the server port.
File URI	Range: 1-127	String	It specifies the URI of the firmware file on server.

Timeout	Range: 1-1000000 Default: 100	Integer	It specifies the period of timeout in milliseconds of HTTP server.
UserName	Range: 0-32 Default: "admin"	String	It specifies the user name of the HTTP server.
Password	Range: 0-32 Default: "admin"	String	It specifies the password of the HTTP server.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+FUHTTPCINIT=0
+FUHTTPCINIT:0
OK
AT+FUHTTPC=0,"192.168.2.26",80,"otafu.bin",100,"admin","password"
CR>OK
```

9.2.3. HTTPD Firmware Upgrade - +FUHTTTPD

Description

This command is used to upgrade the firmware using HTTP server with URI 'sys/fwup' to which client posts the firmware upgrade file and loads as trial firmware. After software reset, issue AT+FUVALIDATE to upgrade trial firmware to the current firmware or discard it.

Pre-requisites

L2 - L3 connections should be established and the HTTP server should be started using AT+NHTTTPDSTART command. If SSL is to be enabled then the corresponding certificates should be stored using AT+NSSLCERTSTORE and configured using AT+NSSLCFG before starting HTTP server.

Syntax

```
AT+FUHTTTPD
```

Status

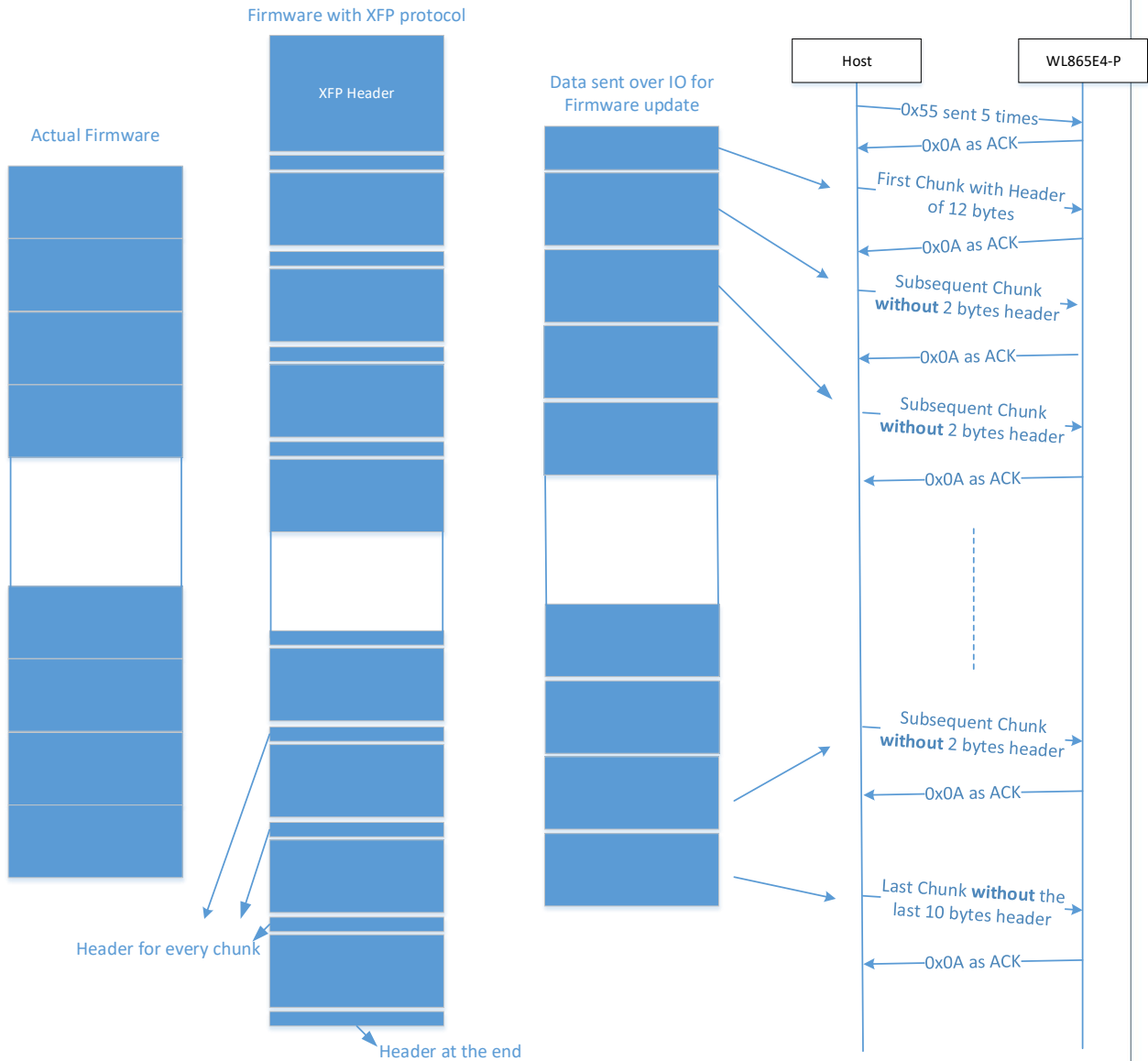
For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+FUHTTTPD
OK
```

9.2.4.

The protocol followed to do firmware update is called XFP. The firmware built has the XFP header which the host that must be remove and send to WL865E4-P module. The below diagram shows the different part of XFP header and the sequence of operation:



The entire firmware is divided into multiple chunks of specific size (256 or 512 or 1024). The XFP header is added to each chunk. The details of the header are as follows:

XFP has two set of headers at the beginning:

1. The first header has few details about the firmware which is not sent over IO to WL865E4-P.

```

E2 00 76 65 72 73 69 6F 6E 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 57 38 36 36 45 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 01 00 06 00 74 83 0F 00 6F 09 0B 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
    
```

```

00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 63 6D 5F 76 65 72 73 69 6F 6E 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 FD 01 01 00 02 00 00 00 ED B9 07 00 FF 00
    
```

The highlighted two bytes gives the length of the first header. In this case it is 0x00E2 i.e. 226 bytes + 1 bytes. It includes the length (0x00E2).

The first underlined byte stream of 32 bytes gives the details of firmware version.

The second underlined byte stream of 32 bytes gives the details of module type.

The third underlined byte stream is the second header.

2. The second header is sent along as a part of the firmware, which is:

```
01 01 00 02 00 00 00 ED B9 07 00 FF 00
```

The highlighted bytes tell the size of the total firmware (0x00 07 B9 ED) and the underscored bytes (0x00 FF) tells the size of each chunk. The firmware size doesn't include the XFP headers.

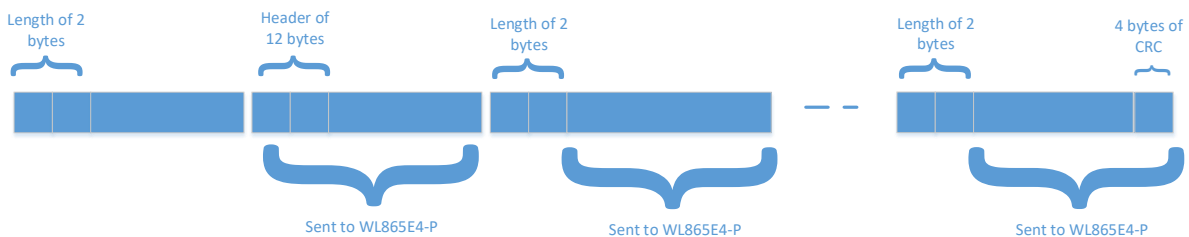
The header in remaining chunk just has 2 bytes that shows the chunk size. This header is not sent to the WL865E4-P.

The last chunk will have the header at the end as well. This header will have the CRC of 4 bytes.

Communication between Host and WE865E4-P:

The Host first sends the start bytes 0x55 to indicate start of XFP procedure. After receiving an acknowledgement (0xA0) from the WL865E4-P the host sends the first chunk.

The first chunk has the 2nd header and part of firmware where the total size is the size of the chunk minus 2. The remaining chunk has the firmware with stripped length field from it, as shown in the following figure:



9.2.4.1. XFP Start - +YXFPSTART

Description

This command is used to start XFP module and performs firmware upgrade. It is proprietary protocol used in Telit modules, for transferring bulk data over serial interface (Ex: UART, SPI and SDIO).

1. Compile the s2w application.
2. Open tera term with High Speed UART port, run the S2w application and enter the AT command AT+YXFPSTART.
3. XFP tool uses High Speed UART port to load the Binary, so close the High Speed com port (tera term).
4. Open XFP tool, select-OK, choose PORT as High Speed com port and Speed is the BAUD rate (115200).

5. Click on "Browse"™ button to choose the binary to program, for example go to `we866e4\ref_app\s2w\build\gcc\output` folder and select `S2W_ouafu.bin`. Click on "Program"™.

6. XFP tool will prompt once done with loading the binary, then close the tool and open tera term and reset the board. s2w banner with "--TRAIL"™ which is trail image will be displayed.

7. Execute "AT+FUTRAILIMG=0,1"™ to complete the firmware upgrade.

Pre-requisites

None.

Syntax

AT+YXFPSTART

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+YXFPSTART
OK
```

9.2.5. Validate Firmware Upgrade - +FUVALIDATE

Description

This command is used to validate the trial firmware either by deleting or upgrading it to the current firmware

Pre-requisites

L2 - L3 connections should complete and AT+FUHTTTPC command should be issued.

Syntax

AT+FUVALIDATE=[<Accept Image Flag>,<Reboot Flag>]

Parameters Description

Parameter	Value	Format	Description
Accept Image Flag	Range: 0-1 Default: 1	Integer	It specifies the handling of the trial image flag, where: 0 - Rejects the trial image flag, 1 - Accepts the trial image flag.
Reboot Flag	Range: 0-1 Default: 1	Integer	It specifies the reboot after accepting the trial image, where 0 - indicates No Reboot, 1 - indicates Reboot.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+FUVALIDATE=1,1
OK
```

9.3. M2M Smart Device Communication (TR50)

It supports the configuration of the default connections between the gateway and M2M service.

Following are the steps involved in interacting with deviceWise cloud:

- Connect the device to an AP with internet connection (Please don't connect to Telit network as it blocks MQTT packets)
- Configure the device to establish the connection with the deviceWise cloud
- Connect the device to the deviceWise cloud
- Send data to the cloud.
- Receive the incoming data from the cloud
- Login in to the web <https://portal-dev.telit.com> and check for the updated data in the cloud

Steps to send data to deviceWise cloud:

1. Connect the device to an AP with internet connection, either through web provisioning or through commands.

Following are the steps involved to connect via commands:

- a. Initialize the NCM module in client mode

```
AT+WNI=0
```

When successful, response is:

```
+WNI:whandle {0 or 1}
```

else,

```
+WNI:Fail
```

- b. Connect to the desired AP:

```
AT+WNCN=Whandle,"SSID","Passphrase"
```

When successful, response is:

```
+WNCN:connected
```

else,

```
+WNCN:not connected
```

2. Configure the node to connect to the deviceWise cloud:

```
AT+DWCFG=api-dev.devicewise.com,0,1xaCL1nuYRFS6JJ8,0,3600,3,0
```

```
OK
```

else, Error

3. Connect the device to the cloud:

- a. Establish a connection with the cloud:

```
AT+DWCONN=1
```

```
OK
```

else, Error

- b. Login to the Telit portal - <https://portal-dev.telit.com> and switch the organization to Telit_DEMO. The device can be found in the list of things using its MAC address. Select a device to view its dashboard.

4. Update the data to the cloud:

- a. Publish the value of light to the cloud:

```
AT+DWSEND=0,property.publish,key,light1,value,1500
```

Where,

1500 is the value of light

When the packets are sent successful, the response is:

#DSEND: <msgId> (msgId – is the index message)

OK

else, Error

- b. The response of the message is notified in the following format:

#DWRING: <type>,<msgId>,<len>

- c. Receive the response of the message sent:

AT+DWRCV=<msgId>

- d. Once the publish is successful, view the updated value of the light in the dashboard, Telit portal.

- 5. To update the value of the sensors using raw data, follow the steps mentioned in point4 and to update temperature and battery value, issue the following commands:

AT+DSEND=0,property.publish,key,temp1,value,43

AT+DSEND=0,property.publish,key,rssi1,value,-49

AT+DSEND=0,property.publish,key,batt1,value,300

- 6. Send data in raw format:

AT+DSENDR=<dataLen>

- 7. Disconnect the device from the cloud:

AT+DWCONN=0

OK, when successful

else, Error, when failed

9.3.1. deviceWISE Configure - +DWCFG

Description

This command is used to configure the deviceWISE parameters.

<serverUrl>,<deviceIdSelector>,<appToken>,<security>,<

<heartBeat>,<autoReconnect>,<overflowHandling>,<atrInstanceId>,<serviceTimeout>

Pre-requisites

None.

Syntax

AT+DWCFG=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: 0-1,0-1,10-86400,0-3,0-1,0-4,1-120,1-5,128,16	RAW Data	It specifies the parameters to be configured: <serverUrl> - URL of the M2M Service instance in address:port form. <deviceIdSelector> 0 : 1 (0=IMEI 1=CCID/ESN), basically 0 if not SIM card or CDMA ID installed <appToken> - The secure application token provided in the Management Portal

		<p><security> - Flag indicating if the SSL encryption is enabled.</p> <p>0: SSL encryption disabled (default), 1: SSL encryption enabled.</p> <p><heartBeat> - If no packets are received in the number of seconds specified in the heartbeat field, a heartbeat message will be sent to keep the connection alive.</p> <p>Default: 60, Range: 10 - 86400</p> <p><autoReconnect> - Flag indicating if the connection manager should automatically reconnect to the service.</p> <p>0: auto-reconnect disabled 1: auto-reconnect lazy - reconnect on next send and every 3600 seconds. 2: auto-reconnect moderate (default) - reconnect 120 seconds, then every 3600 seconds after the first day. 3: auto-reconnect aggressive - reconnect every 120 seconds.</p> <p><overflowHandling> - Flag indicating if the way to handle overflows in data management.</p> <p>0: FIFO (default) 1: LIFO</p> <p><atrunInstanceld> - AT instance that will be used by the service to run the AT Command.</p> <p>Default 4, Range 0 to 4</p> <p><serviceTimeout> - It defines in seconds the maximum time interval for a service request to the server.</p> <p>Default 5, Range 1 to 120</p>
--	--	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Following command is used to get configuration of the deviceWISE parameters:

Syntax

AT+DWCFG?

Response

#DWCFG:<serverUrl>,<deviceIdSelector>,<appToken>, <security>,<heartBeat>,<autoReconnect>,<overflowHandling>,<atrunInstanceld>,<serviceTimeout>,0,0,0Status

For all possible status responses refer [Table 4: Status Responses](#)

9.3.2. deviceWISE Connect/Disconnect - +DWCONN

Description

This command is used to connect or disconnect with M2M service.

Pre-requisites

L2 - L3 connections should be established and AT+DWCFG command should be issued.

Syntax

AT+DWCONN=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: 0-1	RAW Data	It specifies the status flag of M2M service, where: 0 - Disconnects the connection 1 - Connects

Response

+DWCONN: <Connect status>

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Following command is used to get the status of the connection:

Syntax

AT+DWCONN?

Response Parameters Description

Parameter	Range	Type	Description
Connect status	N/A	connected, not connected	It gives the status of the connection.

Status

For all possible status responses refer [Table 4: Status Responses](#)

9.3.3. deviceWISE Connection Status - +DWSTATUS

Description

This command is used to get the status of the connection, including the runtime statistics.

Pre-requisites

Syntax

AT+DWSTATUS

Response

#DWSTATUS: <connected><lastErrorCode>,<latency>,<pktsIn>,<pktsOut>,<bytesIn>,<bytesOut>

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Syntax

AT+DWSTATUS?

9.3.4. deviceWISE Send Data - +DWSEND

Description

This command is used to send formatted data to the M2M service. This data can be normal request, method, method update or an acknowledgment.

Pre-requisites

Before issuing this command, AT+DWCONN command should be issued.

Syntax

AT+DWSEND=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: 0-3	RAW Data	<p>Format is <type>,<param_1>[,<param_2>[,&#124;&#124;,<param_n>]]], Where,</p> <p><type> - code for the type of message to send. (0 for normal request, 1 for method request, 2 for method update, 3 for method acknowledgment).</p> <p>Type 0: <param_1> - command: the api command to execute. <param_i> - string parameter indicating the i-th parameter</p> <p>Type 1: <param_1> - thingKey: the key of a thing to execute. <param_2> - timeout: time to wait in seconds before returning an error for the request. <param_3> - method: the method key of a thing to execute. <param_4> - is singleton: 0 or 1. 1 if no more than one of these instance can exist. <param_5+> - String parameter indicating the i-th parameter, with i=1,&#124;,20.</p> <p>Type 2: <param_1> - id: the identification of the method instance.</p>

			<p><param_2> - message: a message represents the status of the method.</p> <p>Type 3:</p> <p><param_1> - id: the identification of the method instance.</p> <p><param_2> - status: the integer result status for the execution. 0 is reserved for OK.</p> <p><param_3 > When status is not 0 - error message associates with the status.</p> <p>else - param_i should be the name of the element and param_i+1 should be the value of the element.</p>
--	--	--	--

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Syntax

AT+DWSSEND?

9.3.5. deviceWISE Send Raw Data - +DWSENDR

Description

This command is used to send raw data to the M2M service, the content must be valid JSON. The module responds to the command with a

prompt <greater_than><space> and waits for the data to send. When data length in bytes is sent, operation is automatically completed.

Pre-requisites

Before issuing this command, AT+DWCONN command should be issued.

Syntax

AT+DWSENDR=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: 1-1500	RAW Data	It specifies the data length in number of bytes to be sent.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Syntax

AT+DWSENDR?

9.3.6. deviceWISE Receive Data - +DWRCV

Description

This command used to read the formatted data arriving from the M2M Service, the module is notified of these data by the URC +DWRING.

If the incoming data is accepted with AT+DWRCV, then the formatted data is received in the following URC:

#DWDATA: <msgld>,<error>,<len>,<param_1>[,<param_2>[,...[,<param_n>]]]

Pre-requisites

Before issuing this command, AT+DWCONN command should be issued.

Syntax

AT+DWRCV=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: 1-1500	RAW Data	<msgld> - index of the data message to receive, as indicated in the URC #DWRING. Range: >=1 If the data received are the consequence of a previous data sending (issued by AT+DWSEND), then the msgld value is the same as the msgld value reported in the AT+DWSEND.

Response

+DWDATA: <msgld><error><cid><len><param_1[,param_2[,...[,param_n]]]>

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Syntax

AT+DWRCV?

9.3.7. deviceWISE Receive Raw Data - +DWRCVR

Description

This command is used to read the raw data arriving from the M2M service, the module is notified of these data by the URC +DWRING.

If the incoming data is accepted with AT+DWRCVR, then the data is received in the following URC:

#DWRDATA: <msgld>,<len>,<data>

Pre-requisites

Before issuing this command, AT+DWCONN command should be issued.

Syntax

AT+DWRCVR=<Command>

Parameters Description

Parameter	Value	Format	Description
Command	Range: >=1	RAW Data	msgId - index of the data message to receive, as indicated in the URC #DWRING. Range: >=1 If the data received are the consequence of a previous data sending (issued by AT#DWSEND), then the msgId value is the same as msgId value in AT+DWSEND.

Response

+DWRDATA: <msgId>,<len>,<data>

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

Syntax

AT+DWRCVR?

9.3.8. deviceWISE Read Unresolved Data - +DWLRCV

Description

This command is used to obtain pending message information from the M2M Service.

#DWLRCV:

<msg_number>[,<msgId_1>,<msg_1_len>[,<msgId_2>,<msg_2_len>[,...<msgId_n>,<msg_n_len>]]]

where:

<msg_number> - number of messages pending from the M2M Service

Range: >=0

<msgId_i> - index of the i-th data message to receive

<msg_i_len> - length of the i-th data message to receive

Pre-requisites

Before issuing this command, AT+DWCONN command should be issued.

Syntax

AT+DWLRCV

Response

msg_number[,<msgId_1>,<msg_1_len>[,<msgId_2>,<msg_2_len>[,...<msgId_n>,<msg_n_len>]]]

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

NA

9.4. Amazon Web Service (AWS)

Use Case Reference Guide for AWS

Configuring AWS IoT

Before connecting the device to AWS IoT, it is required to have an Amazon Web Service account. Also, configure the resources so that AWS IoT recognizes the EVB and allows it to connect.

Creating an AWS IoT Account

If AWS account with AWS IoT enabled is not present, visit <https://console.aws.amazon.com/> to create your own AWS IoT account.

Creating Thing Resources in AWS IoT

In order, for the EVB to connect to AWS IoT, first configure AWS IoT to know its identity and what access policies to apply to it.

AWS IoT uses three resources to manage devices. Each device is registered as a “Thing” in the AWS IoT Registry. Each Thing has an associated security certificate and each security certificate has at least one associated access policy. Before the EVB connection creates these resources and associations. The following hierarchy of resources is created to enable the EVB to connect:

- **Thing**
- **Certificate**
- **Policy**

After registering the device, the shadow of a thing gets created automatically. A thing shadow is sometimes referred to as a device shadow. The thing shadow is a JSON document that is used to store and retrieve current state information for a thing (device, app, and so on).

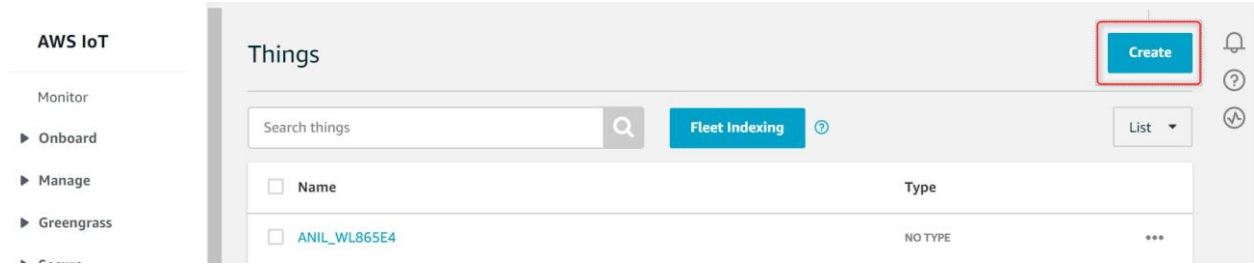
The following are the sections to create the resources.

Creating a Thing and its Security Certificate

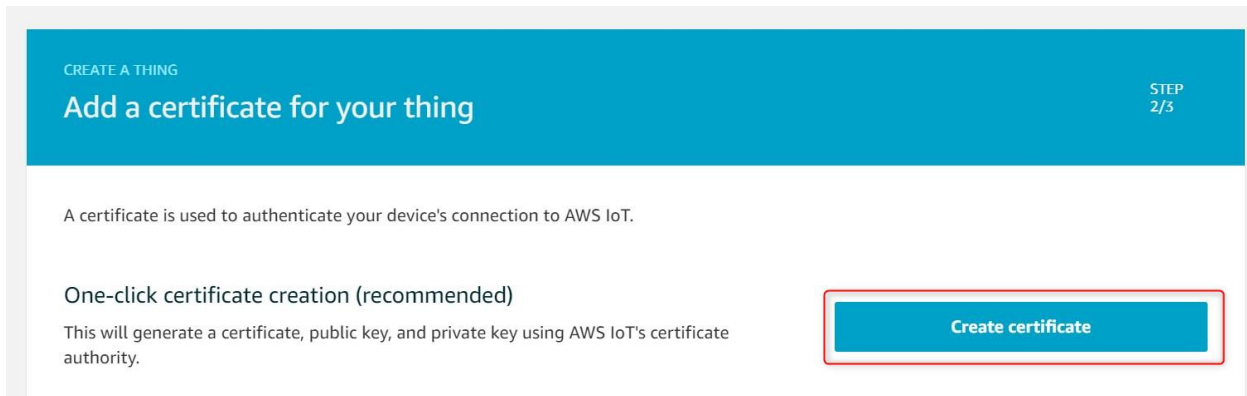
Create a **Thing** to represent the EVB in the AWS IoT Registry. AWS IoT allows us to create a certificate and keys for the EVB, as well as assign an access policy during the process of creating a Thing. Download the Certificate and the key files created during this process to install in the EVB later.

Following is the procedure to create a Thing, create its security certificate, download the certificate and key files, and assign an access policy:

1. Sign into the **AWS console**. <https://console.aws.amazon.com/>
2. Select **AWS IoT** from the **Services** menu.
3. Click **Registry** in the AWS IoT navigation panel.
4. Click **Things**.
5. Click the **Register a thing** button or the **Create** button, whichever appears.



6. In the **Name** field, enter the device identifier of the EVB. The device identifier is the MAC address of the EVB printed on the module label or can be the user-specific string can also be used.
7. Click the **Create thing** button.
8. Add your device to the thing registry
9. Click the **Security** item on the navigation panel. By default, the Certificates section will be highlighted. Click the **Create** button on the right-hand corner of the page. This will navigate to the Create Certificate page.
10. Click the **Create certificate** button.



11. **Download** the three-device key and **certificate** files to your PC as shown in the snippet.

Certificate created!

Download these files and save them in a safe place. Certificates can be retrieved at any time, but the private and public keys cannot be retrieved after you close this page.

In order to connect a device, you need to download the following:

A certificate for this thing	89de69fcdcf.cert.pem	Download
A public key	89de69fcdcf.public.key	Download
A private key	89de69fcdcf.private.key	Download

You also need to download a root CA for AWS IoT:

A root CA for AWS IoT: [Download](#)

[Activate](#)

Note: While downloading the 3rd file (CA for AWS IoT), a new tab will appear as shown in the below snippet.

12. To **download** the **CA certificate**, click on the link as shown in the below snippet.

Note

You might need to right click these links and select **Save link as...** to save these certificates as files.

- RSA 2048 bit key: [Amazon Root CA 1](#)
- RSA 4096 bit key: Amazon Root CA 2. Reserved for future use.
- ECC 256 bit key: [Amazon Root CA 3](#)
- ECC 384 bit key: Amazon Root CA 4. Reserved for future use.

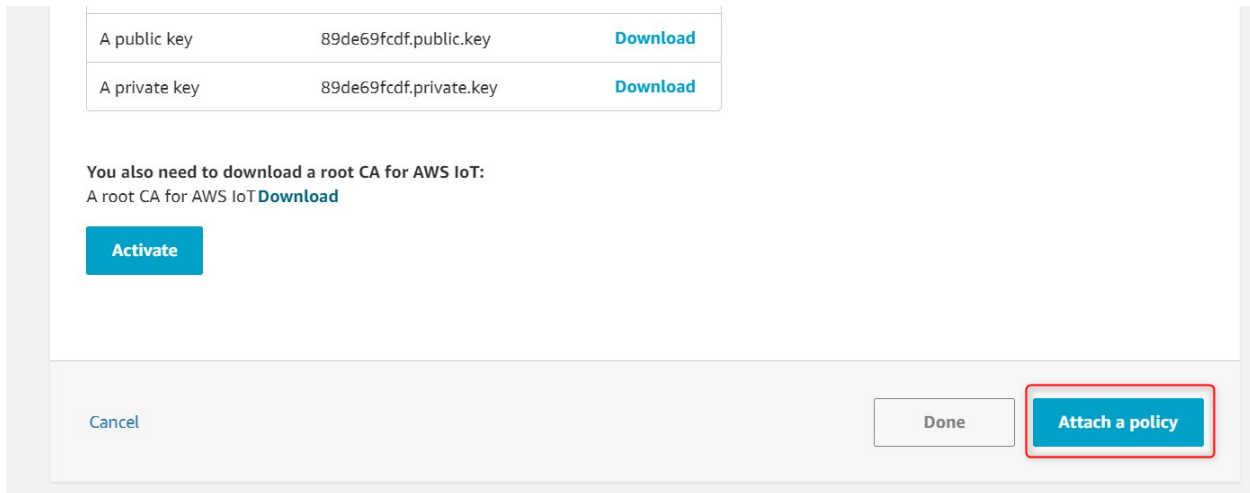
These certificates are all cross-signed by the [Starfield Root CA Certificate](#). All new AWS IoT Core regions, beginning with the May 9, 2018 launch of AWS IoT Core in the Asia Pacific (Mumbai) Region, serve only ATS certificates.

13. Click the **Activate** button.

Creating a Policy Resource

Policy resources are first created. A policy controls access to the devices that are associated with the policy. A single policy may be used to control/access to many different devices.

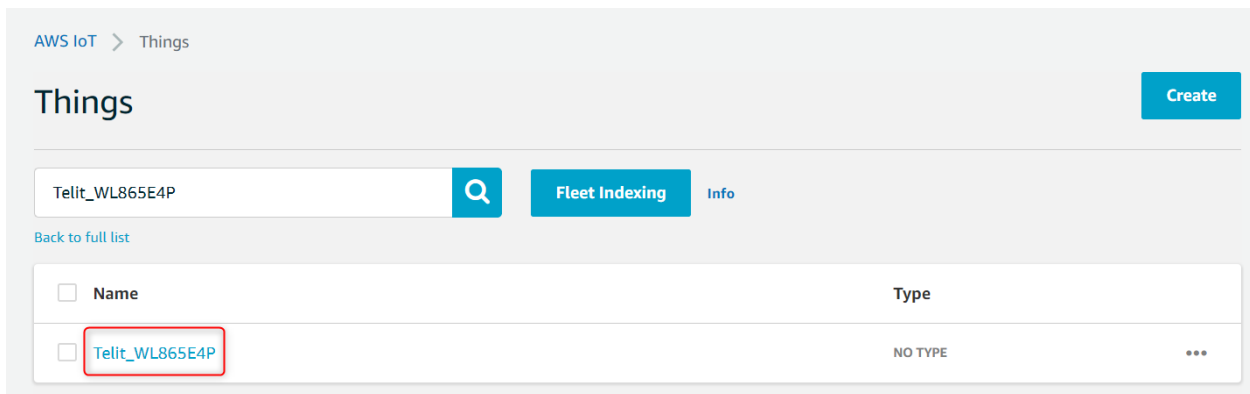
14. Click the **Attach a policy** button.



15. Select the Allow-All checkbox.

16. Click **Register** Thing.

The new device (thing) name can appear in the dashboard as shown in the below snippet.



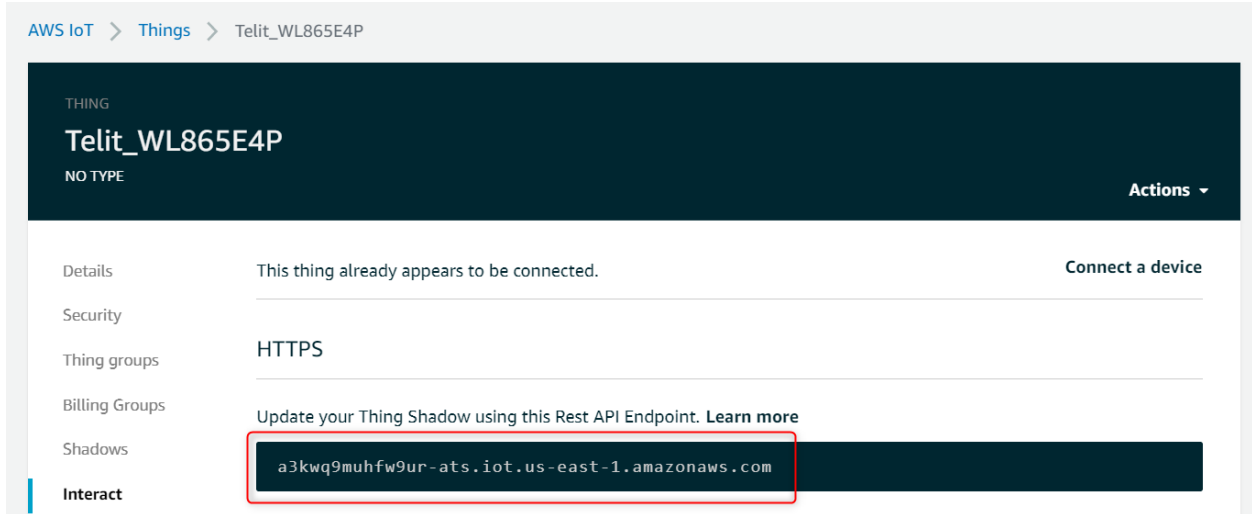
17. Click **Thing** Name (Ex: Telit_WL865E4P), listed in the main window.

18. Click **Interact**.

19. Copy the **hostname** listed under HTTPS.

For example “a3kwq9muhfw9ur-ats.iot.us-east-1.amazonaws.com”.

Use it for HOSTNAME as shown in the below snippet



AWS using Hosted Application

Description Demonstrates the AWS feature where Telit node will connect to the AWS server and send data.

Prerequisite Binary image, Valid AWS account, Thing creation with appropriate certificates (CA, certificate, private key).

Precondition NA

Setup Architecture The setup requires a Telit node, an AP, or a router connected to the internet.

Procedure Following commands are used to configure the Telit node as STA which connects with Access Point (example: "Test_AP") and the WLAN network interface is initialized.

Load the certificates to the Telit Node for AWS server authentication and access.

An HTTPS client session is started and connected to a specified server address.

AT Command Sequence:

AT+YLC=0	Switch to New Telit style AT command mode enable
AT+WNI=0	Mode to start into: = 0 for station = 1 for AP
AT+WNCN=1,"Test_AP"	Connect to the desired Access Point and get an IP address from the DHCP server 1. Handler (output of AT+WNI) 2. SSID 3. Password
AT+NSSLCERTSTORE=0,1,1,"cacert",1206, <send file>	Store a certificate/CA list data in nonvolatile memory
AT+NSSLCERTSTORE=1,1,1,"client",1220, <send file>	
AT+NSSLCERTSTORE=1,2,1,"client",1679, <send file>	
AT+YTIME="01/10/2020,18:00:00+04"	Sets the absolute time

AT+CAWSINIT="a3kwq9muhfw9ur-ats.iot.us-east-1.amazonaws.com","Telit_WL865E4P",20,52, <send file>
 Initializes the AWS module and It will give CID (Example: +CAWSINIT:0). Use the CID given by asynchronous response for the following commands

AT+NSSLCFG=0,1,"2"	Configure SSL connection
AT+NSSLCFG=0,2,"cacert"	
AT+NSSLCFG=0,3,"client"	
AT+CAWSCFG=0,"Name",9,"Bedroom"	Configure the AWS Json schema parameters
AT+CAWSCFG=0,"Temperature",3,"20"	
AT+CAWSCFG=0,"Humidity",6,"10.23"	
AT+CAWSCMD=0,0	Performs pre-defined actions on AWS module

Command Description:

1. AT+YLC Switch to New Telit style AT command mode enable
2. AT+WNI To Initialize NCM in station Mode
3. AT+WNCN Connect to the desired Access Point and get an IP address from the DHCP server
4. AT+NSSLCERTSTORE Store a certificate/CA list data in nonvolatile memory
5. AT+YTIME It sets the absolute time.
6. AT+CAWSINIT Initializes the AWS module
7. AT+NSSLCFG Configures the SSL connection.
8. AT+CAWSCFG Configure the AWS Json schema parameters
9. AT+CAWSCMD Performs pre-defined actions on AWS module

Serial Log:

```

COM4:115200bps - Tera Term (1) VT
File Edit Setup Control Window Help
Serial2WiFi APP
AT+YLC=0
OK
Serial2Wireless APP
AT+WNI=0
+WNI:1
OK
AT+WNCN=1,"Test_AP"
+WNCN:CONNECTED,192.168.43.175,255.255.255.0,192.168.43.1
OK
AT+NSSLCERTSTORE=0,1,1,"cacert",1206,
OK
AT+NSSLCERTSTORE=1,1,1,"client",1220,
OK
AT+NSSLCERTSTORE=1,2,1,"client",1679,
OK
AT+YTIME="01/10/2020,18:00:00+04"
OK
AT+CAWSINIT="a3kwq9muhfw9ur-ats.iot.us-east-1.amazonaws.com","Telit_WL865E4P",20,52,
+CAWSINIT:0
OK
AT+NSSLCFG=0,1,"2"
OK
AT+NSSLCFG=0,2,"cacert"
OK
AT+NSSLCFG=0,3,"client"
OK
AT+CAWSCFG=0,"Name",9,"Bedroom"
OK
AT+CAWSCFG=0,"Temperature",3,"20"
OK
AT+CAWSCFG=0,"Humidity",6,"10.23"
OK
AT+CAWSCMD=0,0
OK

```

AWS-IoT Shadow Document:

1. Open the link <https://console.aws.amazon.com/iot/home?region=us-east-1#/thinghub>
2. Browse **AWS IoT** -> **Things** -> { user specific thing name } -> **Shadows**
3. Under shadows Click on the **Classic Shadow**.

AWS IoT > Things > Telit_WL865E4P > Classic Shadow

THING

Telit_WL865E4P

NO TYPE Actions ▾

Details Shadow ARN [Back to Shadow List](#)

Security A shadow ARN uniquely identifies the shadow for this thing.

Thing groups

Billing Groups

Shadows For more info on using shadow, [Learn more](#)

Interact

Activity Shadow Document [Delete](#) [Edit](#)

Jobs Last update: October 01, 2020, 15:29:50 (UTC+0530)

Violations

Defender metrics

Shadow state:

```

{
  "desired": {
    "welcome": "aws-iot"
  },
  "reported": {
    "welcome": "aws-iot",
    "Name": "Bedroom",
    "Temperature": 52,
    "Humidity": 10.23
  }
}
                
```

aws_json.txt

```
{"Name": "Bedroom", "Temperature": 20, "Humidity": 20.4}
```

9.4.1. AWS Initialize - +CAWSINIT

Description

This command initializes the AWS module start.

Pre-requisites

L2-L3 connections should be established.

Syntax

AT+CAWSINIT=<Host Name>,<Thing Name>,<Interval Time>,<Data length>,<Json Schema>

Parameters Description

Parameter	Value	Format	Description
Host Name	Range: 1-128	String	It specifies the AWS IoT endpoint name.

Thing Name	Range: 1-20	String	It specifies the AWS IOT thing name.
Interval Time	Range: 1-100	Integer	It specifies the data post interval in seconds.
Data length	Range: 0-100	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Json Schema	Range: 0-100	Binary Data	It specifies the JSON Schema.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+CAWSINIT="My Device", "Thing-1", 20, 52, {"temperature":20,"humidity":
20.4,"name":"bedroom"}
+CAWSINIT:CID
OK
```

Syntax

```
AT+CAWSINIT?
```

9.4.2. AWS Configure - +CAWSCFG

Description

This command is used to configure the AWS Json schema parameters.

Pre-requisites

AT+CAWSINIT command for a specific CID must be issued.

Syntax

```
AT+CAWSCFG=<CID>,<JSON Key>,<JSON Type>,[<Configuration value>]
```

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-16	Integer	It specifies the CID obtained after issuing AT+CAWSINIT command.
JSON Key	Range: 0-64	String	It specifies the first-string value of the JSON Key.
JSON Type	Range: 0-10	Integer	It specifies the ID of the configuration available, where: 0- SHADOW_JSON_INT32, 1- SHADOW_JSON_INT16, 2- SHADOW_JSON_INT8,

			3- SHADOW_JSON_UINT32. 4- SHADOW_JSON_UINT16, 5- SHADOW_JSON_UINT8, 6- SHADOW_JSON_FLOAT, 7- SHADOW_JSON_DOUBLE. 8- SHADOW_JSON_BOOL. 9- SHADOW_JSON_STRING.
Configuration value	Range: 0-65535 Default: N/A	String	It specifies the second-string value of the configuration provided in the Configuration ID.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

```
AT+CAWSCFG=0, "key", 9, "value"
OK
```

Syntax

AT+CAWSCFG?

9.4.3. AWS Command - +CAWSCMD

Description

This command performs pre-defined actions on AWS module.

Pre-requisites

AT+CAWSINIT command should be issued.

Syntax

AT+CAWSCMD=<CID>,<Command>

Parameters Description

Parameter	Value	Format	Description
CID	Range: 0-16	Integer	It specifies the CID obtained after issuing AT+CAWSINIT command.
Command	Range: 0-3	Integer	It specifies the command ID defining the action. 0- Run AWS, 1- Stop, 2- Resume, 3- Kill AWS.

Status

For all possible status responses refer [Table 4: Status Responses](#)

Example

AT+CAWSCMD=0, 1
OK

10. APPENDIX A - AT COMMANDS SUMMARY

A1 - Host Interaction

Command	Parameters	Response / Effect
ATB	<Port>,<Baud rate>,[<Bits per character>,<Parity mode>,<Stop bits>]	UART parameters are configured and set.
AT&Kn		Sets the hardware flow control in UART interface.
AT+YSIF	<Input/output type>	Sets Input/output interface to use.
AT+YIDEMO	<Configuration ID>,[<Parameter 2>,<Parameter 3>]	Performs the operation based on the Configuration ID.

A2 - General Operations

Command	Parameters	Response / Effect
AT+YLC	<Mode>	Switches between legacy and New At command mode.
ATEn		Echo mode will be enabled.
ATBKPN		Backspace handling will be enabled.
ATVn		Verbose mode is enabled.
AT+YBR		Displays the reason for system reset.
AT+YBER		Displays the reason for system reset and prints the register details when exception happens.
ATCn		Auto mode is either enabled or disabled.
ATAn		Data mode is enabled.
AT+YLOGSL	<Severity level>	Sets the debug log level value to the input severity level.
AT+YFOP	<Name>,<Option>,[<Password>]	Opens the file with one of the three flags. 0x0 to Open in read only mode. 0x1 to Open in write only mode. 0x2 to Open in read and write mode.
AT+YFCL	<File Descriptor>	Closes an open file.
AT+YFRD	<File Descriptor>,[<Offset>],<Lengt	Reads the file.

	h>	
AT+YFWR	<File Descriptor>,[<Offset>],<Data length>,<Data>	Writes the file from a given point.
AT+YFLN	<Name>	Gives the length of the file and the space occupied by the file in the Flash.
AT+YFLS	[<Path>]	All the files in the Flash are listed.
AT+YFRM	<File name>	Deletes a file.
AT+YFR	<Address>,<Size>	Reads the number of bytes in flash from the given location.
ATZn		Reads the profile from Flash.
AT&Yn		Sets the profile to a to profile number.
AT&Wn		Saves the profile number in the file system.
AT+YPTCP	<CID>,[<Add or Delete Profile>]	Save the CID in SRAM.
AT+YPUDP	<CID>,[<Add or Delete Profile>]	Save the CID in SRAM.
AT&F		Resets/clears factory settings.
AT+DPNADSC	<IP Start Address>,<IP End Address>,<Lease Time>	Sets the AP related DHCP server configurations.
AT+DPNAIPC	<IP Address>,<IP Mask>,<IP Gateway>	IP configuration is set either in AP mode.
AT+DPNAWC	<SSID>,[<PWD>,<Auth>,<Enc>],<Channel>,[<Hidden SSID>,<Beacon Interval>,<DTIM Period>,<WPS>]	Sets the AP configurations.
AT+DPNSIPC	<IP Flag>,[<IP Address>,<IP Mask>,<IP Gateway>,<DNS Primary Server>,<DNS Secondary Server>]	IP configuration is set either in STA mode.
AT+DPSRC	[<Scan retry count>,<Scan retry time delay>,<L3 retry count>,<L3 retry delay time>,<L4 retry count>,<L4	Sets the STA mode L2, L3 and L4 related retry configurations.

	retry delay time>]	
AT+DPNSWC	[<ID>],<SSID>,<PWD>,<Auth>,<Enc>,<Channel>]	Sets the STA wlan configurations.
AT+DPTC	<index number>,<Add Delete>,<Enable>,<IO Interface Id>,<network Interface Id>,<Family>,<Autoflag>,<LPort>,<Remote IP address>,<Remote Port>,<client or server>]	Save the TCP configuration in Profile.
AT+DPUC	<index number>,<Add Delete>,<Enable>,<IO Interface Id>,<network Interface Id>,<Family>,<Autoflag>,<LPort>]	Save the UDP configuration in Profile.
AT+YTIME	<Absolute Time>	It sets the absolute time.
AT+YPS	<Mode>,<Duration>]	Puts the system into power save mode based on the input given.
AT+YHD		It gives the total heap size and memory allocated.
AT+YHLD		It lists the information of the memory currently allocated (not yet freed). The information provides the File name, line number and size of allocation.
AT+YSR		Performs a soft system reset.
AT+CGMI		Displays the name of the manufacturer.
AT+CGMM		Displays the Name of the module.
AT+CGMR		Displays the software version of the Modem.
AT#SWPKGV		Displays all the version details available in the package.
AT+YVER		Version number of the software is obtained.
AT+NSHUTDOWN		It closes all opened sockets and shutdown the network.

A3 - Network Connection Manager

Command	Parameters	Response / Effect
AT+WNI	<Mode>	NCM module is initialized.
AT+WNDI	<WHandle>	Terminates the NCM module.
AT+WNSTAC	<WHandle>,[<Listen interval>,<Keep alive interval>,<WPS flag>,<Method>,<Pin>]	Sets the STA related configurations.
AT+WNAPC	<WHandle>,[<Hidden SSID>,<Beacon Interval>,<DTIM Period>,<WPS>]	Sets the AP related configurations.
AT+WNIPC	<WHandle>,<IP Flag>,[<IP Address>,<IP Mask>,<IP Gateway>,<Host Name>]	IP configuration is set either in STA or AP mode.
AT+WNAIPC	<WHandle>,<IP Start Address>,<IP End Address>,<Lease Time>	Sets the AP related DHCP server configurations.
AT+WNCR	<WHandle>,<SSID>,<Channel>,<Security Type>,<Encryption Type>,[<PassPhrase>]	Creates a network.
AT+WNRETRYC	<WHandle>,[<Scan retry count>,<Scan retry time delay>,<L3 retry count>,<L3 retry delay time>,<L4 retry count>,<L4 retry delay time>]	Sets the STA and AP(TCP) related retry configurations.
AT+WNCN	<WHandle>,[<SSID>,<PassPhrase>,<Channel>]	Establishes the connection with existing network up to L3 level.
AT+WNAPST		Displays the statistics of WLAN interface in AP mode.
AT+WNASTINFO		It prints the MAC and IP address of connected stations in AP mode.
AT+WNIFCFG		Gives information of all interfaces.
AT+WNSTAST		Displays the statistics of WLAN interface in STA mode.
AT+WNDI	<WHandle>	Disconnects from the connected network in station mode or turns down

		the created network in AP mode.
AT+WNEAP	<WHandle>,<Method>,[<User Name>,<Password>],<Identifier>,<CA Certificate>,<Client Certificate>]	Sets EAP 8021x configuration in station mode.

A4 - Wireless Driver

Command	Parameters	Response / Effect
AT+WI	<Mode>	WLAN interface is initialized.
AT+WMACG	<WHandle>	MAC address is obtained from WLAN interface.
AT+WS	<WHandle>,<SSID>,<Channel>]	It scans the available networks depending on the user parameters.
AT+WST	<WHandle>,<Scan time>	Sets the scan time for scanning operation.
AT+WCCG	<WHandle>	Country code is obtained from WLAN interface.
AT+WCCS	<WHandle>,<Country Code>	Country code is set in WLAN interface.
AT+WREGDG	<WHandle>	Regulatory domain is obtained from the driver.
AT+WREGDS	<WHandle>,<Regulatory domain>	Regulatory domain can be set to a device in WLAN interface.
AT+WPHYMODEG	<WHandle>	Physical mode of the device is obtained from WLAN interface.
AT+WPHYMODES	<WHandle>,<Physical mode>	Physical mode is set in WLAN interface for a device.
AT+WPOWERSAVE	<WHandle>,<Power save>,<Idle time>,<PS Poll number>,<DTIM Policy>,<Transmission number to wakeup>]	Power save is set in WLAN interface, where: 0-enables power save mode, 1-disables power save mode.
AT+WTXPOWERS	<WHandle>,<Transmission power>	Sets the transmission power of the device in WLAN interface.
AT+WTXRATEG	<WHandle>	Gives the value of the transmission rate in WLAN interface.
AT+WTXRATES	<WHandle>,<Transmission rate>	Sets the transmission rate in WLAN interface.

AT+WRSSIG		Gives RSSI value of WLAN interface.
AT+WRAWPKTS	<WHandle>,<Rate index>,<Number of tries>,<Channel>,<Packet type>,<addr1>,<addr2>,<addr3>,<addr4>,<Data length>,<Payload>	It sends the raw WLAN packets (Beacon, QOS data, 4 address data) in disassociate state.
AT+WPROMISCSETFILTER	<WHandle>,<Filter number>,<Channel>,<Source MAC address>,<Destination MAC address>,<Frame type>,<Sub type>]	Sets PROMISC mode filter parameters.
AT+WPROMISCCMD	<WHandle>,<Mode>,<Filter number>	Starts capturing the packets.
AT+WAPPIE	<WHandle>,<Frame type>,<OUI>,<Data length>,<Vendor content>]	Adds the application information element to a packet.
AT+WBMISSTINTS	<Beacon miss time>	It sets the beacon miss interval and disconnects the network after sync loss.
AT+BI	<START>	BLE stack is initialized and de-initialized.
AT+BOAD		Reads the Bluetooth device's own device address.
AT+BCONNECT	<Bluetooth Remote Address>,<Bluetooth Address Type>	Establishes a GATT connection to a peripheral device directly via its address.
AT+BDISCONNECT	<CONNECTION HANDLE>	Disconnects the existing Bluetooth connection addressed by connection handle
AT+BSCAN	[<Bluetooth Remote Address>]	Discovers all nearby BLE devices
AT+BSCANRSPDATA	<Scan Response Data>	Sets scan response data for a customized advertising.
AT+BNAME	<Local Device Name>	It modifies the local device name.
AT+BIOCAP	<Input/output capabilities>	Bluetooth Low Energy IO capabilities are set.

AT+BBNDLIST		Lists all the bonded devices.
AT+BBNDDEL	[<BD Address>]	Deletes the stored bond information.
AT+BSSPPIN	<Bluetooth Address>,<Bluetooth Address Type>,<SSP Passkey>	Enter the SSPPIN request with the SSP passkey displayed on the remote device.
AT+BFXPIN	[<Fix Pin>]	It gives 6-digit pin that is used as a fix pin in the security procedures.
AT+BSSPCONF	<Bluetooth Address>,<Bluetooth Address Type>,<Passkey Confirmation>	Accepts or rejects passkey confirmation request.
AT+BPNPID	<Product ID>	Sets the product ID provided in the device information service (DIS).
AT+BPNPVER	<Product Version>	Sets the product version provided in the device information service (DIS).
AT+BPNPVID	<Vendor ID>	Sets the vendor ID in the device information service (DIS).
AT+BPNPVSRC	<Vendor ID Source>	Sets the vendor ID Source provided in the device information service (DIS).
AT+BTIO	<TIO Mode>	This command controls the mode of Terminal I/O service.
AT+BTIODATAMODE		Enters into TIO data mode from AT command mode.
AT+BADDATA	<Advertising Data>	Sets customized advertising data.
AT+BADVE	<Advertising>	Controls the advertising behavior.
AT+BADVINTMAX	<Maximum Advertising Interval>	It configures the maximum advertising interval for a Bluetooth Low Energy peripheral.
AT+BADVINTMIN	<Minimum Advertising Interval>	It configures the minimum advertising interval for a Bluetooth Low Energy peripheral.
AT+BCONINTMAX	<Maximum Connection Interval>	It configures the maximum connection interval for a Bluetooth Low Energy Peripheral.
AT+BCONINTMIN	<Minimum Connection Interval>	It configures the minimum connection interval for a Bluetooth Low Energy Peripheral.

AT+BSLAVELAT	<Slave Latency>	Configures the slave latency during the connection intervals.
AT+BSRVD	<CONNECTION HANDLE>,[<UUID OF SERVICE>,<UUID TYPE>]	Discovers services and characteristics of a device.
AT+BREAD	<Connection Handle>,<Characteristic Handle>	Reads the characteristic value of the service.
AT+BWRITE	<Connection Handle>,<Characteristic Handle>,<Hex Data>	Writes characteristic value of a service.
AT+BCCCD	<Connection handle>,<Characteristic handle>,<CCCD>	
AT+BATTRIB	<Type>	Defines attributes for one or more services in the GATT server.
AT+BSRVDATAEX	<Service ID>,<Channel ID>,<Hex Data>	Allows the user to set new data on a GATT server characteristic.
AT+BBPWRTXT	<Frequency>,<Data Length>,<Data Type>	Writes characteristic value of a service.
AT+BBPWRRXTEST	<Frequency>	Writes characteristic value of a service.
AT+BTXPOWERSET	<Type>,<Value>	Sets power transmission details.
AT+BTXPOWERGET	<Type>	Gives BLE power transmission details.
AT+BTXPWMSCAN	[<Bluetooth Remote Address>]	Does BLE power measurement during scan operation.
AT+BTXPWMWRITE	<Connection Handle>,<Characteristic Handle>,<Hex Data>,[<Timeout>,<Repetition>,<Debug flag>]	Does BLE power measurement during write operation.

A5 - Network Protocol

Command	Parameters	Response / Effect
AT+NCIDI	[<CID>]	Gives the CID information.

AT+NCIDS	[<CID>,<RST flag>]	Gives the status of the CID information.
AT+NPING	<IP address>,<Payload size>,<Count>]	Host connects to the internet protocol network.
AT+NPINGSTATS		Host prints the ping statistics.
AT+SC	<Family>,<Type>,<Protocol>]	Creates a socket with CID.
AT+SB	<CID>,<IP address>,<Port>	Binds socket.
AT+SCO	<CID>,<Server IP>,<Server port>	Connects sockets.
AT+SL	<CID>,<Backlog>,<Auto accept>]	Listen to a socket.
AT+SSOPT	<CID>,<Option name>,<Option value>]	Sets a socket.
AT+SGOPT	<CID>,<Option name>	Gives the set socket option.
AT+SA	<CID>	Client connection is accepted with a CID.
AT+SN	<CID>,<Destination IP address>,<Port>,<Data length>,<Data>	Data is sent to a remote device specified by the IP address.
AT+SRR	<CID>,<Auto receive>]	Gets ready to receive the data.
AT+SR	<CID>,<Length>	Receives data from any CID.
AT+SGERR	<CID>	Gives the error number of the socket.
AT+STPTEST	<CID>,<Mode>,<Iterations>,<Packet size>,<Delay>,<Packets for delay>,<Destination IP address>,<Destination Port>,<Test Duration>]	Throughput tests in one of the specified mode.
AT+STPTESTSTAT	<CID>	Throughput test status.
AT+SCL	<CID>	Closes the socket and clears the CID entry
AT+NSSLINIT	<Role>	Starts the SSL module.
AT+NSSLCFG	<CID>,<Configuration ID>,<Configuration value>	Configures the SSL connection.

AT+NSSLCO	<CID>,<Server IP>,<Server port>	Connects to an SSL server.
AT+NSSLB	<CID>,<Local IP>,<Local port>	The given port gets bonded to the server socket.
AT+NSSL	<CID>,<Backlog>,<Auto accept>]	Listens to SSL socket.
AT+NSSLA	<CID>	Accepts the identified client connection.
AT+NSSLRR	<CID>,<Auto receive>]	Prepares the module to receive data.
AT+NSSLRD	<CID>,<Length>	Reads SSL data from a client device and displays the data.
AT+NSSLWR	<CID>,<Destination>,<Port>,<Data length>,<Data>]	Sends the data in SSL connection to the specified connection id.
AT+NSSLCL	<CID>	Closes the SSL connection and provides the status.
AT+NSSLCERTLIST	<Certificate type>	Lists all the certificates present.
AT+NSSLCERTSTORE	<Certificate type>,<Sequence>,<Format>,<Name>,<Data length>,<Data>	Stores a certificate in nonvolatile memory.
AT+NSSLCERTDELETE	<Certificate type>,<Name>	Deletes a certificate in the certificate list.
AT+NSNTPCFG	<IP address>,<ID>	Configures the server in SNTP module.
AT+NSNTPSTART	[<Interval>]	Starts the SNTP module.
AT+NSNTPSTOP		Stops the SNTP module.
AT+NDNSCRURL	<URL>,<IP version>]	Resolves the IP address of given URL
AT+NDNSCSRVIP	<IP address>,<ID>]	Gives the IP address in the DNS module.
AT+NDNSSADDDHOST	<Host Name>,<IP address>,<TTL>	Given host address will be added in DNS module.
AT+NDNSSSTART		Starts DNS module. If the DNS module is already started gives the status as Started and if not then it gives Not started.

AT+NDNSSSTOP		Stops the DNS module.
AT+NDNSSD	<Device ID>,<Instance name>,[<IP version>,<Timeout>]	Service is discovered in DNS module.
AT+NMDNSSTART	<Mode>	Starts and gives the status of the mDNS module.
AT+NMDNSHNREG	<Host name>	Host name is registered in mDNS module.
AT+NMDNSSRVREG	<Instance name>,<Protocol>,<Port>,[<Text record>]	Registers a service in mDNS module.
AT+NMDNSSRVDEREG	<Service>	De-registers service in mDNS module.
AT+NMDNSUPDATETXT	<Service name>,<Text record>	Service text record is updated in mDNS module.
AT+NMDNSSTOP		Stops the mDNS module.
AT+NHTTPCINIT	[<Type>,<Timeout>,<Maximum Body Length>,<Maximum Header Length>,<Receive Buffer Length>]	Starts the HTTP client for the CID.
AT+NHTTPCCFG	<CID>,<Configuration ID>,<Configuration value>,[<Configuration value2>]	Configures HTTP client.
AT+NHTTPCCO	<CID>,<IP address>,<Port address>	Connects HTTP client to the server.
AT+NHTTPCREQ	<CID>,<Method>,<File path>,[<Data length>,<Data>]	Sends the HTTP request to the HTTP server.
AT+NHTTPCRDRSP	<CID>,<Length>	
AT+NHTTPCCL	<CID>	Closes and displays the status of the connection.
AT+NHTTPCCFG	<Name>,<Mode>,<HTTP Port>,<HTTPS Port>,<Network interface>,<IP Family>,[<UserName>,<Password>]	HTTP server parameters is configured.

AT+NHTTPDSTART		Starts the HTTP server.
AT+NHTTPDCFGURI	<CID>,<URI>,[<AUTH>]	URI is configured.
AT+NHTTPDRD	<CID>,<URI ID>,<Read type>,<Length>	Reads the request data from client.
AT+NHTTPDSENDATA	<CID>,<URI ID>,[<Data length>,<Data>]	Sends the data as the response.
AT+NHTTPDSENDHDR	<CID>,<URI ID>,<Status code>,[<Status text>],<Content Length>,[<Content type>,<User Header>]	Response from HTTP server is sent.
AT+NHTTPDURIRR	<URI ID>,<Receive Ready>	Activates or deactivates the receive ready feature on given URI.
AT+NHTTPDSTOP		Stops the HTTP server and specifies corresponding CID.
AT+NMQTTINIT	<SSL>	Initializes MQTT connection with SSL or without SSL connection.
AT+NMQTTCONNECT	<CID>,<HOST>,[<Port>],<Client ID>,[<User name>,<Password>,<Keepalive>,<Timeout>,<Will topic>,<Will message>,<Will QOS>,<will retain>]	Connects to MQTT server.
AT+NMQTTPUBLISH	<CID>,<QOS>,<Retain flag>,<Message ID>,<Topic>,<Data length>,<Publish data>	Application message is sent to MQTT server.
AT+NMQTTTRR	<CID>	Sends a request to receive data with CID and data length.
AT+NMQTTSUBSCRIBE	<CID>,<QOS>,<Message ID>,<Topic>	MQTT Topic is subscribed.
AT+NMQTTTR	<CID>,<Data length>	Receives MQTT data with CID.
AT+NMQTTUNSUBSCRIBE	<CID>,<Topic>	MQTT Topic is unsubscribed.
AT+NMQTTCL	<CID>	Closes the MQTT connection.

AT+WEBSOCKETNEW	[<Origin>,<Maximum received chunk size>,<Handshake Timeout>,<SSL>,<Close Timeout>,<subprotocol1>,<subprotocol2>,<subprotocol3>,<subprotocol4>]	Creates a new WebSocket with a CID.
AT+WEBSOCKETCONF	<CID>,<Parameter number>,[<param1>,<param2>]	Configures the WebSocket connection.
AT+WEBSOCKETCONN	<CID>,<Server address>,<Server port>,<Resource path>	Connects to a WebSocket server.
AT+WEBSOCKETSEND	<CID>,<Data type>,<Data length>,<Data>	Sends data to the WebSocket device and responds with length of the data on the CID.
AT+WEBSOCKETPING	<CID>,<Ping data>	Ping the WebSocket server, when it is successful displays the ping details.
AT+WEBSOCKETPONG	<CID>,<Pong payload>	WebSocket pong is sent to the server.
AT+WEBSOCKETSEND	<CID>,<Data type>,<Data length>,<Data>	Sends data to the WebSocket device and responds with length of the data on the CID.
AT+WEBSOCKETRECVREADY	<CID>,<Receive buffer size>,[<Auto receive>]	Enables the data received in a CID with the available data is displayed.
AT+WEBSOCKETRECV	<CID>,<Length>	Receives detailed data from a CID.
AT+WEBSOCKETCLOSE	<CID>	Closes the socket and clears the CID entry

A6 - Advanced Services

Command	Parameters	Response / Effect
AT+WNWEBPROV	<Start>,[<Port>,<SSL>,<Server certificate>]	Starts the provisioning server and gives the status.
AT+FUHTTPCINIT	<SSL>	Initializes FWUP module over HTTP client with SSL or without SSL connection.
AT+FUHTTPC	<CID>,<Server Address>,[<Server	Performs firmware upgrade using HTTP client.

	Port>],<File URI>,[<Timeout>,<UserName>,<Password>]	
AT+FUHTTPD		Performs a firmware upgrade using HTTP server.
AT+YXFPSTART		Starts the XFP module, waits a while and then does a firmware upgrade.
AT+FUVALIDATE	[<Accept Image Flag>,<Reboot Flag>]	Validates the firmware either by deleting or upgrading the trial image.
AT+DWCFG	<Command>	Parameters are configured.
AT+DWCONN	<Command>	Connects and disconnects the M2M service, displaying the status of the connection.
AT+DWSTATUS		Displays the status and statistics of the connection.
AT+DWSEND	<Command>	Sends formatted data to the M2M service.
AT+DWSENDR	<Command>	Sends raw data to M2M service.
AT+DWRCV	<Command>	Reads the data from M2M services.
AT+DWRCVR	<Command>	Reads the raw data from M2M services, displaying the message ID and its length.
AT+DWLRCV		Gives the messages information pending in the service.
AT+CAWSINIT	<Host Name>,<Thing Name>,<Interval Time>,<Data length>,<Json Schema>	Configures AWS Instance
AT+CAWSCFG	<CID>,<JSON Key>,<JSON Type>,[<Configuration value>]	Configures AWS module.
AT+CAWSCMD	<CID>,<Command>	Issues commands to AWS module.

11. APPENDIX B

B1 - List of Country Code

Sl. No	Country Name	Code
1	ALBANIA	"AL"
2	ARUBA	"AW"
3	AUSTRIA	"AT"
4	BELARUS	"BY"
5	BELGIUM	"BE"
6	BOSNIA HERZEGOWANIA	"BA"
7	BULGARIA	"BG"
8	CAMBODIA	"KH"
9	CROATIA	"HR"
10	CYPRUS	"CY"
11	CZECH	"CZ"
12	DENMARK	"DK"
13	ESTONIA	"EE"
14	FINLAND	"FI"
15	FRANCE	"FR"
16	GERMANY	"DE"
17	GREECE	"GR"
18	GREENLAND	"GL"
19	GAUTEMALA	"GT"
20	HUNGARY	"HU"
21	ICELAND	"IS"
22	IRELAND	"IE"
23	ITALY	"IT"
24	LATVIA	"LV"
25	LIECHTENSTEIN	"LI"
26	LITHUANIA	"LT"

27	LUXEMBOURG	"LU"
28	MACEDONIA	"MK"
29	MALAWI	"MW"
30	MALTA	"MT"
31	MONACO	"MC"
32	NETHERLANDS	"NL"
33	NETHERLAND ANTILLES	"AN"
34	NORWAY	"NO"
35	OMAN	"OM"
36	POLAND	"PL"
37	PORTUGAL	"PT"
38	ROMANIA	"RO"
39	MONTENEGRO	"ME"
40	SERBIA	"RS"
41	SLOVAKIA	"SK"
42	SLOVENIA	"SI"
43	SPAIN	"ES"
44	SWEDEN	"SE"
45	SWITZERLAND	"CH"
46	TURKEY	"TR"
47	UNITED KINGDOM	"GB"
48	ZIMBABWE	"ZW"
49	AFGHANISTAN	"AF"
50	BHUTAN	"BT"

12. GLOSSARY AND ACRONYMS

AP	Access Point
STA	Station Mode
CTS	Clear to Send
GPIO	General Purpose Input/output
GUI	Graphic User Interface
IMS	IP Multimedia Subsystem
IRA	International Reference Alphabet
PIN	Personal Identification Number
PPP	Point to Point Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
UART	Universal Asynchronous Receiver Transmitter
DNS	Domain Name System
SRAM	Static Random-Access Memory
MDNS	Multicast Domain Name System
M2M	Machine to Machine
DTIM	Delivery Traffic Indication Map

13. DOCUMENT HISTORY

Revision	Date	Changes
0.1	2018-09-07	First issue.
0.2	2018-09-05	Addition of WebSocket commands and HTTPD commands in Advanced Services.
0.3	2018-09-20	Document Template Updated, Command display order arranged.
0.4	2018-10-05	Command Response Updated.
0.5	2018-11-12	Added new AT commands - Module Name, Modem Version, Package Version and XFP Start.
0.6	2018-11-15	Added Appendix A AT commands summary.
0.7	2018-12-03	Script location changed, addition of Initialize/De-initialize BLE command.
0.8	2019-01-18	Added new commands - Configure Station Mode in NCM; Debug Log Level. H4 Added new commands - Configure Station Mode in NCM; Debug Log Level. Added new command - SNTP Stop in SNTP settings; Addition of GET commands. Addition of BLE Commands, Promiscuous Filter Set, Promiscuous Filter Start.
0.9	2019-02-08	Added new command - SNTP Stop in SNTP settings; Addition of GET commands
1.0	2019-02-15	Addition of Manufacturer Name command
1.1	2019-03-08	Addition of Ping Status, BLE Pair
1.2	2019-03-15	Addition of BLE Commands, Promiscuous Filter Set, Promiscuous Filter Start. Added new parameter-Auto receive in Socket Receive Ready, WebSocket Receive Ready commands. Added new parameter-Auto Accept in Socket Listen command.
1.3	2019-03-27	Changed the DocRevision0.5 to command heading. Corrected for WE866 data. Updated command AT+SWPKG to AT#SWPKG. Added new AT command-Hardware Flow Control under UART section. Corrected AT+WNI command reSponse in example sections of WPS, Configure IP Address, Create NCM, Interface Statistics in AP Mode, Interface Statistics in Station Mode.
1.4	2019-04-05	Added new AT command-Flash read in System and Standby in Power save. Updated parameter, range value and description in Configure SNTP

		<p>command.</p> <p>Added new parameter in Start SNTP command</p> <p>Added new parameters and its details -SSL and Server certificate in Web provisioning command.</p> <p>Parameter Server Certificate Name has been removed in command Configure HTTP Server.</p> <p>Added parameter Server Certificate Name in command HTTPD Firmware upgrade.</p> <p>Updated parameter value range in Powersave command in WLAN.</p> <p>Added new command-EAP Configuration in WNCM.</p> <p>Updated example and response format in Socket Throughput Test and Socket Throughput Test Statistics commands.</p>
1.4.1	2019-05-02	<p>Added new AT command-Heap Information List in System Settings, Validate Firmware Upgrade in Firmware Upgrade.</p> <p>Removed NDNS Target Information from Domain Name System (DNS), Trial Image from Firmware Upgrade.</p> <p>Addition of two new parameters in EAP Configuration.</p> <p>Response format update in command responses.</p> <p>Change in Document structure.</p>
1.4.2	2019-05-20	<p>Removed AT command-Disconnect in section WLAN and WWPS in section NCM.</p> <p>Final doc updates from engineering team.</p> <p>Updated section 4.1 Host interface.</p>
1.4.3	2019-05-27	<p>Addition of new command NCM De-initialize in section.</p> <p>Review correction of commands and its details from egg team.</p> <p>Addition of AWS AT commands.</p> <p>Addition of new AT command Scan Time in WLAN section.</p> <p>Addition of 2 new parameter Delay and Packets for delay is added in AT command AT+STPTEST.</p> <p>Addition of new AT command SPI/SDIO Interface in Host interaction.</p>
1.4.4	2019-06-14	<p>Addition of new command BLE Client Character Configuration in section BLE, UART Configuration in section UART, SPI/SDIO Interface Demo in section SPI/SDIO.</p> <p>Added new parameter Keep alive interval in command AT+WNSTAC.</p>
1.4.5	2019-06-18	<p>Doc History - General check for spelling and grammar indicated from MSWord.</p>
1.4.6	2019-06-21	<p>Update to parameter Option name is section Set Socket Option and Get Socket Option.</p> <p>Addition of Country codes in Appendix B-List of Country Codes.</p> <p>Review checks.</p>
1.4.7	2019-06-24	<p>Restructuring of section Domain Name System.</p>

		<p>Addition of details to mDNS section.</p> <p>Review checks.</p>
1.4.8	2019-07-05	<p>Addition of section details under AWS and SPI/SDIO section.</p> <p>Updated Parameter range of Slave latency in BLE Slave Latency section.</p> <p>Updated parameters and its details in SPI/SDIO Interface Demonstration section.</p>
1.4.9	2019-07-16	<p>Structure change - added new chapter "Wireless Driver".</p> <p>Updated Binary Data section with details on Data and Data length.</p> <p>Removed SSL parameter details in MQTT Connect command.</p> <p>Updated the parameter Listen Interval in AT+WNSTAC command.</p> <p>Updated the parameter Option with the value range.</p> <p>Updated File Read section with command syntax and example.</p> <p>Re-corrected the Note on DNS Server under Web Provisioning.</p>
1.4.10	2019-08-02	<p>Added new AT command Baud Rate in Interface, Data Mode in System setting, BLE Terminal Input/output, BLE Terminal Input/output Data Mode.</p> <p>Updates in section - File Read, File Open, File Write, Socket Create.</p> <p>Added new AT command NCM Retry Count.</p> <p>Added parameter "Add or Delete Profile" in Profile TCP and Profile UDP.</p> <p>Added new AT command "Shut Down" in General Operation, "HTTP Server Receive Ready" in HTTP Server (HTTPD).</p>
1.4.11	2019-09-06	<p>Update of Asynchronous Response parameter description in HTTP Server Configure URI.</p> <p>Addition of parameter "Certificate File" in command "MQTT Client Connect".</p> <p>General review corrections.</p>
1.4.12	2019-09-18	<p>Addition of new parameter Text record in Command section "mDNS Service Registration".</p> <p>Update in command section "SPI/SDIO Interface Demonstration".</p>
1.4.13	2019-10-01	<p>Updated response range in commands - Socket Close, SNTP Configure, SNTP Start, Boot Reason, Exceptional Boot reason, Module Name, Modem Version and Package Version.</p> <p>Updated response range and its description in commands - MQTT Client Receive Request and deviceWISE Connect/Disconnect.</p>
1.4.14	2019-11-14	<p>Corrected response command syntax of get station mode configuration.</p> <p>Added new parameter and its details "Format" in SSL certificate store, Updated parameter description in CID information.</p> <p>Added new commands in section BLE - BLE Transmission Test, BLE Reception Test, BLE Set Transmission Power, BLE Get Transmission Power, BLE Power Measurement during Scan, BLE Power Measurement during Write.</p>
1.4.15	2019-12-06	<p>Updated the example in Firmware Upgrade section.</p>

		<p>Updated command description in HTTPC & HTTPD Firmware Upgrade.</p> <p>Updated parameter range and its description in UART Configuration.</p> <p>Updated CID Parameter range in all WebSocket commands.</p> <p>Updated parameter descriptions in Socket send.</p>
1.4.16	2020-02-07	<p>Updated command description in HTTP Server Configure URI, HTTP Client Close & HTTP client Configure, NCM Initialize.</p> <p>Updated parameter details of SNTP Configure and SSL Configure.</p> <p>Updated parameter range in File read and File write.</p>
1.4.17	2020-02-18	<p>HTTP request URL length has been changed to 1024 bytes.</p>
1.4.18	2020-02-27	<p>Updated Data length and data parameter description. Updated Firmware upgrade section.</p>
1.4.19	2020-05-13	<p>Corrections in HTTPC, MQTT and Socket template.</p> <p>Example command correction in HTTP Client Configure and MQTT Initialization.</p> <p>Parameter update in response command of SNTP Configure.</p>
1.4.20	2020-07-02	<p>Added new AT command Backspace Handling in System Settings.</p>
1.4.21	2020-09-08	<p>Example command update in AT+YIDEMO.</p> <p>Update in AT command sequence, Example update in Socket Listen, Socket Receive ready, Socket receive under Socket section.</p>
1.4.22	2020-11-02	<p>Updates in parameter, description and example in commands under section Socket, MQTT, Firmware Upgrade, HTTPC and SSL.</p> <p>Addition of new command HTTPC Initialize Firmware Upgrade in section Firmware Upgrade.</p> <p>Updated command description in section Auto Mode.</p>
1.4.23	2020-11-06	<p>Updates in examples of Save TCP Profile and Save UDP Profile.</p> <p>Update in parameter range in command Baud Rate.</p> <p>Updated command description in section Auto Mode.</p> <p>Added XFP information.</p> <p>Addition of a note in command description under command Socket Accept.</p>
1.4.24	2020-11-20	<p>AT+NMQTTUNSUBSCRIBE new command added.</p> <p>all MQTT commands are updated with command usage examples.</p>
1.4.25	2020-12-11	<p>AT+SETOPT command updated by removing non supported options.</p> <p>AT+GETOPT command updated by removing non supported options.</p>
1.4.26	2021-01-06	<p>Added profile update commands.</p>

		<p>AT+WNCN file is updated with extra info in pass phrase parameter.</p> <p>Updated AWS Template and Added Prefix to AWS init, config, commands.</p> <p>Commands are formatted to AT+CAWSINT, AT+CAWSCFG, AT+CAWSCMD.</p>
1.4.27	2021-01-17	Default profile update commands are modified.



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