WE310F5-X AT Command Reference Guide

80664ST11034A Rev. 14 – 2021-02-11

TELIT
TECHNICAL
DOCUMENTATION

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

NOTICES LIST

While reasonable efforts have been made to assure the accuracy of this document, Telit assumes no liability resulting from any inaccuracies or omissions in this document, or from use of the information obtained herein. The information in this document has been carefully checked and is believed to be reliable. However, no responsibility is assumed for inaccuracies or omissions. Telit reserves the right to make changes to any products described herein and reserves the right to revise this document and to make changes from time to time in content hereof with no obligation to notify any person of revisions or changes. Telit does not assume any liability arising out of the application or use of any product, software, or circuit described herein; neither does it convey license under its patent rights or the rights of others.

It is possible that this publication may contain references to, or information about Telit products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that Telit intends to announce such Telit products, programming, or services in your country.

COPYRIGHTS

This instruction manual and the Telit products described in this instruction manual may be, include or describe copyrighted Telit material, such as computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and its licensors certain exclusive rights for copyrighted material, including the exclusive right to copy, reproduce in any form, distribute and make derivative works of the copyrighted material. Accordingly, any copyrighted material of Telit and its licensors contained herein or in the Telit products described in this instruction manual may not be copied, reproduced, distributed, merged or modified in any manner without the express written permission of Telit. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit, as arises by operation of law in the sale of a product.

COMPUTER SOFTWARE COPYRIGHTS

The Telit and 3rd Party supplied Software (SW) products described in this instruction manual may include copyrighted Telit and other 3rd Party supplied computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and other 3rd Party supplied SW certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Telit or other 3rd Party supplied SW computer programs contained in the Telit products described in this instruction manual may not be copied (reverse engineered) or reproduced in any manner without the express written permission of Telit or the 3rd Party SW supplier. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit or other 3rd Party supplied SW, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.

USAGE AND DISCLOSURE RESTRICTIONS

I. License Agreements

The software described in this document is the property of Telit and its licensors. It is furnished by express license agreement only and may be used only in accordance with the terms of such an agreement.

II. Copyrighted Materials

Software and documentation are copyrighted materials. Making unauthorized copies is prohibited by law. No part of the software or documentation may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without prior written permission of Telit

III. High Risk Materials

Components, units, or third-party products used in the product described herein are NOT fault-tolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems (High Risk Activities"). Telit and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

IV. Trademarks

TELIT and the Stylized T Logo are registered in Trademark Office. All other product or service names are the property of their respective owners.

V. Third Party Rights

The software may include Third Party Right software. In this case you agree to comply with all terms and conditions imposed on you in respect of such separate software. In addition to Third Party Terms, the disclaimer of warranty and limitation of liability provisions in this License shall apply to the Third-Party Right software.

TELIT HEREBY DISCLAIMS ANY AND ALL WARRANTIES EXPRESS OR IMPLIED FROM ANY THIRD PARTIES REGARDING ANY SEPARATE FILES, ANY THIRD PARTY MATERIALS INCLUDED IN THE SOFTWARE, ANY THIRD PARTY MATERIALS FROM WHICH THE SOFTWARE IS DERIVED (COLLECTIVELY “OTHER CODE”), AND THE USE OF ANY OR ALL THE OTHER CODE IN CONNECTION WITH THE SOFTWARE, INCLUDING (WITHOUT LIMITATION) ANY WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO THIRD PARTY LICENSORS OF OTHER CODE SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND WHETHER MADE UNDER CONTRACT, TORT OR OTHER LEGAL THEORY, ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE OTHER CODE OR THE EXERCISE OF ANY RIGHTS GRANTED UNDER EITHER OR BOTH THIS LICENSE AND THE LEGAL TERMS APPLICABLE TO ANY SEPARATE FILES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

APPLICABILITY TABLE

PRODUCTS

	SW Versions	Modules
WE310F5-X SERIES	39.00.000	

CONTENTS

NOTICES LIST **2**

COPYRIGHTS **2**

COMPUTER SOFTWARE COPYRIGHTS **2**

USAGE AND DISCLOSURE RESTRICTIONS **3**

APPLICABILITY TABLE **5**

CONTENTS **7**

FIGURES LIST **13**

TABLES LIST **14**

1. INTRODUCTION **17**

1.1. Scope 17

1.2. Audience 17

1.3. Contact Information, Support 17

1.4. Text Conventions 18

1.5. Related Documents 18

2. OVERVIEW **20**

2.1. AT Commands 20

2.2. Command definition 20

2.3. AT Command Syntax 21

2.4. Command Lines 21

2.5. Information Response and Result Codes 23

3. ARCHITECTURE **26**

3.1. System Overview 26

3.2. Working Principle 27

3.3. System Initialization 27

3.3.1. Auto Connection 28

4. HOST INTERACTION **29**

4.1. Interface 29

4.1.1. UART 29

4.1.1.1. Baud Rate - B 29

4.1.1.2. Hardware Flow Control - &Kn 31

5. GENERAL OPERATIONS **33**

5.1. System Settings 33

5.1.1. Echo Mode - En 33

5.1.2. Verbose Mode - Vn 33

5.1.3. File System....34
5.1.3.1. File Open - +YFOP....34
5.1.3.2. File Close - +YFCL....35
5.1.3.3. File Read - +YFRD....36
5.1.3.4. File Write - +YFWR....37
5.1.3.5. File Length - +YFLN....38
5.1.3.6. File List - +YFLS....39
5.1.3.7. File Delete - +YFRM....40
5.2. Profile Settings....40
5.2.1. Profile Read - Zn....41
5.2.2. Profile Set - &Yn....42
5.2.3. Profile Save - &Wn....42
5.2.4. Profile Clear/Factory Reset - &F....43
5.3. Default Profile....43
5.3.1. AP DHCP server configuration - +DPNADSC....44
5.3.2. AP Static IP configuration - +DPNAIPC....45
5.3.3. AP WLAN configuration - +DPNAWC....47
5.3.4. Station Static IP configuration - +DPNSIPC....50
5.3.5. Station Retry configuration - +DPSRC....52
5.3.6. Station WLAN configuration - +DPNSWC....54
5.3.7. Update TCP Profile - +DPTC....57
5.3.8. Update UDP Profile - +DPUC....60
5.4. Real Time Clock (RTC) Settings....63
5.4.1. Time Settings - +YTIME....63
5.5. Power Save....64
5.5.1. Standby - +YPS....64
5.6. Heap Information - +YHD....64
5.7. Reset - +YSR....65
5.8. Manufacturer's Name - +CGMI....65
5.9. Module Name - +CGMM....66
5.10. Modem Version - +CGMR....66
5.11. Package Version - #SWPKGV....67
5.12. Version - +YVER....68

6. NETWORK CONNECTION MANAGER....70

6.1. Wireless Network Connection Manager (WNCM)....70
6.1.1. NCM Initialize - +WNI....70
6.1.2. NCM Retry Configuration - +WNRETRYC....71
6.1.3. NCM De-initialize - +WNDI....72
6.1.4. Configure Station Mode - +WNSTAC....73
6.1.5. Configure AP Mode - +WNAPC....75

6.1.6. Configure IP Address - +WNIPC 76
6.1.7. Configure IP Address in AP Mode - +WNAPIPC 77
6.1.8. NCM Create - +WNCR 78
6.1.9. NCM Connect - +WNCN 80
6.1.10. Get Associated Station Information - +WNASTINFO 82
6.1.11. Interface Configuration Information - +WNIFCFG 82
6.1.12. NCM Disconnect - +WNDC 84

7. WIRELESS DRIVER 86
7.1. Wireless Local Area Network (WLAN) 86
7.1.1. Get MAC Address - +WMACG 86
7.1.2. Scan - +WS 87
7.1.3. Scan Time - +WST 88
7.1.4. Get Transmission Rate - +WTXRATEG 89
7.1.5. Set Country Code - +WCCS 90
7.1.6. Get Physical Mode - +WPHYMODEG 91
7.1.7. Set Physical Mode - +WPHYMODES 91
7.1.8. Get RSSI - +WRSSIG 92
7.1.9. Send Raw Packets - +WRAWPKTS 92
7.1.10. Set Promiscuous Filter - +WPROMISCSETFILTER 95
7.1.11. Start Promiscuous Mode - +WPROMISCCMD 96
7.1.12. Application Information Element - +WAPPIE 96
7.2. Bluetooth Low Energy (BLE) 97
7.2.1. BLE Initialize/De-initialize - +BI 98
7.2.2. BLE Own Device Address - +BOAD 98
7.2.3. BLE Device Name - +BNAME 99
7.2.4. BLE Advertise Enable - +BADVE 100
7.2.5. BLE Advertise Data - +BADVDATA 101
7.2.6. BLE Scan Response Data - +BSCANRSPDATA 102
7.2.7. BLE Maximum Advertising Interval - +BADVINTMAX 103
7.2.8. BLE Minimum Advertising Interval - +BADVINTMIN 104
7.2.9. BLE Attributes for Code Generation - +BATTRIB 105
7.2.10. BLE Server Data Exchange - +BSRVDATAEX 107
7.2.11. BLE Scan - +BSCAN 108
7.2.12. BLE Connect - +BCONNECT 110
7.2.13. BLE Disconnect - +BDISCONNECT 111
7.2.14. BLE Service Discovery - +BSRVD 112
7.2.15. BLE Read - +BREAD 113
7.2.16. BLE Write - +BWRITE 114
7.2.17. BLE Write Command - +BWRITECMD 115
7.2.18. BLE Client Character Configuration Discriptor - +BCCCD 115

7.2.19. BLE Input/Output Capabilities - +BIOCAP 116
7.2.20. BLE Fix Pin - +BFIXPIN 117
7.2.21. BLE Secure Simple Pairing PIN (SSP-PIN) - +BSSPPIN 118
7.2.22. BLE Bond List - +BBNDLIST 119
7.2.23. BLE Bond Delete - +BBNDDEL 119
7.2.24. BLE Maximum Connection Interval - +BCONINTMAX 120
7.2.25. BLE Minimum Connection Interval - +BCONINTMIN 121
7.2.26. BLE Slave Latency - +BSLAVELAT 122
7.2.27. BLE Product ID - +BPNPPID 123
7.2.28. BLE Product Version ID - +BPNPPVER 124
7.2.29. BLE Vendor ID - +BPNPVID 125
7.2.30. BLE Source Vendor ID - +BPNPVSRC 126
7.2.31. BLE Terminal Input/Output - +BTIO 127
7.2.32. BLE Terminal Input/Output Data Mode - +BTIODATAMODE 128
7.2.33. BLE Set Physical Layer - +BSETPHY 128
7.2.34. BLE Set Data Length - +BDATALENSET 129

8. NETWORK PROTOCOL 131
8.1. Caller Identification (CID) 131
8.1.1. Get CID Information - +NCIDI 131
8.2. Ping - +NPING 132
8.3. Ping Status - +NPINGSTATS 133
8.4. Socket 134
8.4.1. Socket Create - +SC 135
8.4.2. Socket Bind - +SB 136
8.4.3. Socket Connect - +SCO 137
8.4.4. Socket Listen - +SL 138
8.4.5. Set Socket Option - +SSOPT 139
8.4.6. Get Socket Option - +SGOPT 140
8.4.7. Socket Accept - +SA 142
8.4.8. Socket Send - +SN 143
8.4.9. Socket Receive Ready - +SRR 144
8.4.10. Socket Receive - +SR 145
8.4.11. Socket Throughput Test - +STPTEST 147
8.4.12. Socket Throughput Test Statistics - +STPTESTSTAT 149
8.4.13. Socket Close - +SCL 150
8.5. Secure Socket Layer (SSL)/ Transport Layer Security (TLS) 152
8.5.1. SSL Initialize - +NSSLINIT 154
8.5.2. SSL Configure - +NSSLCFG 154
8.5.3. SSL Connect - +NSSLCO 158
8.5.4. SSL Bind - +NSSLB 159

8.5.5. SSL Listen - +NSSLL 160
8.5.6. SSL Accept - +NSSLA 161
8.5.7. SSL Receive Ready - +NSSLRR 161
8.5.8. SSL Receive - +NSSLRD 162
8.5.9. SSL Write - +NSSLWR 163
8.5.10. SSL Close - +NSSLCL 164
8.5.11. SSL Certificate List - +NSSLCERTLIST 165
8.5.12. SSL Certificate Store - +NSSLCERTSTORE 166
8.5.13. SSL Certificate Deletion - +NSSLCERTDELETE 167
8.6. Simple Network Time Protocol (SNTP) Settings 167
8.6.1. SNTP Configure - +NSNTPCFG 168
8.6.2. SNTP Start - +NSNTPSTART 169
8.6.3. SNTP Stop - +NSNTPSTOP 170
8.7. Domain Name System (DNS) 170
8.7.1. DNS Client 170
8.7.1.1. DNS Resolve URL - +NDNSCRURL 171
8.7.1.2. DNS Set Server IP Address - +NDNSCSRVIP 171
8.7.2. DNS Server 172
8.7.2.1. DNS Host Addition - +NDNSSADDHOST 173
8.7.2.2. DNS Server Start - +NDNSSSTART 173
8.7.2.3. DNS Server Stop - +NDNSSSTOP 174
8.7.3. DNS Service Discovery - +NDNSSD 174
8.7.4. DNS Service Get Target Info - +NDNSSDGETTARGETINFO 176
8.8. Multicast Domain Name System (mDNS) 177
8.8.1. mDNS Start - +NMDNSSTART 178
8.8.2. mDNS Host Name Registration - +NMDNSHNREG 179
8.8.3. mDNS Service Registration - +NMDNSSRVREG 179
8.8.4. mDNS Service De-Registration - +NMDNSSRVDEREG 180
8.8.5. mDNS Text Update - +NMDNSUPDATETXT 181
8.8.6. mDNS Stop - +NMDNSSTOP 181
8.9. HTTP Client (HTTPC) 182
8.9.1. HTTP Client Configure - +NHTTPCCFG 182
8.9.2. HTTP Client Initialize - +NHTTPCINIT 183
8.9.3. HTTP Client Connection - +NHTTPCCO 184
8.9.4. HTTP Client Request - +NHTTPCREQ 185
8.9.5. HTTP Client Read Response - +NHTTPCRDRSP 186
8.9.6. HTTP Client Close - +NHTTPCCL 187
8.10. HTTP Server (HTTPD) 188
8.10.1. HTTP Server Configure - +NHTTPDCFG 189
8.10.2. HTTP Server Start - +NHTTPDSTART 190

8.10.3. HTTP Server Configure URI - +NHTTPDCFGURI 191
8.10.4. HTTP Server Read - +NHTTPDRD 192
8.10.5. HTTP Server Send Data - +NHTTPDSENDDATA 193
8.10.6. HTTP Server - Send Header Response - +NHTTPDSENDHDR 194
8.10.7. HTTP Server Receive Ready - +NHTTPDURIRR 195
8.10.8. HTTP Server Stop - +NHTTPDSTOP 195
8.11. Message Queuing Telemetry Transport (MQTT) 196
8.11.1. MQTT Initialize - +NMQTTINIT 197
8.11.2. MQTT Client Connect - +NMQTTCONNECT 198
8.11.3. MQTT Client Publish - +NMQTTPUBLISH 200
8.11.4. MQTT Client Receive Request - +NMQTTRR 201
8.11.5. MQTT Client Subscribe - +NMQTTSUBSCRIBE 202
8.11.6. MQTT Client Receive - +NMQTTR 203
8.11.7. MQTT Client UnSubscribe - +NMQTTUNSUBSCRIBE 204
8.11.8. MQTT Client Disconnect - +NMQTTCL 205

9. ADVANCED SERVICES 207
9.1. Provisioning 207
9.1.1. Web Provisioning - +WNWEBPROV 207
9.2. Firmware Upgrade 208
9.2.1. HTTPC Firmware Upgrade Initialize - +FUHTTPCINIT 209
9.2.2. HTTPC Firmware Upgrade - +FUHTTPC 210
9.2.3. HTTPD Firmware Upgrade - +FUHTTPD 212
9.2.4. 212
9.2.4.1. XFP Start - +YXFPSTART 214
9.2.5. Validate Firmware Upgrade - +FUVALIDATE 215

10. APPENDIX A - AT COMMANDS SUMMARY 217

11. APPENDIX B 228

12. GLOSSARY AND ACRONYMS 230

13. DOCUMENT HISTORY 231

FIGURES LIST

Figure 1: Communication between the Host and the Module 27
Figure 2: Serial to Wireless Application 27

TABLES LIST

Table 1: Document Text Convention 20
Table 2: AT Command Syntax 21
Table 3: Example Response 23
Table 4: Error Response 24

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:

http://www.telit.com

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

Telit appreciates feedback from the users of our information.

1.4. 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/m2m-iot-products/wifi-bluetooth-modules/ for current documentation and downloads.

2. OVERVIEW

This chapter provides guidelines for using AT command line interface to design, configure and provision WE310F5-X 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:

- Special text fonts represent particular-commands, keywords, variables, or window sessions
- Color text indicates cross-reference, hyperlinks to supplemental information
- Command notation indicates commands, subcommands, 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**	Encloses optional parameters. Choose none or select one or more unlimited number of times. Do not enter brackets as part of any command. [parm1|parm2|parm3]
? **Question mark**	Used with the square brackets to limit the immediately following token to one occurrence.
<CR> **Carriage return**	Each command is terminated by a carriage return.
<LF> **Line Feed**	Each command is terminated by a line feed.
<CR><LF> **Carriage return Line feed**	Each command is terminated by <CR><LF>.
< > **Angle brackets**	Enclose a numeric range, endpoints inclusive. Do not enter angle brackets as part of any command. <SSID>
= **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 font description	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 limitation 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+YLC<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+YLC?<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.

2.5. Information Response and Result Codes

When a command is executed the response can be either in synchronous or in asynchronous format that may occur at any point. Following is an example of a command executed with response in verbose and non-verbose mode:

Sl 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

The first line is the command executed to connect to a network.

The second line shows the synchronous response of the command. The response is always prefixed with the command name. In few cases, the synchronous response doesn't come with the prefix.

The third line shows the status of the command whether the command processing is successful, or it failed.

If there is any change in the connection status, then an asynchronous response is given which is seen in line four.

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>

Following are the AT commands the does not have prefixes in Responses:

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

Following are the AT commands the does not have prefixes "AT+" in Command:

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

The result codes of an Error response 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.
PARMETER OUT OF 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 RECEIVED	6	Parsing of parameter of type data failed, because the data entered is excess compared to the length mentioned in the command.

Table 4: Error Response

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.

Following are the basic application development sequence for a Serial-to-Wireless user:

1. Evaluate the hardware and firmware
   - Download the software, program, and execute.
   - To download the software, go to DownloadZone (https://www.telit.com/support-training/download-zone/), and download all the latest packages including the binary.
   - Flash the binary using WE310F5-X Module Programming Reference Guide on the custom hardware or on the evaluation board and execute in RUN mode.
2. Develop host firmware
   - Interface host application using AT commands, refer WE310F5-X AT Command Reference Guide.
   - Configure the serial interface (UART) for mode and polarity. For software interface, choose Command & Response, Byte stuffing/de-stuffing as “None” for UART options.
   - Issue general, power save, and security related commands as required.
   - Start connection to an access point or do provisioning as required.
   - Obtain the IP address and start data transferring.
   - Select advanced services if any.
3. Debug the host and the module
   - Debug using the AT commands and other options if required, refer WE310F5-X AT Command Reference Guide.
   - Analyze using Wire shark over wireless. For more details, refer information about AirPcap Nx in http://www.riverbed.com.
4. Production Process
   - Perform generic recommendations in production line.
   - Perform RF tests.

For detailed use cases and example , refer “WE310F5-X Use Case Reference Guide”.

3.2. Working Principle

Following representation shows the communication between the Host and the WE310F5-X module:

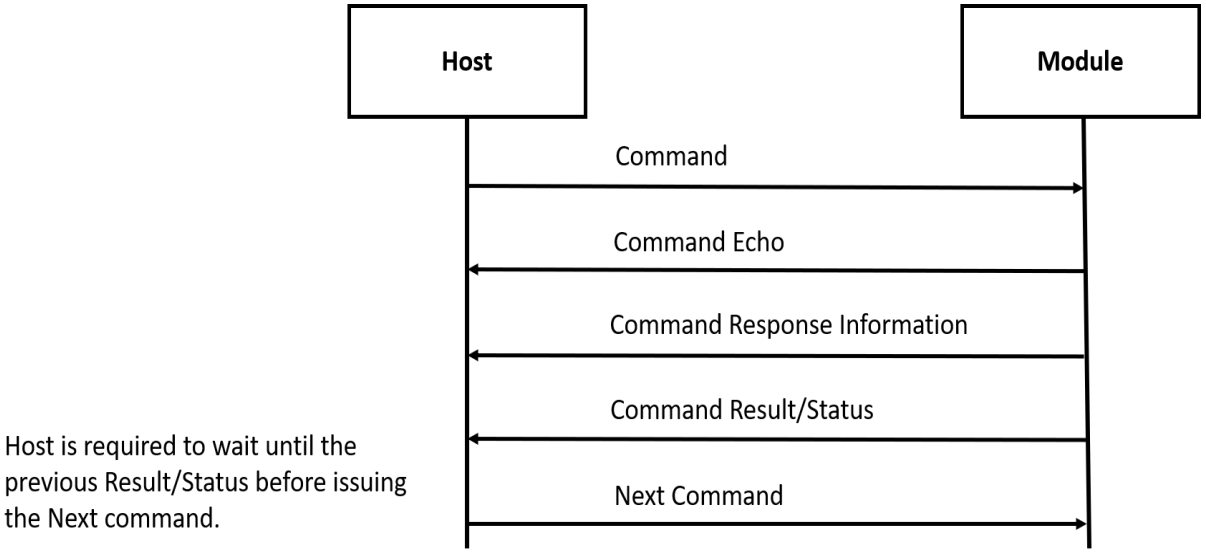


Figure 1: Communication between the Host and the Module

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 the AP mode, initializing the provisioning software. User can either configure the module through the provisioning mechanism or can issue commands to start in Station mode and join the intended AP.
- In the profile, configuration related to wireless network- UDP/TCP/DNS/MDNS/HTTP/MQTT 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/HTTP/MQTT configuration. It configures the services and fetches based on the MDNS configuration.
- Serial to wireless application is initialized based on the profile settings.

Following diagram represents the sequence of communication between the interfaces:

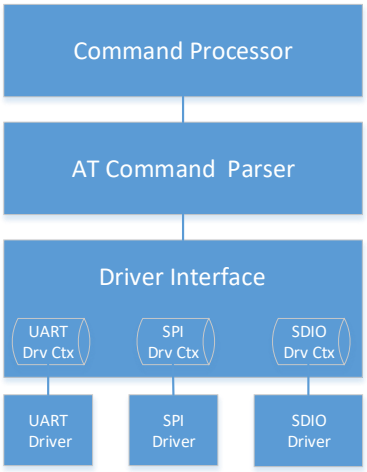
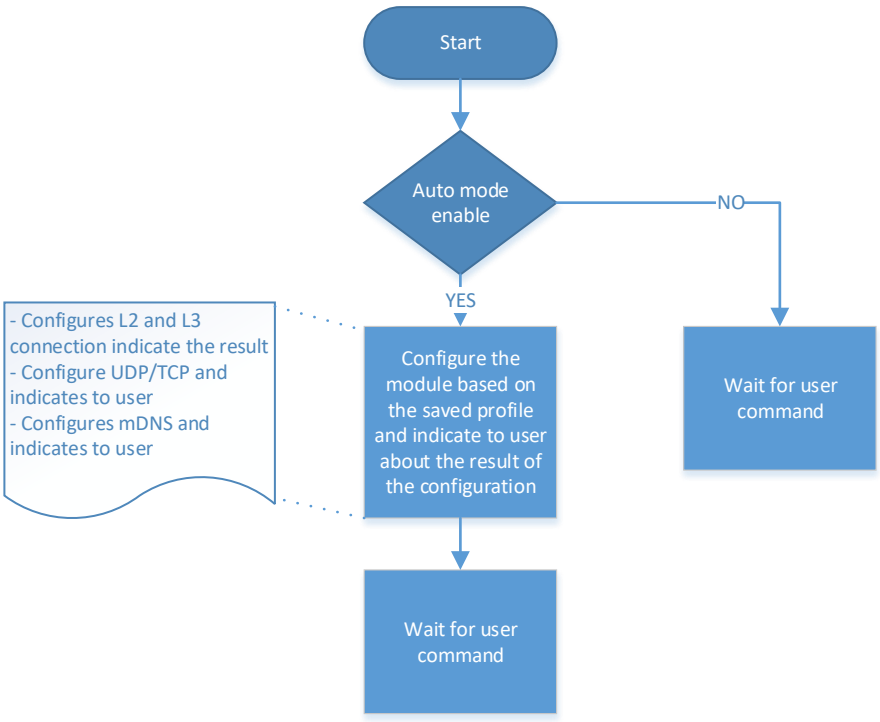


Figure 2: Serial to Wireless Application

Serial to Wireless application takes command input from three different IOs. The software configurations can be by either UART and SPI or UART 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.

Note: Current release does not support SPI and SDIO interface.

3.3.1. Auto Connection



4. HOST INTERACTION

4.1. Interface

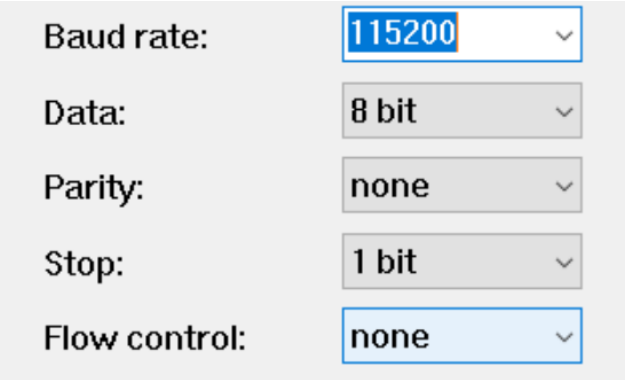
An embedded host uses one of the serial IO interfaces to connect to the module.

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.

4.1.1. UART

The UART0 is enabled by default. User can configure the UART port with the below shown configuration. Both UART0 and UART1 takes AT command but UART1 displays debug logs along with the AT command response.



By default, HW flow control is disabled. User can enable HW flow control by issuing AT&K command for UART0.

The hardware flow control on UART1 is not supported.

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 300 to 921600 baud rate and port 1 supports only 115200 baud rate.
Bits per character	Range: 5-8 Default: 8	Integer	It specifies the bits per character.
Parity mode	Range: 0-2 Default: 0	Integer	It specifies the parity mode being used, where:- 0 is No Parity, 1 is odd Parity and 2 is Even Parity.
Stop bits	Range: 1,3 Default: 1	Integer	It specifies the

			number of stop bits, where:- 1 for 1 bit and 3 for 2 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

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

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. 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

5.1.2. 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

5.1.3. File System

5.1.3.1. File Open - +YFOP

Description

This command opens a specified file with the given option.

User is required to close a particular file before opening the same file again in another mode.

Only when the file close operation is complete, the file is stored in the File system. maximum 10 files user can open at a time.

maximum subdirectory depth count supported is 10(when there are no other files opened).

maximum subdirectory depth count supported will decrease if any files are opened(for each file open count supported will decrease by one)

till it gets closed.

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,	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.

	0x4C2		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

5.1.3.2. File Close - +YFCL

Description

This command closes a specified file.

User is required to close a particular file before opening the same file again in another mode.

Only when the file close operation is complete, the file is stored in the File system.

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

5.1.3.3. 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: 0X0-0XFFFFFFFF	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	0X0-0XFFFFFFFF	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

Example1:

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

5.1.3.4. 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: 0X0-0XFFFFFFFF	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: 1-65536	Integer	It specifies the data to be sent with a gap of ~10msec before sending the data.
Data	Range: 1-65536	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,fghij

OK

5.1.3.5. 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 in the flash, if the file is secure then it adds more bytes to the actual data written by

			the user. If the file is still open then the actual size may come lesser then the data written to the file, as the last flash write happens when we close the file.
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

5.1.3.6. File List - +YFLS

Description

This command lists all the files in the specified path.

maximum subdirectory depth count supported is 10(when there are no files opened),

if number of files opened increases, maximum subdirectory depth count decreases by number of files opened.

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

5.1.3.7. 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

5.2. Profile Settings

Following are the set of AT commands for profile setting:

- Profile Read - Zn
- Profile Set - &Yn
- Profile Save - &Wn
- 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 node supports two Profiles by default (profile0 and profile1).

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.

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":[1,3,6,9,11,0,0,0,0,0]}},"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},{"enable":1,"port":0,"baud":115200,"parity":0,"stop_bits":1,"char_bits":3,"loopback":0,"flow_ctrl":0}],"dbg_cfg":{"enable":1,"debug_config":{"enableCI":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. 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

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 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 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: "NONE"	String	It specifies the type of security and types are: "NONE", "WPA2".
Enc	Range: 1-4 Default: "NONE"	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 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 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	IP Address	It specifies the Primary DNS server address.

	Default: N/A		
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 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 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 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 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: "NONE"	String	It specifies the type of security and types are: "NONE", "WPA", "WPA2".
Enc	Range: 1-4 Default: "NONE"	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 configuration.
SSID	1-32	String	It specifies the SSID.
PWD	8-64	String	It specifies the password.
Auth	N/A	None, WPA, WPA2	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. this index is independent of UDP index.
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: 1-2 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

+YPSTA: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. this index is independent of TCP index.
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 Default: 0	Integer	It specifies the local port number to bind. If add-delete filed is set to add, then this parameter 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+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, the serial IO turns off and the system wakes up only when there is any network event in L4 has occurred or if any timer interrupts the occurrence 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

+YHD:<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

+YHD:102400,9024

OK

5.7. 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

OK

Serial2Wireless APP

5.8. 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

5.9. 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

WE310F5

OK

5.10. 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

M0G.000003

OK

5.11. 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#SWPKGV

39.00.000-B005-P0G.000000

M0G.000003

P0G.000000

A0G.000002

R0G.060203

B0G.000002

OK

5.12. 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:"39.00.000-B005"

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>,[<bandwidth>]

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.
bandwidth	Range: 2-3 Default: 2	Integer	Bandwidth to initialize the WLAN mode, where: 2-20Mhz 3-40Mhz.

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 Retry Configuration - +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>,<l2 retry count>,<L2 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.
l2 retry count	Range: 1-65535 Default: 1	Integer	It specifies the l2 retry count while connection.
L2 retry time delay	Range: 1000-65535 Default: 1000	Integer	It specifies the time between L2 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?

6.1.3. NCM De-initialize - +WNDI

Description

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

Pre-requisites

AT+WNDC 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

6.1.4. Configure Station Mode - +WNSTAC

Description

This command sets the Station mode configurations. It should be issued before AT+WNCN command, else default values are 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: 3	Integer	It specifies the listen interval in station mode in number of beacon intervals.This parameter is not supported
Keep alive interval	Range: 0-255 Default: 5	Integer	It specifies the keep alive interval in STA mode after connection in seconds.This parameter is not supported
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	String	It specifies the pin used in WPS PIN method during the parameter "Method" selection.

	Default: N/A		

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 in 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

6.1.5. Configure AP Mode - +WNAPC

Description

This command sets the AP configurations. It must be executed before AT+WNCR command, else will take default values. WPS in AP mode is not supported

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). 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

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

6.1.6. 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	IP Address	It specifies the static IPV4 address of the interface in either Station or AP mode.

	Default: N/A		
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

6.1.7. Configure IP Address in AP Mode - +WNAPIPC

Description

This command sets the DHCP server configuration in AP mode.

Pre-requisites

AT+WNIPC command should be issued.

Syntax

AT+WNAPIPC=<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+WNAPIPC=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+WNAPIPC?

Response

+WNAPIPC:<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+WNAPIPC?

+WNAPIPC:192.168.3.5,192.168.3.250,86400000

OK

6.1.8. NCM Create - +WNCR

Description

This command is used to create a network. The AP can be created only in BGN mode.

Note: Limited AP hangs while connecting to 5th station.

Pre-requisites

AT+WNAPIPC 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	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", "WPA2".
Encryption Type	Range: N/A	String	It specifies the type of encryption and the types are: "NONE", "AES".
PassPhrase	Range: 8-63 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,"WE310_SEC",6,"WP2","AES","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

6.1.9. NCM Connect - +WNCN

Description

This command connects the existing network up to L3 level. WEP security is not supported

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: 8-63 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 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, disconnected, DHCP failed, auto IP done, new IP	It specifies the current connection status.
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. Get Associated Station Information - +WNASTINFO

Description

This command lists the MAC addresses and IP addresses of stations connected, when device is in AP mode.

Pre-requisites

AT+WNCR command should be issued.

Syntax

AT+WNASTINFO

Response

+WNASTINFO:<MAC Address>, <IP Address>

Response Parameters Description

Parameter	Range	Type	Description
MAC address	N/A	MAC Address	It specifies the MAC address of the connected station.
IP address	N/A	IP Address	It specifies the IP 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

6.1.11. 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	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, WPA PSK, WPA2 PSK	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

6.1.12. 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

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. NCM will internally initialize the WLAN module and WLAN interface also.

Following AT commands are sequentially executed to get information:

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

Following AT commands are sequentially executed to set information:

1. AT+WI
2. AT+WAPPIE
3. AT+WCCS
4. AT+WPHYMODES
5. 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

AT+WNCN=1,”SSID”

AT+WRSSIG

AP mode:

AT+WNI=1

AT+WPHYMODES=1,”B”

AT+WPHYMODEG=1

7.1.1. Get MAC Address - +WMACG

Description

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

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:00:21:7E:24:A6:50

OK

7.1.2. Scan - +WS

Description

This command scans all the channels in the WLAN interface.

Pre-requisites

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+WNI command for STA mode.
SSID	Range: 1-32 Default:	String	It specifies the SSID of the network to scan.
Channel	Range: 1-14 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	1-13	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, WPA2 PSK, WPA3	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

7.1.3. Scan Time - +WST

Description

This command sets the scan time for scanning.

Pre-requisites

AT+WNI=0 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+WNI command for STA mode.

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

7.1.4. Get Transmission Rate - +WTXRATEG

Description

This command is used to get the value of transmission rate in WLAN interface. This command only supports in Station mode.

Pre-requisites

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

Syntax

AT+WTXRATEG=<WHandle>

Parameters Description

Parameter	Value	Format	Description
WHandle	Range: 1	Integer	It specifies the WHandle obtained after issuing AT+WI or AT+WNI command. This command is not supported in AP mode

Response

+WTXRATEG:<Transmission rate>

Response Parameters Description

Parameter	Range	Type	Description
Transmission rate	1-20	Integer	It specifies the current transmission rate of the interface, where: 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+WTXRATEG=1

+WTXRATEG:12

OK

7.1.5. Set Country Code - +WCCS

Description

This command sets the country code in WLAN interface.

Pre-requisites

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

7.1.6. 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	B, BG, BGN	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:BGN

OK

7.1.7. Set Physical Mode - +WPHYMODES

Description

This command sets the physical mode of the WLAN interface. WE310F5 module supports only B/BG/BGN modes

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.WE310F5 module supports only "B","BG","BGN" modes

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+WPHYMODES=1,"BG"

OK

7.1.8. Get RSSI - +WRSSIG

Description

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

Pre-requisites

AT+WNI=0 and AT+WNCN command should be issued. STA mode should be in connected state.

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

7.1.9. Send Raw Packets - +WRAWPKTS

Description

This command is used to send the raw WLAN packets (Beacon, probe req, probe resp, data, action frames).

The device must be in disassociation state when user sends raw WLAN packets.\b

Combinations of four addresses are:

Beacon Data frame:

addr1 - Transmitter address, source address, BSSID address.

addr2 - Not used.

addr3 - Not used.

addr4 - Not used.

Probe Request:

addr1 - Transmitter address, source address, BSSID address.

addr2 - Not used.

addr3 - Not used.

addr4 - Not used.

Probe Response:

addr1 - Not used.

addr2 - Receiver address, Destination address.

addr3 - Transmitter address, source address, BSSID address.

addr4 - Not used.

Data frame:

addr1 - Not used.

addr2 - Receiver address, Destination address, STA address.

addr3 - Transmitter address, source address, BSSID address.

addr4 - Not used.

Action frame:

addr1 - Not used.

addr2 - Receiver address, Destination address.

addr3 - Transmitter address, source address, BSSID address.

addr4 - Not used.

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. Setting of data rate is not supported.
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: 0-4	Integer	It specifies the payload sent in raw WLAN packet, where: 0-for Beacon, 1-for Probe Request, 2-for Probe Response, 3-for Data frame 4-for Action frame
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. This addr is not supported in WE310F5 module.
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=1,1,10,6,0,00:E0:4C:87:11:07,11:22:33:44:55:63,00:E0:4C:87:11:07,,5,"abcde"

OK

7.1.10. Set Promiscuous Filter - +WPROMISCSETFILTER

Description

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

Pre-requisites

AT+WNI=0 command should be issued, as the WE310F5 module supports promiscuous mode is STA mode 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:ff,0,8

OK

7.1.11. Start Promiscuous Mode - +WPROMISCCMD

Description

This command is used to start the device in Promiscuous mode. WE310F5 module module supports promiscuous mode is STA mode only.

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.

7.1.12. 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

7.2. Bluetooth Low Energy (BLE)

Bluetooth Low Energy (BLE) provides AT commands for enabling advertisements, device discovery, query of services, and for sending 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.

    - The device in in central role scans for devices and initiates connection establishment
    - The device in peripheral role makes the advertisement and accepts connection establishment.
- GATT server and GATT Client functionality: It determines the type of communication established between 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.

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	12	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 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. The device name is reflected only when customized advertising is disabled.

Pre-requisites

AT+BI=1 command and AT+BADVE=3 should be issued. After setting the local device name, enable advertising using AT+BADVE=0.

Syntax

AT+BNAME=<Local Device Name>

Parameters Description

Parameter	Value	Format	Description
Local Device Name	Range: 1-18	String	It specifies the name of the local Device which has a limit up to 18 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	N/A	String	It specifies the Device name.

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	N/A	String	It specifies the Device name.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BNAME?
+BNAME:"MyDevice_123456"
OK

7.2.4. 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	0-3	Integer	It specifies the status of Advertising.

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+BADVE?

+BADVE:1

OK

7.2.5. BLE Advertise Data - +BADVDATA

Description

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

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BADVDATA=<Advertising Data>

Parameters Description

Parameter	Value	Format	Description
Advertising Data	Range: 0-62	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+BADVDATA?

Response

+BADVDATA:<Advertising Data>

Response Parameters Description

Parameter	Range	Type	Description
Advertising Data	0-62	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

7.2.6. 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.

Syntax

AT+BSCANRSPDATA=<Scan Response Data>

Parameters Description

Parameter	Value	Format	Description
Scan Response Data	Range: 0-62	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	0-62	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 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	20-10240	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

7.2.8. 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 Advertising Interval	Range: 20-10240	Integer	It specifies minimum interval used for advertising (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	20-10240	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

7.2.9. BLE Attributes for Code Generation - +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.

Pre-requisites

AT+BI=1 command should be issued.

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: "pserv"(Mandatory), "char"(Mandatory), "charval"(Mandatory), "complete"(Mandatory).

Response

+BATTRIB:<Identifier>

Response Parameters Description

Parameter	Range	Type	Description
Identifier	CharID, ServiceID	String	It specifies 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=0x1A","uuid=12A1"

OK

AT+BATTRIB="charval","perm=0011","len=1","val=0x59"

+BATTRIB:"CHARID:0x2"

OK

where "CHARID:0x2" is CharacteristicID with value '2'

AT+BATTRIB="complete"

+BATTRIB:"SRVID:0x0"

OK

where "SRVID:0x0" is ServiceID with 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.

7.2.10. 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: 0x0-0xFFFF	Hexadecimal	It specifies the Service identifier returned from the command AT+BATTRIB="COMPLETE".
Channel ID	Range: 0x0-0xFFFF	Hexadecimal	It specifies the Channel identifier returned from the command AT+BATTRIB="CHARVAL","...".
Hex Data	Range: N/A	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 serviceId 0

AT+BSRVDATAEX=0,2,"4546"

OK

To read the value of GATT server characteristic with channel 0x2 for service with serviceId 0

AT+BSRVDATAEX=0,2,"?"

+BSRVDATAEX: 0,2,4556

7.2.11. BLE Scan - +BSCAN

Description

This command is used to discover all the BLE devices.

This command works in both blocking mode and non-blocking mode.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BSCAN=[<Bluetooth Remote Address>,<Scan time Duration>,<Scan ON_OFF>,<block command flag>]

Parameters Description

Parameter	Value	Format	Description
Bluetooth Remote Address	Range: 12 Default: N/A	String	It specifies the scan results using Bluetooth remote address of the devices to be discovered.
Scan time Duration	Range: 0-1000000 Default: 10	Integer	It specifies the scan duration in seconds. Default scan time is 10 seconds. If scan duration is 0 seconds then scan time duration is infinite, and scan will stop only on scan stop command.
Scan ON_OFF	Range: 0-1 Default: 1	Integer	It specifies the scan ON and OFF functionality. Default value is scan ON. 1 - SCAN ON 0 - SCAN OFF.
block command flag	Range: 0-1 Default: 1	Integer	It specifies the scan command to be in blocking mode or non-blocking mode for the given time duration. 0 - scan command works in non-blocking mode and returns from the AT command immediately. All scan results are asynchronous results in this mode. 1 - scan command works in blocking mode. All scan results are synchronous results in this mode. Note: If scan duration is 0, the scan command works only in non-blocking mode.

Response

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

Response Parameters Description

Parameter	Range	Type	Description
BDADDR	12	String	It specifies the Bluetooth device address of discoverable device.
NAME	N/A	String	It specifies the Device advertise friendly name of the discoverable device.
RSSI	N/A	Integer	It specifies the RSSI value of discoverable device.
BDADDRTYPE	N/A	String	It specifies the Bluetooth device address type of the discoverable device.
CONNECTIONTYPE	N/A	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","SCAN_RESPONSE"

+BSCAN:"008025DB1066","BM+S50",-34,"t2","SCAN_RESPONSE"

OK

The above command scans all devices for 10 seconds in blocking mode

AT+BSCAN="008025D1D6D9"

+BSCAN:"008025D1D6D9","BM+S50",-67,"t2","SCAN_RESPONSE"

OK

The above command scans for BLE MAC address "008025D1D6D9" for 10 seconds in blocking mode

AT+BSCAN="008025D1D6D9",20,,0

OK

+BSCAN:"008025D1D6D9","BM+S50",-67,"t2","SCAN_RESPONSE"

+BSCAN

OK

The above command scans for BLE MAC address "008025D1D6D9" for 20 seconds in non-blocking mode.

After 20 seconds, "+BSCAN" without any results and "OK" are printed to represent the scan is stopped in non-blocking mode

AT+BSCAN="008025D1D6D9",0,,

OK

+BSCAN:"008025D1D6D9","BM+S50",-67,"t2","SCAN_RESPONSE"

The above command scans for BLE MAC address "008025D1D6D9" for infinite time in non-blocking mode.

AT+BSCAN=,,0,

OK

The above command stops scanning which is started in non-blocking mode.

7.2.12. BLE Connect - +BCONNECT

Description

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

Note: It supports a maximum of 3 connections in central role

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BCONNECT=<Bluetooth Remote Address>,<Bluetooth Address Type>,[<Connect Type>]

Parameters Description

Parameter	Value	Format	Description
Bluetooth Remote Address	Range: 12	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.
Connect Type	Range: 1-5 Default: "gatt"	String	It specifies the Connection type, where: gatt - GATT Connection, tio - TIO Connection.

Response

+BCONNECT:<Connection Handle>

Response Parameters Description

Parameter	Range	Type	Description
Connection Handle	0x0-0xFFFF	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","gatt"

+BCONNECT:1

OK

AT+BCONNECT="008025D11DE4","t2","tio"

+BCONNECT:1

+BTIO:CONNECT

OK

Asynchronous Response

+BCONNECT:<Connect Status>

Asynchronous Response Parameters Description

Parameter	Range	Type	Description
Connect Status	N/A	CONNECT	It specifies the connect status with connection handle.

7.2.13. 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: "0x0-0xFFFF"	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

7.2.14. 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: "0x0-0xFFFF"	Hexadecimal	It specifies the connection handle returned at the time of BLE connect command.
UUID of Service	Range: 1-32 Default: N/A	String	It specifies the UUID of the service for discovery.
UUID TYPE	Range: 0-2 Default: N/A	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	N/A	String	Specifies the UUID and characteristics 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.

7.2.15. 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: "0x0-0xFFFF"	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	0x0-0xFFFF	Hexadecimal	It specifies the Connection handle of the device, once the connection with remote device successful.
CHARHNDL	0x1-0xFFFF	Hexadecimal	It specifies the characteristic handle of the device, once the characteristic of service discovered.
HEXDATA	N/A	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

7.2.16. 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: "0x0-0xFFFF"	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

7.2.17. BLE Write Command - +BWRITECMD

Description

This command is used to write without response (write command) on the characteristics value of a service.

Pre-requisites

AT+BI=1 command should be issued.

Syntax

AT+BWRITECMD=<Connection Handle>,<Characteristic Handle>,<Hex Data>

Parameters Description

Parameter	Value	Format	Description
Connection Handle	Range: "0x0-0xFFFF"	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+BWRITECMD=1,2B,"6162"

OK

7.2.18. BLE Client Character Configuration Discriptor - +BCCCD

Description

This command enables or disables the notifications and indications for a characteristic feature.

Pre-requisites

None.

Syntax

AT+BCCCD=<Connection handle>,<Characteristic handle>,<CCCD>

Parameters Description

Parameter	Value	Format	Description
Connection handle	Range: "0x0-0xFFFF"	Hexadecimal	It specifies the return value of Connection handle during BLE connect.
Characteristic handle	Range: "0x0-0xFFFF"	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

7.2.19. 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 1 - Display Yes/No 2 - Keyboard only 3 - No Input and No Output (default) 4 - Display and Keyboard

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 IO capabilities:

Syntax

AT+BIOCAP?

Response

+BIOCAP:<Input/output capabilities>

Response Parameters Description

Parameter	Range	Type	Description
Input/output capabilities	0-4	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

7.2.20. BLE Fix Pin - +BFIXPIN

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+BFIXPIN=<Fix Pin>

Parameters Description

Parameter	Value	Format	Description
Fix Pin	Range: 1-6	String	It specifies the 6-digit value of the fix pin.

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+BFIXPIN="123456"

OK

Following command is used to get the set fixpin:

Syntax

AT+BFIXPIN?

Response

+BFIXPIN:<Fixpin>

Response Parameters Description

Parameter	Range	Type	Description
Fixpin	1-6	String	It specifies the 6-digit pin.

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+BFIXPIN?

+BFIXPIN:"123456"

OK

7.2.21. 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

7.2.22. BLE 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	12	String	It specifies the Bluetooth device of own device address.
BD Address Type	N/A	String	It specifies the Bluetooth device address type.
Device Role	N/A	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",""

OK

7.2.23. BLE 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: 12 Default: N/A	String	It specifies the bond of the device address or all the stored bond information to be deleted. Bluetooth Address - deletes the bond of the device with specified address from the bonded-device list, if no input is given then it will delete all the 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

7.2.24. 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.

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	8-4000	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.

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	8-4000	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	0-200	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 Product ID - +BPNPPID

Description

This command is used to set product ID provided in the device information service (DIS).

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	0x0-0xFFFF	Hexadecimal	It specifies the Product ID.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BPNPPID?

+BPNPPID:B01A

OK

7.2.28. BLE Product Version ID - +BPNPPVER

Description

This command is used to set the product version provided in the device information service (DIS).

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	0x0-0xFFFF	Hexadecimal	It specifies the Product version.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BPNPPVER?

+BPNPPVER:700

OK

7.2.29. BLE Vendor ID - +BPNPVID

Description

This command is used to set the vendor ID provided in the device information service (DIS).

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	0x0-0xFFFF	Hexadecimal	It specifies the Vendor ID.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BPNPVID?

+BPNPVID:8F

OK

7.2.30. BLE Source Vendor ID - +BPNPVSRC

Description

This command is used to set the vendor ID source provided in the device information service (DIS).

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	1-2	Integer	It specifies the Vendor ID source.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BPNPVSRC?

+BPNPVSRC:1

OK

7.2.31. 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.

Peripheral TIO with security has the following limitation for the current release:

1) Peripheral TIO with security works fine if there is no bond information of the connecting peer device.

2) For this, if the TIO disconnect happens gracefully i.e - if AT+BDISCONNECT is issued after TIO connection is established from Central, then in TIO disconnect the peripheral bond information is deleted.

3) In other cases, bond information of the connecting Central device should be removed for successful TIO connection.

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	0-1	Integer	It specifies the TIO mode.

Status

For all possible status responses refer Table 4: Status Responses

Example

at+BTIO?

+BTIO:0

OK

7.2.32. 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

7.2.33. BLE Set Physical Layer - +BSETPHY

Description

This command is used by Master (Central) to set the physical layer (PHY) preferences for the connection identified by the connection handle.

The Controller may not make the change because of the peer that does not support the requested physical layer and may perfer the current physical layer.

Note: Low Energy(LE) coded Physical layer is not supported. Only Low Energy 1M and 2M physical layer are supported.

Pre-requisites

AT+BI=1 command should be issued. There should be an established BLE connection.

Syntax

AT+BSETPHY=<Connection Handle>,<Physical layer preference>,[<LE coded options>]

Parameters Description

Parameter	Value	Format	Description
Connection Handle	Range: "0x0-0xFFFF"	Hexadecimal	It specifies the connection handle of established BLE connection.
Physical layer preference	Range: 0-2	Integer	It specifies the Tx and Rx PHY preferences: 0 - Prefer LE 1M PHY, 1 - Prefer LE 2M PHY, 2 - Prefer LE Coded PHY,
LE coded options	Range: 0-2 Default: 2	Integer	It specifies the Low Energy coded physical layer options and this parameter is valid only when physical layer preference parameter value is LE Coded PHY. 0 - No preferred coding when transmitting on the LE Coded PHY, 1 - Prefers S=2 coding when transmitting on the LE Coded PHY, 2 - Prefers S=8 coding when transmitting on the LE Coded PHY,

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+BSETPHY=1,1

OK

7.2.34. BLE Set Data Length - +BDATALENSET

Description

This command is used to set the the data length used in Link Layer for data length extension.

Pre-requisites

AT+BI=1 command should be issued. There should be an established BLE connection.

Syntax

AT+BDATALENSET=<Connection Handle>,<Data Length>

Parameters Description

Parameter	Value	Format	Description
Connection Handle	Range: "0x0-0xFFFF"	Hexadecimal	It specifies the connection handle of established BLE connection.

Data Length	Range: 27-251	Integer	It specifies the maximum number of payload octets that the local Controller should include in a single Link Layer packet on this connection.

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+BDATALENSET=1,251

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. For server, the remote IP address remains 0 because the IP is local IP address.

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-CLIENT,IPv4,192.168.120.3,8344,8355

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: 20-1576 Default: 64	Integer	It specifies the size of each ping request packet 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	20-1576	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, 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+SB=CID, port (optional command)

   AT+SCO=CID, ServerIp, Server_port

3. **UDP server**

   AT+SC= Family, Type, Protocol

   AT+SB=CID, port

4. **UDP client**

   AT+SC= Family, Type, Protocol

   AT+SB=CID, port' (optional command)

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

ATSR

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	0-13	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: 0-72	Integer	It specifies the name of the option: 3 - Allows local address reuse, always set 4 - Keep connections alive, not enabled by default 6 - Permit sending of broadcast messages, supported 8 - Linger on close if data present, supported 10 - Don't Linger, supported 19 - Receives buffer size, supported 22 - Send timeout, supported 23 - Receive timeout, supported /** At IP 'level'. */ 38 - Add an IPv4 group membership. 39 - Drop an IPv4 group membership.

			46 - IPv4 type of service and precedence. 47 - Changes the default value set by the TCP/IP service provider in the TTL field of the IP header in outgoing datagrams /** UDP multicast traffic handling */ 51 - The TTL for subsequent multicast datagrams to be set to any value from 0 to 255 52 - Interface for the multicast datagrams should be sent from. 53 - Enable/Disable loopback for multicast. 54 - Enable/Disable the return of packet information on an IPv4 socket /* Additional options at SOL_SOCKET level */ 62 - Don't create UDP checksum 63 - Bind to device interface /** IPPROTO_TCP option level */ 65 - Don't delay send to coalesce packets, supported 66 - send KEEPALIVE probes when idle milliseconds 67 - set Keep idle, but use seconds for get/setsockopt 68 - set Keep interval - Use seconds for get/setsockopt 69 - Set keep count - Use number of probes sent for get/setsockopt /** Options for level IPPROTO_UDPLITE */ 71 - sender checksum coverage 72 - minimal receiver checksum coverage
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=0,18,"8192"

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: 0-72	Integer	It specifies the name of the option: 2 - Socket has had listen(), supported 3 - Allows local address reuse, always set 4 - Keep connections alive, not enabled by default 6 - Permit sending of broadcast messages, supported 8 - Linger on close if data present, supported 10 - Don't Linger, supported 19 - Receives buffer size, supported 22 - Send timeout, supported 23 - Receives timeout, supported 24 - Get error status and clear 25 - Get socket type, supported /** At IP 'level'. */ 46 - IPv4 type of service and precedence. 47 - Changes the default value set by the TCP/IP service provider in the TTL field of the IP header in outgoing datagrams /** UDP multicast traffic handling */ 51 - The TTL for subsequent multicast datagrams to be set to any value from 0 to 255 52 - Interface for the multicast datagrams should be sent from. 53 - Enable/Disable loopback for multicast. /* Additional options at SOL_SOCKET level */ 62 - Don't create UDP checksum /** IPPROTO_TCP option level */ 65 - Don't delay send to coalesce packets,

			supported 66 - send KEEPALIVE probes when idle milliseconds 67 - set Keep idle, but use seconds for get/setsockopt 68 - set Keep interval - Use seconds for get/setsockopt 69 - Set keep count - Use number of probes sent for get/setsockopt /** Options for level IPPROTO_UDPLITE */ 71 - sender checksum coverage 72 - minimal receiver checksum coverage

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.

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.

Status

For all possible status responses refer Table 4: Status Responses

Example

To send the data through created socket:

AT+SN=0,192.168.140.3,8355,10,0123456789

OK

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 received data length.

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 number of bytes to be received that is indicated from AT+SRR command response. For UDP, if the data length given by user is less than the length of data present during AT+SRR response then the rest of data is lost. And the UDP protocol standard does not allow buffering of remaining 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=0,,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. 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 delay	Range: 1-100 Default: 5	Integer	It specifies the number of packets to be sent before each delay.
Destination IP	Range: 1-1000	IP Address	It specifies the IP address of the destination

address	Default:		address 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

+STPTEST: <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.

8.4.12. 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

8.4.13. 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+NSSLL
- 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=1,1,1,"client",820,<send File>

   AT+NSSLCERTSTORE =1,2,1,"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 version configuration to TLS 1.2.

   AT+NSSLCFG=0,2,"2"

5. Connect to the SSL 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

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: 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 6 - To set the SNI 7 - To set the Domain 8 - To set the Max Fragment Length 9 - To enable/disable server validation PARAM-DESCRIPTION>
Configuration value	Range: 1-64	String	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 CA Certificate 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 TLS_DHE_RSA_WITH_AES_128_CBC_SHA256 Bit 16: Cipher TLS_DHE_RSA_WITH_AES_256_CBC_SHA256 Bit 17: Cipher TLS_RSA_WITH_AES_128_GCM_SHA256 Bit 18: Cipher TLS_RSA_WITH_AES_256_GCM_SHA384 Bit 19: Cipher TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 Bit 20: Cipher TLS_DHE_RSA_WITH_AES_256_GCM_SHA384 Bit 21: Cipher TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA Bit 22: Cipher TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA Bit 23: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA Bit 24: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA Bit 25: Cipher TLS_ECDH_RSA_WITH_AES_128_CBC_SHA Bit 26: Cipher TLS_ECDH_RSA_WITH_AES_256_CBC_SHA Bit 27: Cipher TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA Bit 28: Cipher TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA Bit 29: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 Bit 30: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 Bit 31: Cipher TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256 Bit 32: Cipher TLS_ECDH_ECDSA_WITH_AES_256_CBC_SHA384 Bit 33: Cipher TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 Bit 34: Cipher TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 Bit 35: Cipher TLS_ECDH_RSA_WITH_AES_128_CBC_SHA256 Bit 36: Cipher TLS_ECDH_RSA_WITH_AES_256_CBC_SHA384 Bit 37: Cipher TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 Bit 38: Cipher TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 Bit 39: Cipher

			TLS_ECDH_ECDSA_WITH_AES_128_GCM_SHA256 Bit 40: Cipher TLS_ECDH_ECDSA_WITH_AES_256_GCM_SHA384 Bit 41: Cipher TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 Bit 42: Cipher TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 Bit 43: Cipher TLS_ECDH_RSA_WITH_AES_128_GCM_SHA256 Bit 44: Cipher TLS_ECDH_RSA_WITH_AES_256_GCM_SHA384 Bit 45: Cipher TLS_RSA_WITH_AES_128_CCM Bit 46: Cipher TLS_RSA_WITH_AES_256_CCM Bit 47: Cipher TLS_DHE_RSA_WITH_AES_128_CCM Bit 48: Cipher TLS_DHE_RSA_WITH_AES_256_CCM Bit 49: Cipher TLS_RSA_WITH_AES_128_CCM_8 Bit 50: Cipher TLS_RSA_WITH_AES_256_CCM_8 Bit 51: Cipher TLS_DHE_RSA_WITH_AES_128_CCM_8 Bit 52: Cipher TLS_DHE_RSA_WITH_AES_256_CCM_8 Bit 53: Cipher TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (Not Supported) Bit 54: Cipher TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (Not Supported) Bit 55: Cipher TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (Not supported) Default: ALL Ciphers are enabled 5 - Set the Tx Max Fragment Length 0 : 16384 1 : 512 2 : 1024 3 : 2048 4 : 4096 (default value) 6 - To Set the SNI (supported only for TLS client) 7 - Domain name in String format 8 - Set the Max Fragment Length 0 : 16384 1 : 512 2 : 1024 3 : 2048 4 : 4096 (default value)

			9 - To enable/disable server validation 0: Disables server validation 1: Enables server validation (Default)

Status

For all possible status responses refer Table 4: Status Responses

Example

1. To Set TLS version to TLS1.2

AT+NSSLCFG= 0, 1, "2"

OK

2. To Set CA Certificate to "apache_cacert"

AT+NSSLCFG= 0, 2, "apache_cacert"

OK

3. To Set Server/Client Certificate to "ccert"

AT+NSSLCFG= 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+NSSLCFG= 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+NSSLCFG= 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+nssll=0,2

OK

+nssll=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 Default: 0.0.0.0	IP Address	It specifies the IP address of the destination to send 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 certificates 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).

Following is the sequence of execution:

1. AT+NSNTPSTART
2. AT+NSNTPCFG
3. AT+NSNTPSTOP

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 or the name of the SNTP 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

Start the SNTP module

AT+NSNTPSTART

OK

To configure the IP address

AT+NSNTPCFG="216.239.35.12",0

OK

Configure the sntp server name, internally dns resolves the server name and IP address it will be configured

AT+NSNTPCFG="0.pool.ntp.org",1

OK

Get the SNTP configuration

AT+NSNTPCFG?

+NSNTPCFG:0,"216.239.35.12"

+NSNTPCFG:1,"162.159.200.1"

OK

Following command is used to get configuration of the server in SNTP module

Syntax

AT+NSNTPCFG?

Response

+NSNTPCFG:<ServerID>,<Address>,<Status>

Response Parameters Description

Parameter	Range	Type	Description
ServerID	0-1	Integer	It specifies the server id.
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:0,"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=<Server_ip>,<id>
2. AT+NDNSCRURL

Steps to setup DNS server and request to resolve URL:

1 Configure the DNS sever at ID 0

AT+NDNSCSRVIP=8.8.8.8,0

OK

2 Request to resolve any domain name

AT+NDNSCRURL="time.google.com"

+NDNSCRURL:"216.239.35.12"

OK

Once the domain name is resolved, the command gives response '+NDNSCRURL' with ip address.

Note: Maximum of two DNS servers can be configured.

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+NDNSSADDHOST

Steps to add DNS host

1. Start the DNS server

   AT+NDNSSSTART

   OK
2. Add DNS host

   AT+NDNSSADDHOST="www.telitTest.com",192.168.43.100

   OK
3. Stop the DNS server

   AT+NDNSSSTOP

   OK

8.7.2.1. DNS Host Addition - +NDNSSADDHOST

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+NDNSSADDHOST=<Host Name>,<IP address>

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.

Status

For all possible status responses refer Table 4: Status Responses

Example

AT+NDNSSADDHOST="www.testinghost.com",192.168.146.100

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

8.7.4. DNS Service Get Target Info - +NDNSSDGETTARGETINFO

Description

This command is used to get the target information in DNS module.

Pre-requisites

L2 - L3 connections should be established.

Syntax

AT+NDNSSDGETTARGETINFO=<Device ID>,<Instance name>,[<IP version>,<Timeout>]

Parameters Description

Parameter	Value	Format	Description
Device ID	Range: 0,1	Integer	It specifies the ID of the device obtained after issuing AT+WNI command.
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 discovery.
Timeout	Range: 0-5000 Default: 5000	Integer	It specifies the period of timeout in milliseconds for handling the request.

Response

+NDNSSDGETTARGETINFO:Response values

Response Parameters Description

Parameter	Range	Type	Description
rsp_type		Integer	
svc_name		String	
ttl		Integer	
svr_name		String	
priority		Integer	
weight		Integer	
port		Integer	
server_name_in_target_info		String	
ipv4_addr		IPv4 Address	
ipv6_addr		IPv6 Address	
txt		String	

Status

For all possible status responses refer Table 4: Status Responses

Example

NA

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=<wlan interface mode>
2. AT+NMDNSHNREG=<host name>
3. AT+NMDNSSRVREG
4. AT+NMDNSUPDATETXT
5. AT+NMDNSSRVDEREG
6. AT+NMDNSSTOP

Steps to register a service and update a text record and deleting a mDNS service:

1. Initialize MDNS module

   AT+NMDNSSTART =1

2. Register the host name

   AT+NMDNSHNREG ="Telit_G"

3. Adding a service

   AT+NMDNSSRVREG="_SERVICE1","_http._tcp",80,"updateTXT1=test1;updateTXT2=test2"

4. Updating the service text, needs the service instance name and the text to be updated

AT+NMDNSUPDATETXT="_SERVICE1","updateTXT1=test1;updateTXT2=test2;updateTXT3=test3"

5. Deleting the services requires the service name

   AT+NMDNSSRVDEREG="_ SERVICE1"

6. Stop the MDNS module

   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

/ Start MDNS with the WLAN interface initialized */*

AT+NMDNSSTART=1

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+NMDNSSTART=1

OK

AT+NMDNSHNREG="Telit_G"

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 and the type of the service to be registered. Service is the type of service, like _http and proto can be UDP or TCP which represent

			_udp and _tcp. Example: If the service being registered is of type HTTP service and TCP protocol then the input to the parameter should be of format "_http._tcp".
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+NMDNSSTART=1

OK

AT+NMDNSHNREG="Telit_G"

OK

AT+NMDNSSRVREG="_WEBAPP","_http._tcp",80,"LIGHT=OFF,FAN=ON"

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+NMDNSSTART=1

OK

AT+NMDNSHNREG="Telit_G"

OK

AT+NMDNSSRVREG="_WEBAPP","_http._tcp",80,"LIGHT=OFF,FAN=ON"

OK

AT+NMDNSSRVDEREG="_WEBAPP"

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+NMDNSSTART=1

OK

AT+NMDNSHNREG="Telit_G"

OK

AT+NMDNSSRVREG="_WEBAPP","_http._tcp",80,"LIGHT=OFF,FAN=ON"

OK

AT+NMDNSUPDATETXT="_WEBAPP","LIGHT=ON,FAN=OFF"

OK

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)

8.9.1. 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 - M2MB_HTTPC_CONF_SET_HEADER 2 - M2MB_HTTPC_CONF_SET_CGI_PARAMS 3 - M2MB_HTTPC_CONF_ENABLE_RESP_HEADER 4 - M2MB_HTTPC_CONF_CLEAR_ALL_HEADER
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

+NTTPPCINIT:0

AT+NHTTPCCFG=0,3,"1"

OK

8.9.2. 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: 0-86400 Default: 25	Integer	It specifies the connection timeout in seconds.
Maximum Body Length	Range: 0-1440 Default: 1440	Integer	It specifies the maximum length of the body in bytes.
Maximum Header Length	Range: 0-1440 Default: 1440	Integer	It specifies the maximum length of the header in bytes.

Receive Buffer Length	Range: 512-1440 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

8.9.3. HTTP Client Connection - +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, (Not Supported) 6 - CONNECT, (Not Supported) 7 - PATCH. (Not Supported)
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 Read Response - +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)

To perform HTTPD 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:

7. AT+NHTTPDCFG=<name>,<mode>,<http port>,<https port>,<network interface>,<IP family>,[<user name>,<Password>]
8. AT+NHTTPDSTART
9. AT+NHTTPDCFGURI=<uri>,<uri id>,[<auth>]
10. AT+NHTTPDRD=<cid>,<uri id>,<read type>,<length>
11. AT+NHTTPDSENDHDR=<cid>,<uri id>,<status code>,[<status text>],<content length>,[<content type>,<user header>]
12. AT+NHTTPDSENDDATA=<cid>,<uri id>,[<Data Length>,<Data>]
13. AT+NHTTPDSTOP

Steps to use HTTPD commands

1. AT+ NHTTPDCFG= "test_server",0,8080,443,0,4

   +NHTTPDCFG:0

   OK

   The command gives a synchronous response '+NHTTPDCFG ' as the CID which is used for data transfer.

2. Start the HTTP server

   AT+NHTTPDSTART'

3. Registering an URI 'sys/test' with URI ID '0'

   AT+NHTTPDCFGURI= 0,"sys/test"

   +NHTTPDCFGURI:0

   OK

   The command gives a synchronous response '+NHTTPDCFGURI' with URI ID at which the URI is registered.

4. For any client request over the registered URI, we get an asynchronous response in below format,

   +NHTTPDURIREQ:<cid>,<uri id>,<method>,<header length>,<body length>

   Example
   +NHTTPDURIREQ:0,0,4,250,20

5. Read the header/body from the request with command 'AT+NHTTPDRD'

   The read command gives a synchronous response in below format,

   +NHTTPDRD:<cid>,<uri id>,<read type>,<actual length>,<read length>, <header/body content>

   a. Read the header from the request line, the '*read type*' will be 0,

      AT+NHTTPDRD=0,0,0,250

      The command gives a synchronous response with the header of 250 bytes,

      +NHTTPDRD:0,0,0,250,250,POST /sys/test HTTP/1.1

Host: 192.168.25.100:8080

…

OK

b. Read the data from the request line, the '*read type*' will be 1

AT+NHTTPDRD=0,0,1,20

The command gives a synchronous response with the data of 20 bytes,

+NHTTPDRD:0,0,1,20,20,12345678912345678910

OK

6. Sending the response headers where the data length is 10 bytes

AT+NHTTPDSENDHDR=0,0,200,"OK",10,"text/plain",

OK

7. Sending 10 bytes of data,

AT+NHTTPDSENDDATA=0,0,10,HelloWorld

OK

8. Stop the HTTP server.

AT+NHTTPDSTOP

OK

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 enabled, then the certificates are 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 username 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 in 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+NHTTPDSENDHDR 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 - +NHTTPDSENDHDR

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+NHTTPDRD command.

Syntax

AT+NHTTPDSENDHDR=<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+HTTPDSTOP

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+NMQTTCL: Disconnects with the server
- AT+NMQTTPUBLISH: Publishes data to the server
- AT+NMQTTRR: Receives a request for the incoming data, when connected using the following escape sequence:

  MQTTRR:<CID>, <Data length>

- AT+NMQTTR: 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+NMQTTRR=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+NMQTTCL=0

   +NMQTT:0

Steps to establish MQTT connection with security:

1. Initialize MQTT client interface specifying the connection type (with SSL/Without SSL) in first parameter:

   AT+NMQTTINIT=1

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. Configure all SSL related configurations with SSL commands, use same CID which we got in '*AT+NMQTTINIT' command response*

   Eg: *AT+NSSLCFG=0,1,"2"*

4. 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

5. To receive data from the server on any topic, user must subscribe:

   AT+NMQTTSUBSCRIBE=0,0,10,"thing/gsDemo_lp_178fbc/property/temp1"

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+NMQTTRR=0

   This command would further notify incoming data with the length and the CID:

   +NMQTTRR: 0,,10

7. Read the incoming data:

   AT+NMQTTR =0,10

8. Publish the data to the server:

   AT+NMQTTPUBLISH=0,1,0,10,"thing/gsDemo_lp_178fbc/property/temp1",5,"568.9",12

9. Close the connection with the remote server using it's CID:

   AT+NMQTTCL=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>,[<UserName>,<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
UserName	Range: N/A Default:	String	It specifies the username 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+nsslcfg=0,1,"2"

OK

at+nsslcfg=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+NMQTTINIT =0

+NMQTTINIT:0

OK

Connect to MQTT broker.

AT+NMQTTCONNECT=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+NMQTTPUBLISH=0,1,0,1234,"thing/gainspan/property/light",3,123

OK

8.11.4. MQTT Client Receive Request - +NMQTTRR

Description

This command is used to send receive request.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MCONNECT command should be issued.

Syntax

AT+NMQTTRR=<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+NMQTTCONNECT=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+NMQTTSUBSCRIBE=0,1,675,"thing/gainspan/property/light"

OK

8.11.6. MQTT Client Receive - +NMQTTR

Description

This command is used to receive the data.

Pre-requisites

L2 - L3 connections should be established and AT+NMQTTINIT, AT+MQTTCONNECT, AT+NMQTTRR commands should be issued.

Syntax

AT+NMQTTR=<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

Connect to MQTT broker. Here the broker address is api-dev.devicewise.com and the app token is

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.

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 web provisioning starts. If the DNS server is started before web provisioning, 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+FUHTTPC

After successful firmware upgrade, user must issue:

2. AT+FUVALIDATE

Example:

AT+WNI=0

AT+WNCN=1,"Telit_Guest","qwerty123456"

AT+FUHTTPCINIT=0

AT+FUHTTPC=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+FUHTTPD

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 “WE310F5 Use Case Reference Guide”.

9.2.1. HTTPC Firmware Upgrade Initialize - +FUHTTPCINIT

Description

This command is used to initialize FWUP module over HTTP client by enable/disable secure connection.

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. The corresponding certificates should be stored using AT+NSSLCERTSTORE command and

configured using AT+NSSLCFG command before starting the FWUP HTTP client(after AT+FUHTTPCINIT and before AT+FUHTTPC).

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 established. If the firmware upgrade with HTTP client is performed along with SSL,

then AT+FUHTTPCINIT should be issued to enable/disable SSL. The corresponding certificates should be stored using AT+NSSLCERTSTORE command and

configured using AT+NSSLCFG command before starting the FWUP HTTP client(after AT+FUHTTPCINIT and before AT+FUHTTPC).

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 username 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

To initialize FWUP module over HTTP client without SSL:

AT+FUHTTPCINIT=0

+FUHTTPCINIT:0

OK

AT+FUHTTPC=0,"192.168.2.26",80,"otafu.bin",100,"admin","password"

CR>OK

To initialize FWUP module over HTTP client with SSL

AT+FUHTTPCINIT=1

+FUHTTPCINIT:0

OK

Configure all SSL parameters with ssl commands(for SSL commands refer SSL document) as below with same CID got in AT+FUHTTPCINIT command.

at+nsslcfg=0,1,"2"

OK

at+nsslcfg=0,9,"0"

OK

AT+FUHTTPC=0,"192.168.2.26",80,"otafu.bin",100,"admin","password"

CR>OK

9.2.3. HTTPD Firmware Upgrade - +FUHTTPD

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+NHTTPDSTART command. If SSL is enabled, then the corresponding certificates should be stored using AT+NSSLCERTSTORE and configured using AT+NSSLCFG before starting HTTP server.

Syntax

AT+FUHTTPD

Status

For all possible status responses refer Table 4: Status Responses

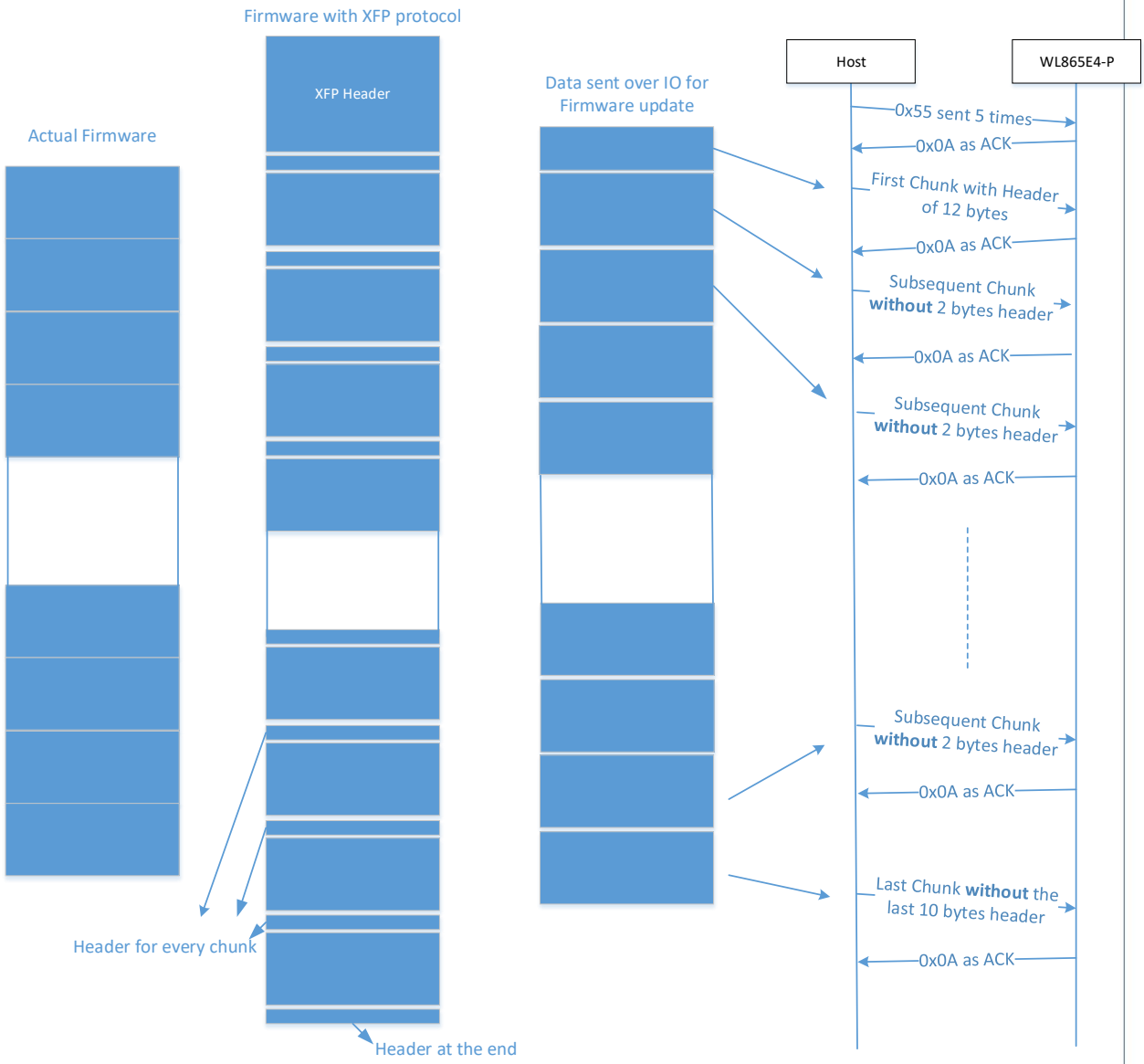
Example

AT+FUHTTPD

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 WE310F5 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 WE310F5

   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 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
   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 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.

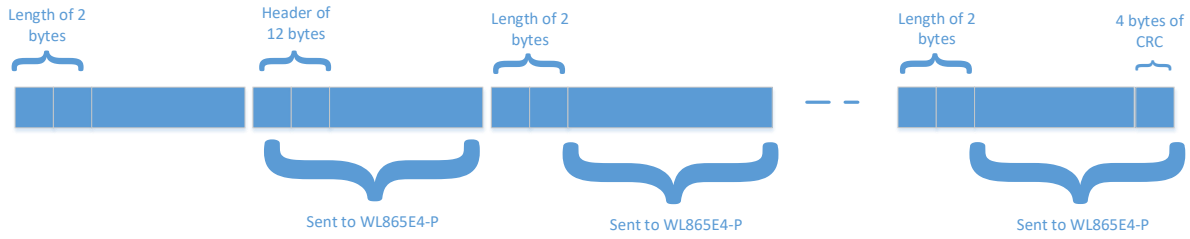
The header in remaining chunk just has 2 bytes that shows the chunk size. This header is not sent to the WE310F5.

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 WE310F5 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).

To upgrade the device with UART, XFP.exe tool needs to be used by giving the port that is being used.

Following is the sequential execution of the AT commands:

1.AT+XFPSTART

After successful firmware upgrade, user must issue:

2.AT+FUVALIDATE

Procedure for XFP:

1.Compile the s2w application.

2.Open tera term with High-Speed UART port, Run S2w application and give the AT command AT+YXFPSTART.

3.XFP tool uses High Speed UART port to load the Binary so close the High Speed comport(tera term).

4.Open XFP tool, Select OK, Choose PORT as High Speed com port, Speed is the BAUD rate (115200).

5.Click on "Browse" Button to choose the binary "s2w_otafu.bin" and click on "Program".

6.XFP tool will give you a prompt once done with loading binary, then close the tool, open tera term and reset the board, s2w banner is seen with "Serial2Wireless APP - FWUP SUCCESS" banner, which indicates Firmware upgrade is successful.

7. Use AT+FUVALIDATE command either to accept or reject the Firmware upgrade trail image.

Note: In case of hosted application, the host interface is disabled as the interface used by XFP tool. Hence the reset banner with "FWUP SUCCESS" message on the terminal(teraterm) is not seen.

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 be completed and AT+FUHTTPC 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

Serial2Wireless APP

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.

A2 - General Operations

Command	Parameters	Response / Effect
ATEn		Echo mode will be enabled.
ATVn		Verbose mode is enabled.
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>],<Length>	Reads the file.
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.
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&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 retry delay time>]	Sets the STA mode L2, L3 and L4 related retry configurations.
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+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.

A3 - Network Connection Manager

Command	Parameters	Response / Effect
AT+WNI	<Mode>,[<bandwidth>]	NCM module is initialized.
AT+WNRETRYC	<WHandle>,[<Scan retry count>,<Scan retry time delay>,<l2 retry count>,<L2 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+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+WNAPIPC	<WHandle>,<IP Start Address>,<IP End Address>,<Lease Time>	Sets the AP related DHCP server configurations.
AT+WNCR	<WHandle>,<SSID>,<Channel>,<Security Type>,<Encryption	Creates a network.

	Type>,[<PassPhrase>]	
AT+WNCN	<WHandle>,[<SSID>,<PassPhrase>,<Channel>]	Establishes the connection with existing network up to L3 level.
AT+WNASTINFO		It prints the MAC and IP address of connected stations in AP mode.
AT+WNIFCFG		Gives information of all interfaces.
AT+WNDC	<WHandle>	Disconnects from the connected network in station mode or turns down the created network in AP mode.

A4 - Wireless Driver

Command	Parameters	Response / Effect
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+WTXRATEG	<WHandle>	Gives the value of the transmission rate in WLAN interface.
AT+WCCS	<WHandle>,<Country Code>	Country code is set 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+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	Sets PROMISC mode filter parameters.

	address>,<Frame type>,<Sub type>]	
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+BI	<START>	BLE stack is initialized and de-initialized.
AT+BOAD		Reads the Bluetooth device's own device address.
AT+BNAME	<Local Device Name>	It modifies the local device name.
AT+BADVE	<Advertising>	Controls the advertising behavior.
AT+BADVDATA	<Advertising Data>	Sets customized advertising data.
AT+BSCANRSPDATA	<Scan Response Data>	Sets scan response data for a customized advertising.
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+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+BSCAN	[<Bluetooth Remote Address>,<Scan time Duration>,<Scan ON_OFF>,<block command flag>]	Discovers all nearby BLE devices
AT+BCONNECT	<Bluetooth Remote Address>,<Bluetooth Address Type>,[<Connect 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+BSRVD	<Connection Handle>,[<UUID of	Discovers services and

	Service>,<UUID TYPE>]	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+BWRITECMD	<Connection Handle>,<Characteristic Handle>,<Hex Data>	Writes characteristic value of a service.
AT+BCCCD	<Connection handle>,<Characteristic handle>,<CCCD>	
AT+BIOCAP	<Input/output capabilities>	Bluetooth Low Energy IO capabilities are set.
AT+BFIXPIN	<Fix Pin>	It gives 6-digit pin that is used as a fix pin in the security procedures.
AT+BSSPPIN	<Bluetooth Address>,<Bluetooth Address Type>,<SSP Passkey>	Enter the SSPPIN request with the SSP passkey displayed on the remote device.
AT+BBNDLIST		Lists all the bonded devices.
AT+BBNDDEL	[<BD Address>]	Deletes the stored bond information.
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+BPNPPID	<Product ID>	Sets the product ID provided in the device information service (DIS).
AT+BPNPPVER	<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+BSETPHY	<Connection Handle>,<Physical layer preference>,[<LE coded options>]	Sets the BLE physical preferences.
AT+BDATALENSET	<Connection Handle>,<Data Length>	Set the data length used in LL for data length extension.

A5 - Network Protocol

Command	Parameters	Response / Effect
AT+NCIDI	[<CID>]	Gives 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+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+NSSLL	<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+NDNSSADDHOST	<Host Name>,<IP address>	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+NDNSSDGETTARGETINFO	<Device ID>,<Instance name>,[<IP version>,<Timeout>]	Displays all the target information 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+NHTTPCCFG	<CID>,<Configuration ID>,<Configuration value>,[<Configuration value2>]	Configures HTTP client.
AT+NHTTPCINIT	[<Type>,<Timeout>,<Maximum	Starts the HTTP client for the

	Body Length>,<Maximum Header Length>,<Receive Buffer Length>]	CID.
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+NHTTPDCFG	<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+NHTTPDSENDDATA	<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>,[<UserName>,<Password>,<K	Connects to MQTT server.

	eepalive>,<Timeout>,<Will topic>,<Will message>,<Will QOS>,<Will retain>]	
AT+NMQTTPUBLISH	<CID>,<QOS>,<Retain flag>,<Message ID>,<Topic>,<Data length>,<Publish data>	Application message is sent to MQTT server.
AT+NMQTTRR	<CID>	Sends a request to receive data with CID and data length.
AT+NMQTTSUBSCRIBE	<CID>,<QOS>,<Message ID>,<Topic>	MQTT Topic is subscribed.
AT+NMQTTR	<CID>,<Data length>	Receives MQTT data with CID.
AT+NMQTTUNSUBSCRIBE	<CID>,<Topic>	MQTT Topic is unsubscribed.
AT+NMQTTCL	<CID>	Closes the MQTT connection.

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 Port>],<File URI>,[<Timeout>,<UserName>,<Password>]	Performs firmware upgrade using HTTP client.
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.

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	2020-05-26	First issue.
1	2020-07-06	Addition of Network and System commands. Update to Applicability table. Addition of BLE commands.
2	2020-07-27	Addition of HTTPD and SSL commands. Addition of File List command in File System. Addition of Send Raw Packets command in WLAN. Addition of BLE Bond Delete, BLE Bond List, BLE Input/Output Capabilities, BLE Maximum Connection Interval, Minimum Connection Interval, BLE Product ID, BLE Product Version ID, BLE Vendor ID, BLE Source Vendor ID, BLE Slave Latency, BLE Secure Simple Pairing Confirmation (SSP-CONF), BLE Secure Simple Pairing PIN (SSP-PIN) commands in BLE.
3	2020-08-18	Addition of Firmware Upgrade and Web Provisioning commands in Advance Services. Update on raw data information in Send Raw Packets command in WLAN. Addition of Set Promiscuous Filter, Start Promiscuous Mode and Application Information Element in WLAN.
4	2020-08-25	Correction the example command in File Open. Update in the example command response in Reset. Removed WPA in Security type and TKIP in Encryption type in NCM Create. Added the WPA3 as the scan response in Scan. Update to syntax in BLE Bond Delete. Corrected the command expression in BLE Advertise Data.
5	2020-09-18	Addition of section HTTPC in Network Protocol. Addition of BLE Terminal Input/Output, BLE Terminal Input/Output Data Mode, BLE Write Command in BLE. Updated BLE Connect, BLE Device Name, BLE Advertise Data, BLE Scan Response Date, BLE Attributes For Code Generation, BLE SSPPIN, BLE Input/Output Capabilities in BLE. Removed SSP Configuration in BLE. Update MQTT Connect and MQTT Publish in MQTT section. Addition of Get transmission Rate in WLAN.
6	2020-09-29	Addition of section Configure IP Address in WNCM. Updates in section BLE.
7	2020-10-05	Addition of section BLE Set Physical Layer and BLE Set Data Length in BLE.

		Description update section BLE and update in Parameter range in section BLE Device Name.
8	2020-10-19	Addition of section BLE Fix Pin and update of BLE Terminal Input/Output Data Mode in BLE. Addition of NCM Retry Configuration and updated NCM Create in NCM. Updated section MQTT. Updated section HTTPC Firmware Upgrade and added HTTPC Firmware Upgrade Initialize in section Firmware Upgrade. Updated HTTPC Initialize and HTTPC Request in section HTTPC. Updated SSL Configuration in SSL.
9	2020-10-30	Updated example in Profile Clear/Factory Reset. Updated example in Heap Information. Updated command description of File Open and File Close section. Addition of Socket Throughput Test and Socket Throughput Test Statistics commands in section Socket
10	2020-11-13	Updated section Firmware Upgrade and XFP. Added section information to XFP. Updated NCM Initialize, NCM Create, NCM Connect and Interface Configuration Information. Updated example in SNTP Configuration.
11	2020-11-20	Folder Structure Changes. Updated AP configuration that WPS is not supported. Updated STA configuration that listen interval and keep alive timer are not supported. Updated AP creation xml file that is WNCR. Updated range of passphrase in WNCN command.
12	2020-12-08	Folder Structure Changes.
13	2021-01-27	Addition Standby Command under Power Save section. Updated the Range of Bluetooth Device address in BLE section.
14	2021-02-11	New parameter has been added related to bandwidth in WNI. Default profile update commands are modified. Two parameters has been added to WNRETRYC. WNCN xml has been updated.

SUPPORT INQUIRIES

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

www.telit.com

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

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

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

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

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

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