Infinite Possibilities

User Manual

INDOOR AND OUTDOOR ACCESS POINT USER MANUAL USING GUI

Indoor & Outdoor Access Points

This document helps you to understand the product features, configuration, login and logout process of Thin and Thick Access Point. This manual guides you through the installation process and the entire software user set.

Revision: A0-09

12th Sep 2019

Copyright Notice

This document is copyright of HFCL Limited, All Rights Reserved. No part of this document, in whole or in part, may be used, reproduced, stored in a retrieval system or transmitted, in any form, or by any means, electronic or otherwise, including photocopying, reprinting, or recording, for any purpose, without the express written permission of HFCL Limited.

Legal Disclaimer

The information contained in this document is subject to change without notice. The information in this document is provided for informational purposes only. HFCL Limited specifically disclaims all warranties, express or limited, including, but not limited, to the implied warranties of merchantability and fitness for a particular purpose, except as provided for in a separate software license agreement.

About HFCL Limited

HFCL Limited delivers innovative, customized and competitive products and latest solutions in the high technology telecommunications infrastructure sector, thereby enabling its customers to stay ahead of their peers in technology and network efficiency.

The company's core specialization lies in manufacturing and providing a wide range of turnkey solutions. HFCL Limited has implemented several Greenfield projects (setting up CDMA & GSM networks, satellite communications, wireless spectrum management and DWDM optical transmission network), rolled out over 100,000 kilometres of OFC network, implemented over 25,000 2G/3G cell sites, provided high security applications to Defence and has developed expertise in the areas of Railways, Homeland Security and Smart cities.

Correspondence

HFCL Ltd.
8, Commercial Complex,
Masjid Moth, Greater Kailash II,
New Delhi-110048, India

Contact us at: +91 1130882624/2626
For your queries please mail us at:
Sales: sales.corp@hfcl.com
Enquiry: info@hfcl.com
Investors: investor@hfcl.com

Revision History

Date	Rev No.	Description	By
13-12-2018	A0-00	Initial Draft	Sonia
05-02-2019	A0-01	Feature update	Himankush Jaswal
26-02-2019	A0-02	Feature update	Himankush Jaswal
25-03-2019	A0-08	GUI update.	Himankush Jaswal
12-09-2019	A0-09	TFTP settings removed, Process page removed, IPv4/IPv6 selection added for traceroute diagnostics, Static/Active lease settings added, Wi-Fi schedule feature added, 2.4 GHz radio configuration page added, Real Time graphs updated, Connected clients page added, DHCP & DNS page updated, Advanced SSID settings added, Advanced radio settings added, Advanced network interface settings added, FCC statement added,	Himankush Jaswal

Table of Contents

1 ABOUT THIS DOCUMENT 11

1.1 PURPOSE 11
1.2 INTENDED AUDIENCE 11
1.3 DOCUMENT CONVENTIONS 11
1.4 TERMS AND ABBREVIATIONS 12

2 PRODUCT OVERVIEW 15

3 FEDERAL COMMUNICATION COMMISSION CERTIFIED 15

3.1 DUAL BAND 4X4:4 INDOOR ACCESS POINT 16
3.2 DUAL BAND 4X4:4 OUTDOOR ACCESS POINT (ION8/ION8E) 18

4 HARDWARE SETUP 20

4.1 SYSTEM REQUIREMENTS 20
4.2 PACKAGING CONTENT – FOR ION8I/ION8/ION8E VARIANTS OF THIS PRODUCT 21

5 GETTING TO KNOW THE IO ACCESS POINT 22

5.1 DUAL BAND 4X4:4 INDOOR ACCESS POINT 22
5.1.1 Front / Side View 22
5.2 BOTTOM VIEW 23
5.2.1 Back View 24
5.3 DUAL BAND 4X4:4 OUTDOOR ACCESS POINT 25
5.3.1 Front / Side View 25
5.4 BACK VIEW 26

6 INITIAL SETUP 27

6.1 DUAL BAND 4X4:4 INDOOR ACCESS POINT 28
6.1.1 Connect to the Indoor Access Point 29
6.2 DUAL BAND 4X4:4 OUTDOOR ACCESS POINT 31
6.2.1 Connect to the Outdoor Access Point 32

7 CONNECT TO THE THIN MODE ACCESS POINT AND LOG IN 34

7.1 LOGIN THROUGH GUI 34

8 STATUS OVERVIEW SCREEN 35

8.1 SYSTEM SUMMARY 35
8.2 SYSTEM SOFTWARE 36
8.3 SYSTEM HARDWARE 37

9 ADMINISTRATION 38

9.1 SET AP PASSWORD 38
9.2 REBOOT THIN AP 39

10 THIN AP CONFIGURATION 40

10.1 INTERFACES 40
10.1.1 General Network interface setup configuration 41

10.2 ADVANCED NETWORK INTERFACE SETUP CONFIGURATION FOR THIN AP 46

11 SWITCH AP MODE 47

12 LOGOUT 47

13 CONNECT TO THE THICK ACCESS POINT AND LOG IN 48

13.1 LOGIN THROUGH GUI 48

14 STATUS OVERVIEW SCREEN 49

14.1 SYSTEM SUMMARY 49
14.2 SYSTEM SOFTWARE 50
14.3 SYSTEM HARDWARE 51
14.4 SYSTEM WIRELESS 52

15 SYSTEM MAINTENANCE SCREEN 53

15.1 SYSTEM GENERAL SETTINGS 53
15.2 SYSTEM LOG SETTINGS 55
15.3 SET PASSWORD FOR THICK AP 57
15.4 BACKUP/FLASH FIRMWARE 58
15.4.1 Generate Backup 58
15.4.2 Upload configuration or backup 59
15.4.3 Upgrade firmware 60
15.5 REBOOT 62
15.6 FACTORY RESET 63

16 NETWORK INTERFACES OF THICK AP 64

16.1 GENERAL NETWORK INTERFACE SETUP CONFIGURATION FOR THICK AP 65
16.1.1 Static IP configuration for thick AP 66
16.1.2 DHCPv4 client configuration for thick AP 68
16.1.3 DHCPv6 client configuration for thick AP 69
16.2 ADVANCED NETWORK INTERFACE SETUP CONFIGURATION FOR THICK AP 70
16.3 NETWORK/WIRELESS/RADIO AND SSID CONFIGURATION OF THICK AP 71
16.3.1 5 GHz radio configuration 72
16.3.2 2.4 GHz radio configuration 74
16.3.3 Advanced radio configuration (2.4 GHz and 5 GHz) 76
16.3.4 SSID configuration 77
16.4 NETWORK/MESH CONFIGURATION OF THICK AP 82
16.5 DHCP AND DNS CONFIGURATION OF THICK AP 84
16.5.1 Static/Active lease settings 85
16.6 STATIC ROUTES 86

17 WI-FI SCHEDULE 88

18 DIAGNOSTICS 90

18.1 ROUTES 90
18.2 SYSTEM LOG 91
18.3 KERNEL LOG 92
18.5 REAL-TIME GRAPHS 93
18.6 DIAGNOSTIC TOOLS 94

18.6.1 Check the network connection/status 94
18.6.2 Check the route of the established network connection 95
18.7 CONNECTED CLIENTS 96

19 SWITCH AP MODE 97

20 LOGOUT 97

21 INSTALLATION SETUP 98

21.1 MOUNTING OF DUAL BAND 4x4:4 INDOOR ACCESS POINT (WALL AND CEILING) 98
21.2 MOUNTING OF DUAL BAND 4x4:4 OUTDOOR ACCESS POINT (POLE AND WALL) 101
21.2.1 Assembly-1 of Mounting Bracket 101
21.2.2 Assembly-2 of Mounting Bracket 102
21.2.3 Mounting Bracket onto the Outdoor Access Point 103
21.3 OUTDOOR ACCESS POINT MOUNTING ONTO THE POLE 104
21.4 OUTDOOR ACCESS POINT MOUNTING ONTO THE WALL 106
21.5 GROUNDING OF AP 109

22 USE CASES 110

List of Figures

Figure 1: Dual Band 4x4:4 Indoor Access Point - Specifications & Highlights-1 16
Figure 2: Dual Band 4x4:4 Indoor Access Point - Specifications & Highlights-2 17
Figure 3: Dual Band 4x4:4 Outdoor Access Point - Specifications & Highlights-1 18
Figure 4: Dual Band 4x4:4 Outdoor Access Point - Specifications & Highlights-2 19
Figure 5: Packaging Content of ion8i/ion8/ion8e Variants 21
Figure 6: Front/side view of the indoor AP 22
Figure 7: Bottom view of the indoor AP 23
Figure 8: Back side view of the indoor AP 24
Figure 9: Front/side view of the outdoor AP 25
Figure 10: Back view of the outdoor AP 26
Figure 11: Power up the device using PoE adaptor 28
Figure 12: Power up the device using AC Adaptor (12V) 28
Figure 13: Connect to the network-1 29
Figure 14: Connect to the network-1 30
Figure 15: Power up the device using PoE adaptor 31
Figure 16: Connect to the network-1 32
Figure 17: Connect to the network-1 33
Figure 18: Basic overview of login screen 34
Figure 19: Basic layout of the system summary screen 35
Figure 20: Basic layout of the system software screen 36
Figure 21: Basic layout of the system hardware screen 37
Figure 22: Basic overview of the system admin password configuration screen 38
Figure 23: Basic overview of the reboot screen 39
Figure 24: Basic overview of the interface configuration screen 40
Figure 25: Basic overview of the network interface setup configuration screen to switch protocol 41
Figure 26: Basic overview of static address parameters for general network interface setup 42
Figure 27: Basic overview of DHCP client parameters for general network interface setup 44
Figure 28: Basic overview of DHCPv6 client parameters for general network interface setup 45
Figure 29: Basic overview of the advanced network interface setup configuration screen 46
Figure 30: Basic overview of the screen to switch mode from thin AP to thick AP 47
Figure 31: Basic overview of login screen 48
Figure 32: Basic layout of the system summary screen 49
Figure 33: Basic layout of the system software screen 50
Figure 34: Basic layout of the system hardware screen 51
Figure 35: Basic layout of the thick AP system wireless overview screen 52
Figure 36: Basic overview of the system general settings screen for thick AP 53
Figure 37: Basic overview of the system general settings screen for thick AP 55
Figure 38: Basic overview of the system admin password configuration screen for thick AP 57
Figure 39: Basic overview of the backup/flash firmware screen to generate backup 58
Figure 40: Basic overview of the backup/flash firmware screen to upload configuration 59
Figure 41: Software file in the system drive 60
Figure 42: Basic overview of the backup/flash firmware screen to upgrade the firmware 60
Figure 43: Verify software upgrade 61
Figure 44: Basic overview of the reboot screen 62
Figure 45: Basic overview of the factory reset screen 63
Figure 46: Basic overview of the interface configuration screen for thick AP 64
Figure 47: Basic overview of the network interface setup configuration screen to switch protocol for thick AP 65

Figure 48: Basic overview of static address parameters for general network interface setup for thick AP 66
Figure 49: Basic overview of network interface screen to set the protocol to DHCPv4 for thick AP 68
Figure 50: Basic overview of network interface screen to set the protocol to DHCPv6 for thick AP 69
Figure 51: Basic overview of the advanced network interface setup configuration screen 70
Figure 52: Basic overview of the wireless configuration screen for thick AP 71
Figure 53: Basic overview of the 5 GHz radio configuration screen 72
Figure 54: Basic overview of the 2.4 GHz radio configuration screen..... 74
Figure 55: Basic overview of the advanced radio parameters (2.4 GHz and 5 GHz) configuration screen 76
Figure 56: Basic overview of the screen to configure general SSID parameters..... 77
Figure 57: Basic overview of the screen to configure wireless security parameters of SSID..... 79
Figure 58: Basic overview of the screen to configure the MAC filter for SSID configuration..... 80
Figure 59: Basic overview of the screen to configure the advanced parameters of SSID configuration.... 81
Figure 60: Basic overview of the mesh configuration screen for thick AP..... 82
Figure 61: Basic overview of the screen to enable thick AP as DHCP server 84
Figure 62: Basic overview of the screen to configure a static lease..... 85
Figure 63: Basic overview of the static route configuration screen for thick AP 86
Figure 64: Basic overview of the Wi-Fi schedule screen..... 88
Figure 65: Basic overview of the screen to view the active routes 90
Figure 66: Basic overview of the System Log screen..... 91
Figure 67: Basic overview of the Kernel Log screen 92
Figure 67: Basic overview of the Real-time graphs/ traffic 93
Figure 68: Basic overview of the diagnostics tool screen to check the connection status 94
Figure 69: Basic overview of the diagnostics tool screen to check the route of established connection.... 95
Figure 70: Basic overview of the screen to show connected clients 96
Figure 71: Basic overview of the screen to switch mode from thick AP to thin AP..... 97
Figure 72: Mounting bracket for indoor AP 98
Figure 73: Mounting bracket on to the wall or ceiling for indoor AP 98
Figure 74: Alignment of mounting bracket with indoor AP..... 99
Figure 75: Alignment of mounting bracket with indoor AP..... 99
Figure 76: Unmounting of indoor AP..... 100
Figure 77: Assembly-1 of mounting bracket 101
Figure 78: Final assembly of mounting bracket..... 102
Figure 79: Mounting bracket alignment with the 4x4 outdoor AP..... 103
Figure 80: Overview of the 4x4 outdoor AP with pole and clamping bracket 104
Figure 81: Basic overview of pole mounted 4x4 outdoor AP 105
Figure 82: Items needed for mounting the device to wall 106
Figure 83: Hammer foundation bolts into the wall..... 107
Figure 84: Basic overview of wall mounted 4x4 outdoor AP 108
Figure 85: Grounding point of AP..... 109
Figure 86: Use Case Diagram of Indoor AP..... 110
Figure 87: Use Case Diagram of Outdoor AP 110

List of Tables

Table 1: List of information displayed in front/side view of the indoor AP 22
Table 2: List of information displayed in bottom view of the indoor AP 23
Table 3: List of information displayed in the back side view of the indoor AP 24
Table 4: List of information displayed in front/side view of the outdoor AP....25
Table 5: List of information displayed in back view of the outdoor AP....26
Table 6: List of actions to login through GUI....34
Table 7: List of information displayed in the system summary....35
Table 8: List of information displayed in the system software screen....36
Table 9: List of information displayed in the system hardware screen....37
Table 10: List of actions to configure the system settings 38
Table 11: List of actions to reboot the AP....39
Table 12: List of actions to view/edit the network configuration 40
Table 13: List of actions to switch protocol 41
Table 14: List of actions to provide static address parameters 43
Table 15: List of actions to provide DHCP client parameters....44
Table 16: List of actions to provide DHCPv6 client parameters 45
Table 17: List of actions for advanced network interface setup configuration....46
Table 18: List of actions to switch mode from thin AP to thick AP....47
Table 19: List of actions to login through GUI....48
Table 20: List of information displayed in the system summary 49
Table 21: List of information displayed in the system software screen....50
Table 22: List of information displayed in the system hardware screen....51
Table 23: List of information displayed in thick AP system wireless overview....52
Table 24: List of actions to configure the system general settings for thick AP....53
Table 25: List of actions to configure the system general settings for thick AP....55
Table 26: List of actions to configure the password for thick AP....57
Table 27: List of actions to generate a backup of current device's configuration and files 58
Table 28: List of actions to upload configuration from an external file 59
Table 29: List of actions to upgrade the firmware from an external file....60
Table 30: List of actions to reboot the AP....62
Table 31: List of actions to factory reset the access point....63
Table 32: List of actions to view/edit the network configuration of thick AP....64
Table 33: List of actions to switch network protocol for thick AP 65
Table 34: List of actions to provide static address parameters for thick AP 66
Table 35: List of actions to set the protocol to DHCPv4 for thick AP 68
Table 36: List of actions to set the protocol to DHCPv6 for thick AP 69
Table 37: List of actions for advanced network interface setup configuration....70
Table 38: List of actions to view the wireless configuration of thick AP 71
Table 39: List of actions for 5 GHz radio configuration of thick AP 72
Table 40: List of actions for 2.4 GHz radio configuration of thick AP 74
Table 41: List of actions for advanced radio parameters (2.4 GHz and 5 GHz) configuration of thick AP76
Table 42: List of actions to configure the general SSID parameters....78
Table 43: List of actions to configure the wireless security parameters of SSID 79
Table 44: List of actions to configure the MAC filter for SSID configuration....80
Table 45: List of actions to configure the advanced parameters of SSID configuration 81
Table 46: List of actions to view the mesh configuration of thick AP 82
Table 47: List of actions to enable thick AP as DHCP server....84
Table 48: List of actions to configure a static lease....85

Table 49: List of actions for static route configuration of thick AP 86
Table 50: List of actions to create, edit, or delete a Wi-Fi schedule 89
Table 51: List of actions to view the active routes on the system 90
Table 52: List of actions to view the system log 91
Table 53: List of actions to view the kernel log 92
Table 53: List of actions to view real-time traffic graphs 93
Table 54: List of actions to check the connection status 94
Table 55: List of actions to check the route of established connection 95
Table 56: List of actions to view connected clients 96
Table 57: List of actions to switch mode from thick AP to thin AP 97

1 About this Document

1.1 Purpose

This document helps you to understand IO products and provides information to familiarize you with the product features. It also guides you through the installation process and the entire software user set.

1.2 Intended Audience

The intended audiences for this document are:

1. Network Administrators
2. System Administrators
3. Product managers
4. System Integration and Verification team at HFCL Ltd.

1.3 Document Conventions

The different conventions used in this document are explained in the following table:

Document Conventions

Convention	Description
Note	Note provides information about important features or instructions. This appears with a background.
Caution	This alerts you to potential damage to a program, device, or system. This appears with a background.
Warning	This alerts you to potential injury or fatality. It may also alert you to potential electrical hazards. This appears with a background.
Courier new font	File and directory names are represented in Courier New font.
Bold font	Any option that needs to be selected or typed in the user interface is represented using bold font.
<home_directory>	Command variables, the values of which you must supply.
cd$HOME	A command that you must enter in a Command Line Interface (CLI) exactly as written. This appears with a background.

1.4 Terms and Abbreviations

The different terms and abbreviations used in this document are explained in the following table:

Terms and Abbreviations

Terms/Abbreviation	Expansion
AP	Access Point
BLE	Bluetooth Low Energy
CLI	Command-Line Interface
COS	Class Of Service
CPU	Central Processing Unit
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DSCP	Differentiated Services Code Point
EMS	Element Management System
GI	Guard Interval
GPS	Global Positioning System
GUI	Graphic User Interface
HAL	Hardware Abstraction Layer
HTTP	Hypertext Transfer Protocol
IEEE	Institute Of Electrical And Electronics Engineers
IP	Internet Protocol
IPV4	Internet Protocol Version 4
IPV6	Internet Protocol Version 6
KBPS	Kilobits Per Second
L2TP	Layer 2 Tunneling Protocol
L2VPN	Layer 2 Virtual Private Network
LAN	Local Area Network
LED	Light-Emitting Diode

LMAC	Lower Media Access Control
MAC	Media Access Control
MBPS	Megabits Per Second
MCS	Modulation And Coding Scheme
MIMO	Multiple-Input And Multiple-Output
MPEG	Moving Picture Experts Group
MTU	Maximum Transmission Unit
NTP	Network Time Protocol
OSD	On Screen Display
P2MP	Point-To-Multipoint
P2P	Point-To-Point
PCP	Priority Code Point
POE	Power Over Ethernet
PTZ	Pan, Tilt, Zoom
QAM	Quadrature Amplitude Modulation
QOS	Quality Of Service
RFID	Radio Frequency Identification
RJ	Registered Jack
RSSI	Elative Received Signal Strength
RX	Received
SNMP	Simple Network Management Protocol
SNR	Signal-To-Noise Ratio
SSH	Secure Shell
STA	Station
TDMA	Time-Division Multiple Access
TX	Transmission
U-BOOT	Universal Boot-Loader
UBR	Unlicensed Band Radio

UID	User Id
UTP	Unshielded Twisted Pair
VAP	Virtual Access Point
VGA	Video Graphic Adapter
VLAN	Virtual Local Area Network
WAN	Wide Area Network
WDS	Wireless Distribution System
WIDS	Wireless Intrusion Detection System
WLC	Wireless Lan Controller
WPA	Wi-Fi Protected Access

2 Product Overview

Thank you for choosing the IO Access Point (AP). IO Access Points are oriented to next generation high-speed wireless access. The Access Point Configuration is controlled through GUI and WLC. BLE Support is also available for initial configuration for all the APs.

Following are the variants of IO product family:

1. Dual Band 4x4:4 Indoor Access Point (ion8i).
2. Dual Band 4x4:4 Outdoor Access Point (ion8/ion8e).

3 Federal Communication Commission Certified

These equipment are tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

These equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If these equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement:

These equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. These equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

These devices complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. These devices may not cause harmful interference
2. These devices must accept any interference received, including interference that may cause undesired operation.

3.1 Dual Band 4x4:4 Indoor Access Point

Technical specifications of this variant are given below:

FEATURES	INDOOR 4x4 AP (ion8i)
Description	Dual Band Indoor Access Point with integrated 2.4 and 5 GHz radio, capable of delivering throughput upto 2.5 Gbps, with 4x4:4 Multi-User MIMO and 802.11ac Wave 2 compliance
Peak Throughput (aggregate)	Upto 2.5 Gbps
Wi-Fi Standard Support	802.11 a/b/g/n/ac/ac Wave 2
No. of Radios	Dual concurrent 2.4 GHz and 5 GHz (with extended 5 GHz channel support, country-specific restrictions apply)
MU-MIMO	4x4:4
Max Transmit Power (per chain)	2.4 GHz– up to 23 dBm and 5 GHz– up to 24 dBm (will depend on country specific guidelines)
Antenna Type	Integrated Omni-directional antennas
Antenna Gain	4 dBi for 2.4 GHz and 4.5 dBi for 5 GHz
Maximum User Support	192
Channel Bandwidth	20, 40, 80, 80+80 & 160 MHz
Modulation	up to 256 QAM
Wireless Security	WPA-Personal, WPA2-Personal, WPA2-Enterprise, EAP Type (EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2, PEAPv1/EAP-GTC, EAP-SIM, EAP-AKA, EAP-AKA Prime, EAP-FAST), Protected Management Frames
WAN Protocols	Static IPv4/IPv6, DHCP client v4/v6

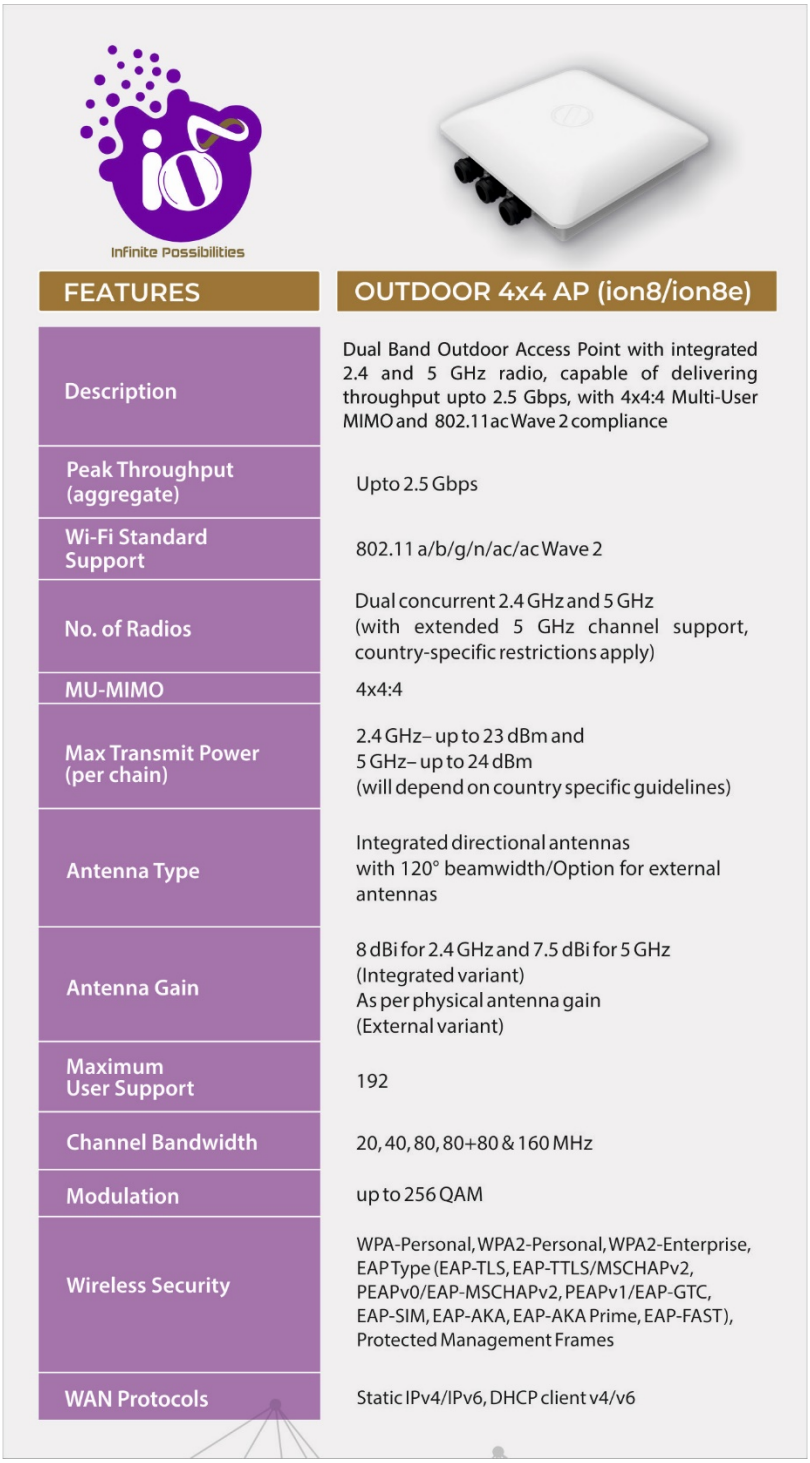
Figure 1: Dual Band 4x4:4 Indoor Access Point - Specifications & Highlights-1

FEATURES	INDOOR 4x4 AP (ion8i)
Mesh Support	Self-creating, Self-healing Mesh
Maximum number of SSID (per radio)	16
BLE Support	Yes
Ethernet support/ Ports/Interface	1 X 10/100/1000BASE-T Ethernet, 1 X Combo Port (1 X 1000Base X Optical Ethernet SFP or 10/100/1000BASE-T Ethernet), DC Power Jack
Rogue AP Detection and Prevention	Yes
Receiver Sensitivity	-97 dBm or better
Power Supply	IEEE 802.3at PoE/PoE+ or + 12V DC Power Adaptor
Power Consumption (Max)	20 W
Wireless QOS	WMM (802.11e)
Band Steering Support for Dynamic RF Optimization	Yes
Geo-Location	N/A
Management	Standalone (via mobile app or GUI) or through appliance-based WLC and EMS or cloud-based
Enclosure Type	Two-piece enclosure with ABS top and bottom body
Enclosure Dimensions	230 X 227.2 X 50.6 mm
Weight	0.65 kg
Operating Temperature	-15°C to 50°C
Humidity	N/A
Certifications	FCC Class B, CE, Passpoint 2.0

Figure 2: Dual Band 4x4:4 Indoor Access Point - Specifications & Highlights-2

3.2 Dual Band 4x4:4 Outdoor Access Point (ion8/ion8e)

The Dual Band 4x4:4 outdoor Access Point has two factory fitted variants: one with integrated antennas (ion4) and the other with connectors for external antennas (ion4e). Technical specifications are given below:



FEATURES	OUTDOOR 4x4 AP (ion8/ion8e)
Description	Dual Band Outdoor Access Point with integrated 2.4 and 5 GHz radio, capable of delivering throughput upto 2.5 Gbps, with 4x4:4 Multi-User MIMO and 802.11ac Wave 2 compliance
Peak Throughput (aggregate)	Upto 2.5 Gbps
Wi-Fi Standard Support	802.11 a/b/g/n/ac/ac Wave 2
No. of Radios	Dual concurrent 2.4 GHz and 5 GHz (with extended 5 GHz channel support, country-specific restrictions apply)
MU-MIMO	4x4:4
Max Transmit Power (per chain)	2.4 GHz– up to 23 dBm and 5 GHz– up to 24 dBm (will depend on country specific guidelines)
Antenna Type	Integrated directional antennas with 120° beamwidth/Option for external antennas
Antenna Gain	8 dBi for 2.4 GHz and 7.5 dBi for 5 GHz (Integrated variant) As per physical antenna gain (External variant)
Maximum User Support	192
Channel Bandwidth	20, 40, 80, 80+80 & 160 MHz
Modulation	up to 256 QAM
Wireless Security	WPA-Personal, WPA2-Personal, WPA2-Enterprise, EAP Type (EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/EAP-MSCHAPv2, PEAPv1/EAP-GTC, EAP-SIM, EAP-AKA, EAP-AKA Prime, EAP-FAST), Protected Management Frames
WAN Protocols	Static IPv4/IPv6, DHCP client v4/v6

Figure 3: Dual Band 4x4:4 Outdoor Access Point - Specifications & Highlights-1

FEATURES	OUTDOOR 4x4 AP (ion8/ion8e)
Mesh Support	Self-creating, Self-healing Mesh
Maximum number of SSID (per radio)	16
BLE Support	Yes
Ethernet support/ Ports/Interface	1 X 10/100/1000BASE-T Ethernet, 1 X Combo Port (1 X 1000Base X Optical Ethernet SFP or 10/100/1000BASE-T Ethernet)
Rogue AP Detection and Prevention	Yes
Receiver Sensitivity	-97 dBm or better
Power Supply	IEEE 802.3at PoE/PoE+
Power Consumption (Max)	20 W
Wireless QOS	WMM (802.11e)
Band Steering Support for Dynamic RF Optimization	Yes
Geo-Location	GNSS-1 (GPS + GLONASS)
Management	Standalone (via mobile app or GUI) or through appliance-based WLC and EMS or cloud-based
Enclosure Type	Two-piece enclosure with UV protected ABS + PC top body and aluminium bottom body
Enclosure Dimensions	260 X 262 X 84.6 mm
Weight	2.10 kg (for Integrated antenna variant) and 2.30 kg (for External antenna variant)
Operating Temperature	-15°C to 60°C
Humidity	5 to 95% (non-condensing)
Certifications	FCC Class B, CE, Passpoint 2.0, IP 67

Figure 4: Dual Band 4x4:4 Outdoor Access Point - Specifications & Highlights-2

4 Hardware Setup

4.1 System Requirements

Before installing the access point, make sure that your system includes the following:

1. 10/100/1000 Mbps local area network device such as a hub or switch.
2. The Category 5 UTP straight-through Ethernet cable with RJ-45 connector included in the package, or one like it.
3. We can power up the device through PoE adaptor which should be 803at/af compliant. A 100–240 V, 50–60 Hz AC power source.
4. A web browser to configure the devices.
5. At least 802.11b/g-compliant devices.

4.2 Packaging Content – For ion8i/ion8/ion8e variants of this product

Your package contains the following items.

Figure 5: Packaging Content of ion8i/ion8/ion8e Variants

Your box contains the following items:

1. User can choose any of the Access Point model mentioned below:
   a. Dual Band 4x4:4 Indoor Access Point (ion8i).
   b. Dual Band 4x4:4 Outdoor Access Point (ion8/ion8e).
2. AC power adaptor (plug varies by region).
3. PoE Adaptor (only with Dual Band 4x4:4 Outdoor Access Point (ion8/ion8e)).
4. Mounting bracket kit.
5. User Manual.
6. Quick Start Guide with cabling and access point setup instructions. If any parts are incorrect, missing, or damaged, contact HFCL Ltd. customer care support.

5 Getting to Know the IO Access Point

5.1 Dual Band 4x4:4 Indoor Access Point

5.1.1 Front / Side View

A basic overview of the front/side view of the indoor AP is given below:

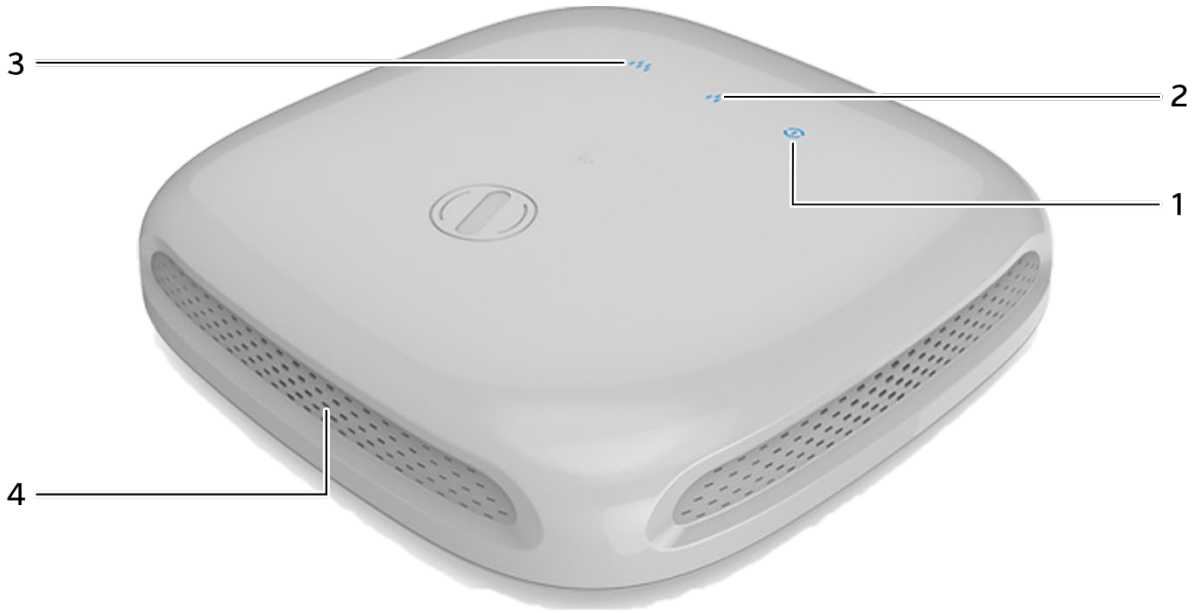


Figure 6: Front/side view of the indoor AP

Information displayed in the above figure is detailed in the table below:

Table 1: List of information displayed in front/side view of the indoor AP

Callout	Name	Description
1.	Power LED	This LED blinks in Blue color to notify the user that device is powered ON
2.	2.4GHz LED	This LED blinks in Blue color when 2.4GHz wireless network interface comes up
3.	5GHz LED	This LED blinks in Blue color when 5GHz wireless network interface comes up
4.	Vent	Transfers the heat in the ambient

5.2 Bottom View

Bottom side overview of the indoor AP is given below:

Figure 7: Bottom view of the indoor AP

Information displayed in the above figure is detailed in the table below:

Table 2: List of information displayed in bottom view of the indoor AP

Callout	Name	Description
1.	Cable Connection Area	The space is provided for power and other cables of AP as shown in the back view of the same
2.	Mounting Slot	This helps in the attachment of mounting bracket and indoor AP in case of wall and ceiling mounting

5.2.1 Back View

Back side overview of the indoor AP is given below:

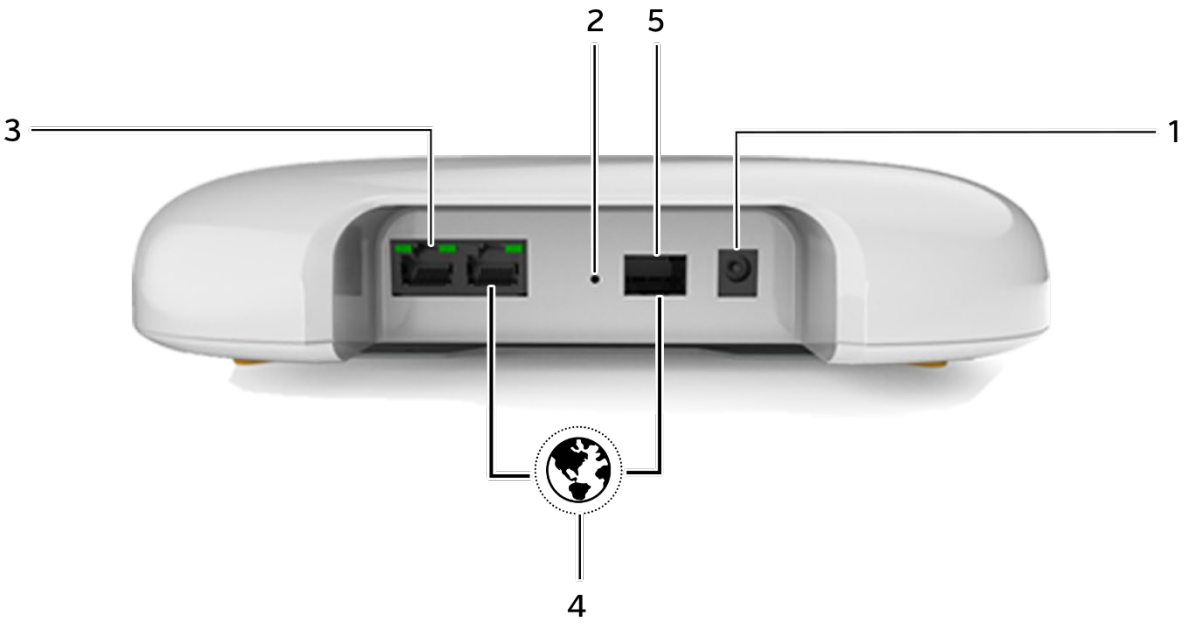


Figure 8: Back side view of the indoor AP

Information displayed in the above figure is detailed in the table below:

Table 3: List of information displayed in the back side view of the indoor AP

Callout	Name	Description
1.	DC Jack	The DC jack is provided to power up the AP with 12 V power adaptor
2.	Reset	Use an appropriate pointed pin and press the reset button to restore the AP with default factory settings
3.	LAN + PoE Port	Used for powering up the device via PoE adaptor. This port can be used to carry data as well (optional)
4.	WAN Combo Port	Used to connect the device with the backhaul network or to connect to a laptop through an Ethernet cable. One of Ethernet or SFP can be used at a time
5.	SFP	Connects fiber cable with the maximum data transfer rate capability of 1 Gbps.

5.3 Dual Band 4x4:4 Outdoor Access Point

5.3.1 Front / Side View

A basic overview of the front/side view of the outdoor AP is given below:

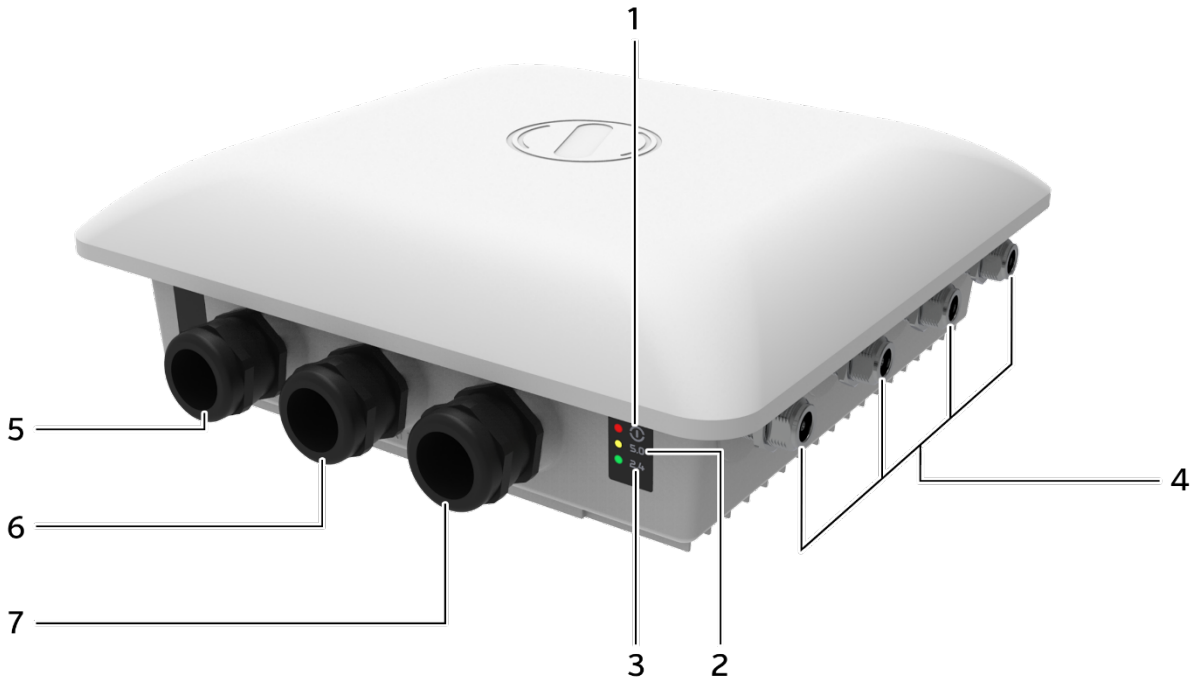


Figure 9: Front/side view of the outdoor AP

Information displayed in the above figure is detailed in the table below:

Table 4: List of information displayed in front/side view of the outdoor AP

Callout	Name	Description
1.	Power LED	This LED will blink in Red color to notify the user that device is powered ON
2.	5GHz LED	This LED will blink in Yellow color when 5GHz wireless network interface comes up
3.	2.4GHz LED	This LED will blink in Green color when 2.4GHz wireless network interface comes up
4.	External antenna connectors	Total 8 n-type antenna connectors are available for ion8e variant of 4x4:4 outdoor AP. Four on LHS and four on RHS.
5.	LAN + PoE Port	Used for powering up the device via PoE adaptor. This port can be used to carry data as well (optional)
6.	Combo Port	Used to connect the device with the backhaul network or to connect to a laptop through an Ethernet cable. One of Ethernet or SFP can be used at a t time
7.	SFP	Connects fiber cable with the maximum data transfer rate capability of 1 Gbps.

5.4 Back View

Back side overview of the outdoor AP is given below:

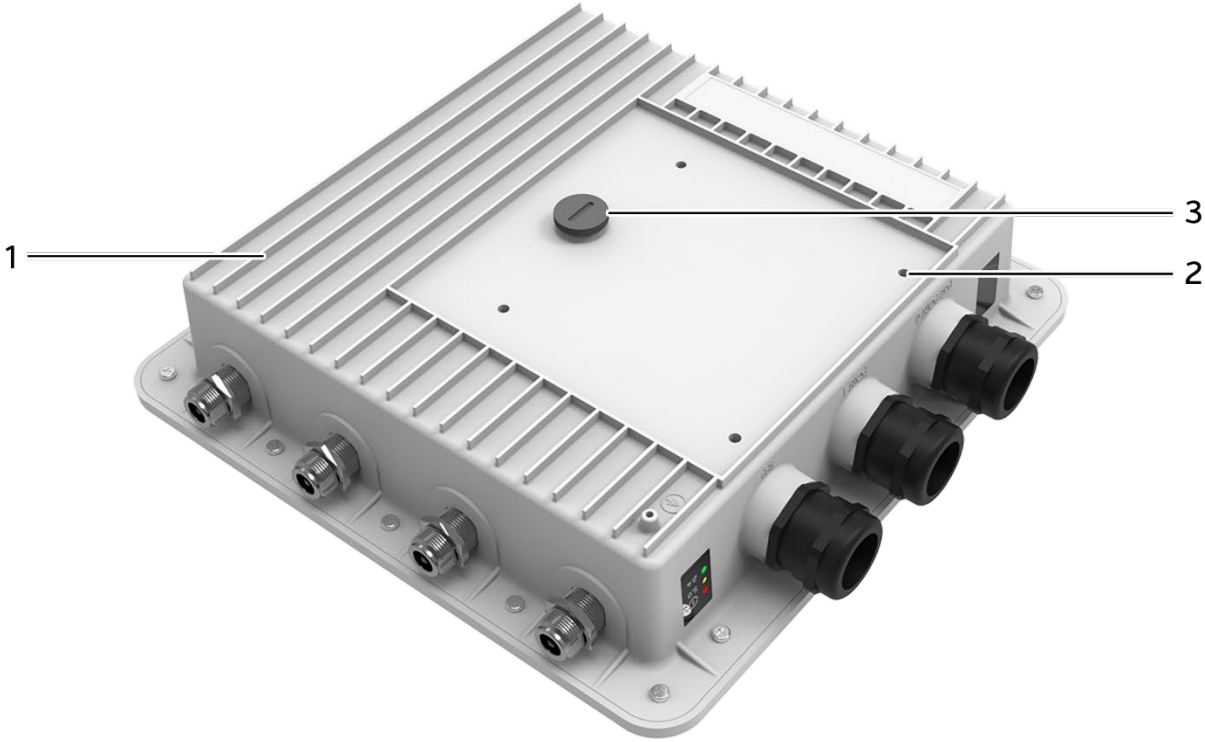


Figure 10: Back view of the outdoor AP

Information displayed in the above figure is detailed in the table below:

Table 5: List of information displayed in back view of the outdoor AP

Callout	Name	Description
1.	Thermal Plate (Heat Transfer)	It helps in heat transfer from the board environment to Ambient.
2.	Screws for Mounting bracket	This helps in the attachment of mounting bracket and outdoor AP in case of pole and wall mounting
3.	Humidity controller cap	Cap to control the humidity

Note: The Reset button of outdoor AP is located below the humidity controller cap. Turn the humidity controller cap in counter clock wise direction and remove it from the access point. Use an appropriate pointed object to press the button. It serves two functions:

1. Restart: Press and release the Reset button quickly.
2. Restore to Factory Default Settings: Press and hold the Reset button for more than five seconds.

6 Initial Setup

Observe the following safety precautions and avoid damage to the access point:

1. Do not power the device during installation.
2. Do not subject the device to high temperatures.
3. Keep away from high voltage cables.
4. Disconnect the device before cleaning it.
5. Do not wipe the device with a damp cloth.
6. Do not wash the device with liquid.
7. Do not open the enclosure when the AP is working.
8. Fasten the device tightly.

6.1 Dual Band 4x4:4 Indoor Access Point

Power up the device using PoE Adaptor or AC Adaptor (12V) as shown below:

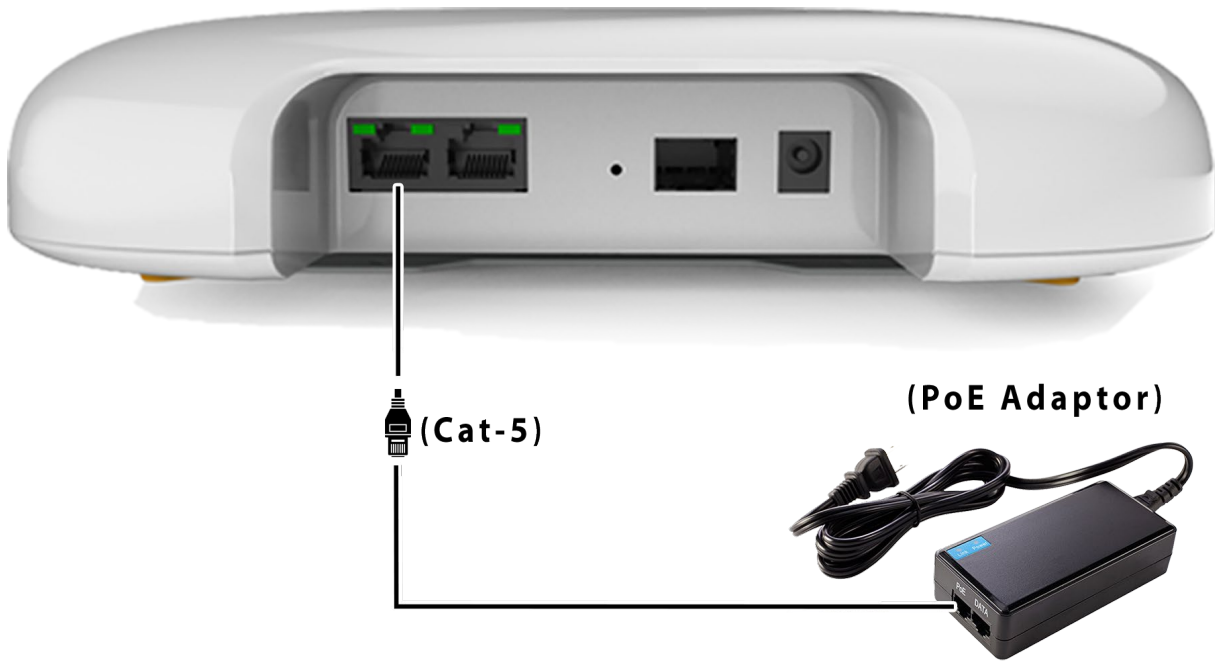


Figure 11: Power up the device using PoE adaptor

(OR)

Figure 12: Power up the device using AC Adaptor (12V)

6.1.1 Connect to the Indoor Access Point

Follow the steps mentioned below and connect to the indoor AP through GUI:

1. Configure a computer with a 1-domain static IP address e.g. 192.168.1.1 and a subnet mask of 255.255.255.0.
2. For help configuring a static IP address on your computer, check the instructions or online help that came with that computer.
3. Connect the Ethernet cable to the computer.
4. Connect the other end of the Ethernet cable to the PoE adaptor or combo port of the access point.
    a. Connect the other end of the Ethernet cable to the combo port. Use the unused port of PoE adaptor and connect to the backhaul network

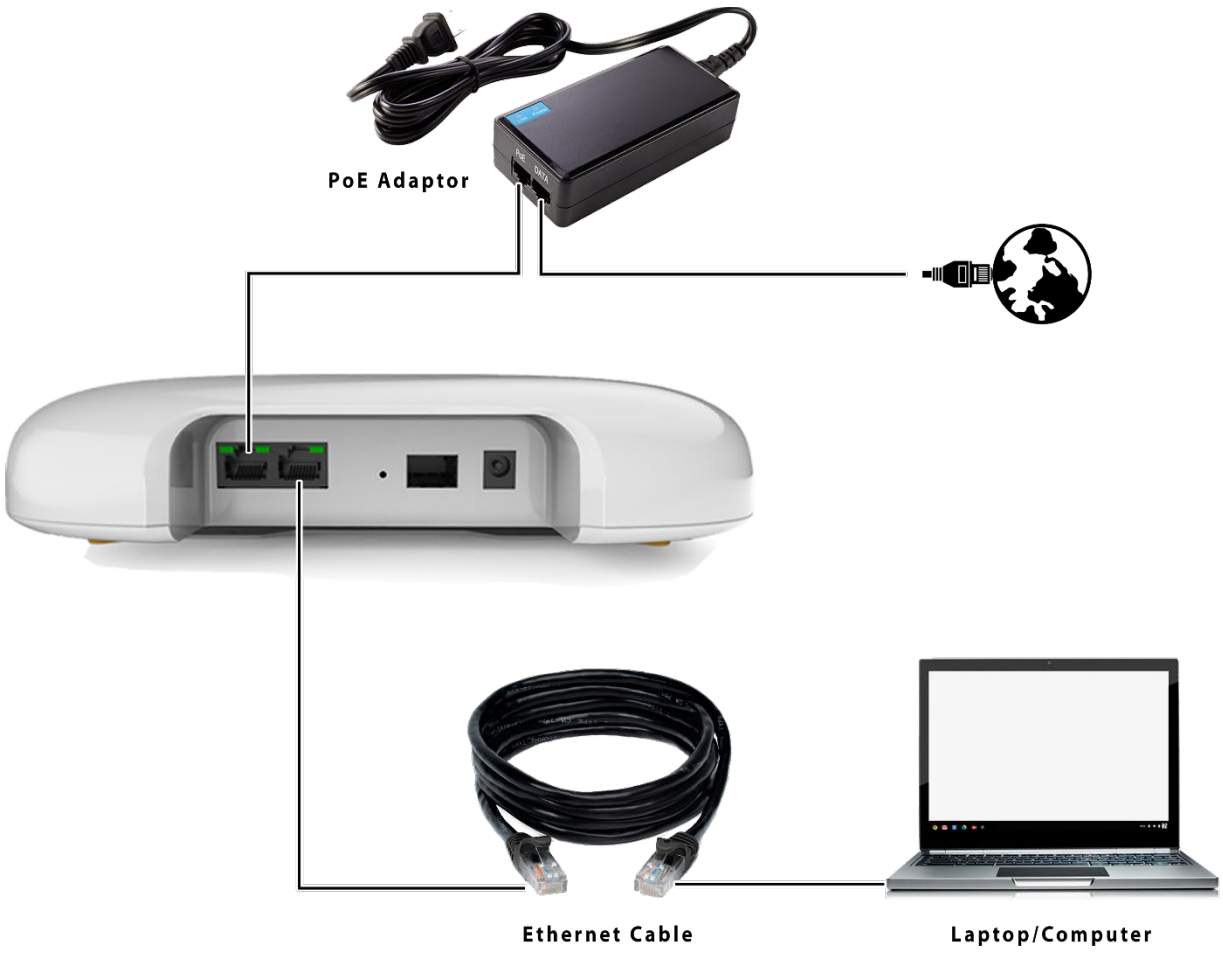


Figure 13: Connect to the network-1

(OR)

b. Connect the other end of the Ethernet cable to the PoE adaptor. Use the combo port and connect to the backhaul network.

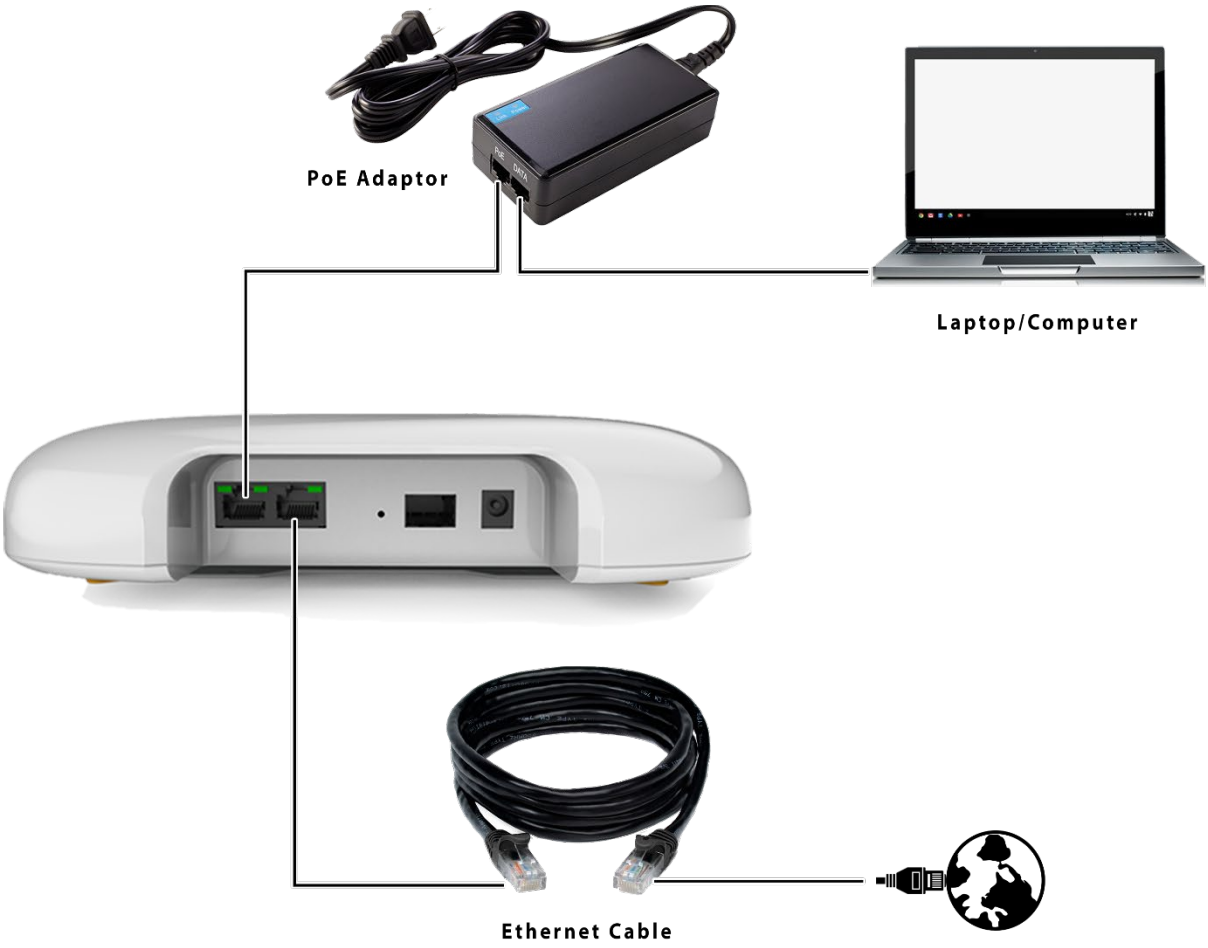


Figure 14: Connect to the network-1

5. Device will be powered On.
6. Open a web browser and enter the "AP static IP address" (**192.168.1.1**) in the address bar.
7. A login screen will appear.

6.2 Dual Band 4x4:4 Outdoor Access Point

Power up the device using PoE Adaptor as shown below:

Figure 15: Power up the device using PoE adaptor

6.2.1 Connect to the Outdoor Access Point

Follow the steps mentioned below and connect to the outdoor AP through GUI:

1. Configure a computer with a 1-domain static IP address e.g. 192.168.1.1 and a subnet mask of 255.255.255.0.
2. For help configuring a static IP address on your computer, check the instructions or online help that came with that computer.
3. Connect the Ethernet cable to the computer.
4. Connect the other end of the Ethernet cable to the PoE adaptor or combo port of the access point.
    a. Connect the other end of the Ethernet cable to the combo port. Use the unused port of PoE adaptor and connect to the backhaul network

Figure 16: Connect to the network-1

(Or)

b. Connect the other end of the Ethernet cable to the PoE adaptor. Use the combo port and connect to the backhaul network.

Figure 17: Connect to the network-1

5. Device will be powered On.
6. Open a web browser and enter the "AP static IP address" (**192.168.1.1**) in the address bar.
7. A login screen will appear.

7 Connect to the Thin Mode Access Point and Log In

You can connect to the access point's web management interface to view or change its LAN and wireless access settings. Refer the procedure mention in "Connect to the Indoor Access Point" and "Connect to the Outdoor Access Point" section and connect to a thin mode access point.

7.1 Login through GUI

This is the 1st screen of AP GUI. It provides access to the users with valid login credentials only. The login credentials will determine the access rights of the user.

A basic overview of the same is shown below:

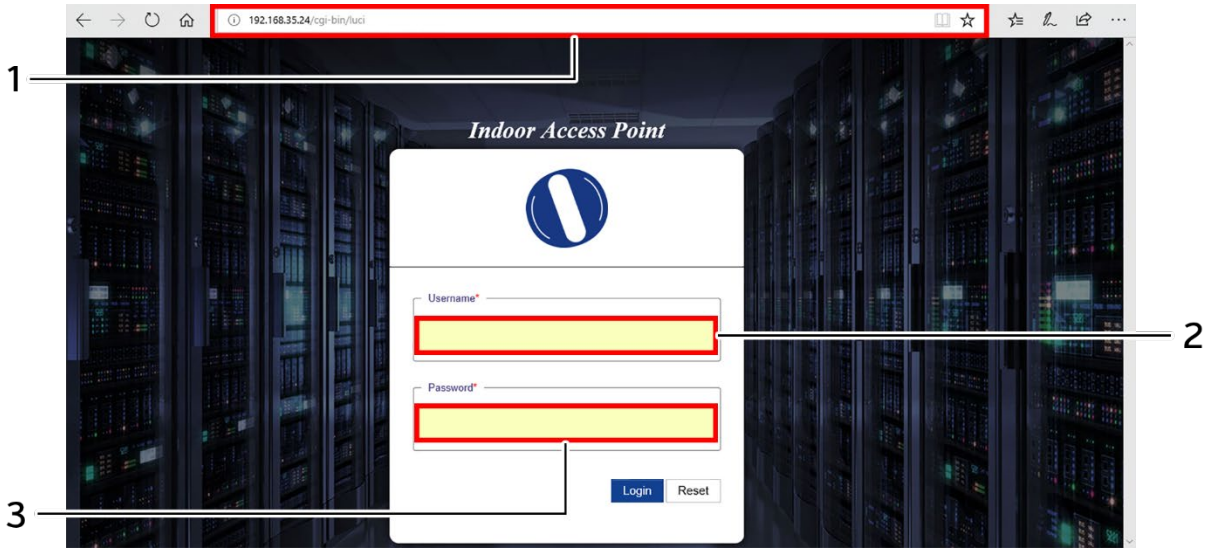


Figure 18: Basic overview of login screen

Follow the steps given below to login through GUI:

Table 6: List of actions to login through GUI

Callout	Name	Description
1.	Web browser	Open a web browser and enter the "IP address of the AP" in the address bar. 192.168.1.1 is the default IP address
2.	User name	Enter the valid "User ID"
3.	Password	Enter the valid "Password"

Click on "Login", a successful/authenticated login will take the user to Status Overview screen.

8 Status overview screen

The screen provides the status overview of:

1. System summary
2. System feature
3. Software
4. Hardware

8.1 System summary

A basic layout of the system summary is given below:

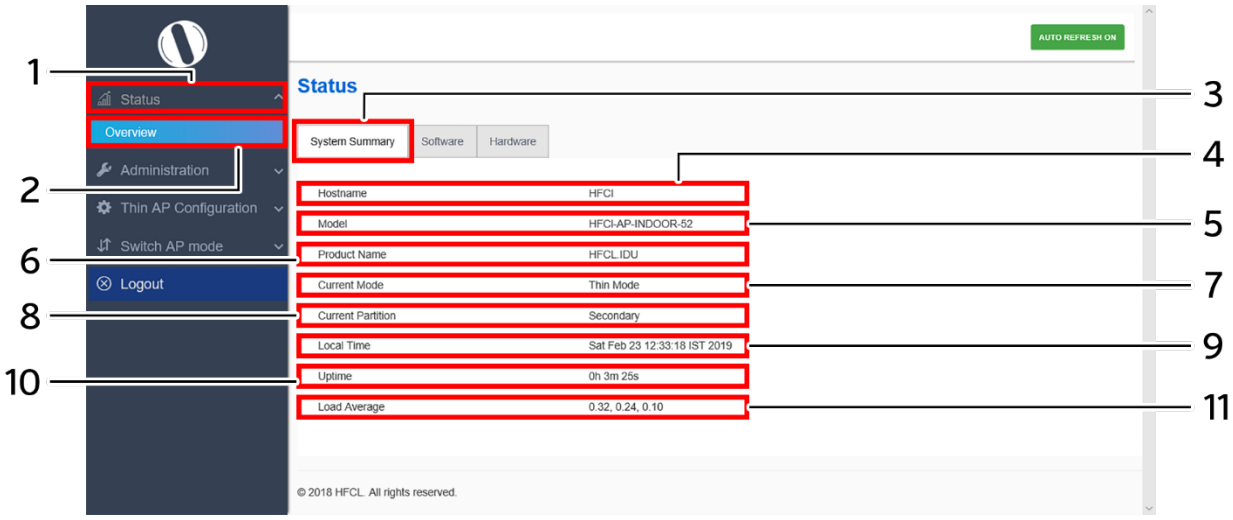


Figure 19: Basic layout of the system summary screen

Follow the steps given below to view the system summary:

Table 7: List of information displayed in the system summary

Callout	Name	Description
1.	Status	Click on the "Status" dropdown
2.	Overview	Click on "Overview" option
3.	System summary	Click on "System summary" option
4.	Hostname	Displays the "Hostname" assigned to the respective AP in the "System Configuration" screen
5.	Model	Displays the model number of the product. The same is configured with the factory settings of the device and reflects in this section on system boot up
6.	Product Name	Displays the name of the product
7.	Current Mode	Displays the current acting mode of the AP (Thick mode or Thin mode)
8.	Current Partition	Displays the current partition in use
9.	Local Time	Displays the date and time details according to the time zone allocated in the "System Configuration" screen

Callout	Name	Description
10.	System uptime	Displays the time duration since the respective AP board is up and successfully running without any shutdown
11.	Average Load	Displays the average load on the device

8.2 System software

A basic layout of the system software is given below:

Figure 20: Basic layout of the system software screen

Follow the steps given below to view the system software information:

Table 8: List of information displayed in the system software screen

Callout	Name	Description
1.	Status	Click on the "Status" dropdown
2.	Overview	Click on "Overview" option
3.	Software	Click on "Software" option
4.	Firmware Version	Displays the current firmware version of the respective AP. The operating system is based on openwrt project model

8.3 System hardware

A basic layout of the system hardware is given below:

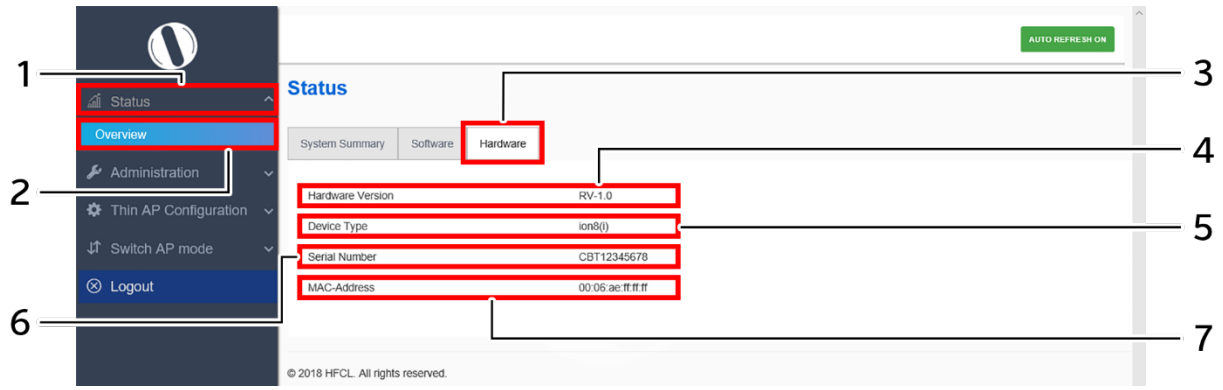


Figure 21: Basic layout of the system hardware screen

Follow the steps given below to view the system hardware information:

Table 9: List of information displayed in the system hardware screen

Callout	Name	Description
1.	Status	Click on the "Status" dropdown
2.	Overview	Click on "Overview" option
3.	Hardware	Click on "Hardware" option
4.	Hardware Version	Displays the current hardware version of the respective AP
5.	Device Type	Displays the device type (Indoor or Outdoor)
6.	Serial Number	Displays the serial number of the respective AP. The same is configured with the factory settings of the device and reflects in this section on system boot up
7.	MAC-Address	Displays the MAC address assigned to the product. The same is configured with the factory settings of the device and reflects in this section on system boot up

9 Administration

The user can perform following admin activities for thin AP:

9.1 Set AP Password

This screen provides the user with options to change the default password. The default username is "root" and the default admin password is "root".

A basic overview of the screen is given below:

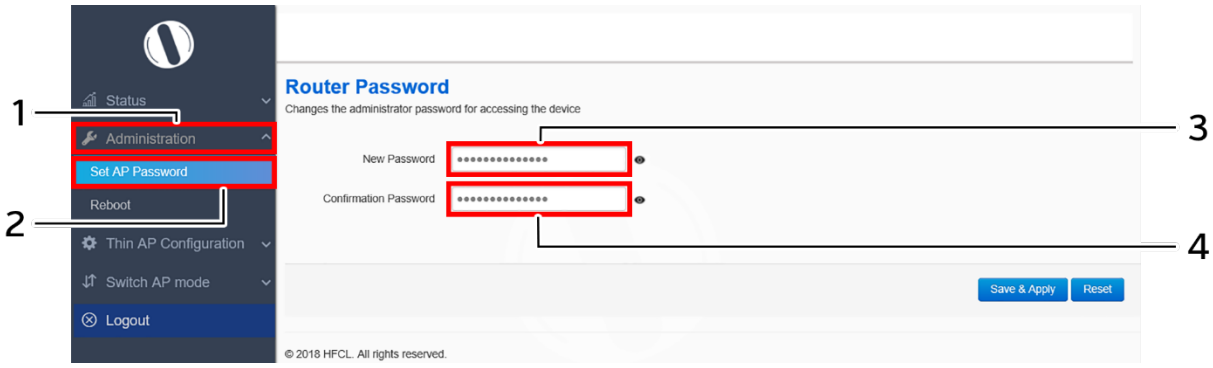


Figure 22: Basic overview of the system admin password configuration screen

Follow the steps given below and configure the system admin password for the AP:

Table 10: List of actions to configure the system settings

Callout	Name	Description
1.	Administration	Click on "Administration" dropdown
2.	Set AP Password	Click on "Set AP Password" option
3.	Password	Enter the new "Password"
4.	Confirm Password	Enter the password again for "Confirm Password"

Click on "Save & Apply" to save the system admin password configuration or click "Reset" to configure the same again.

9.2 Reboot Thin AP

Reboot restarts the device from current partition (Primary or Secondary partition) with existing configuration. A basic overview of the Reboot screen is given below:

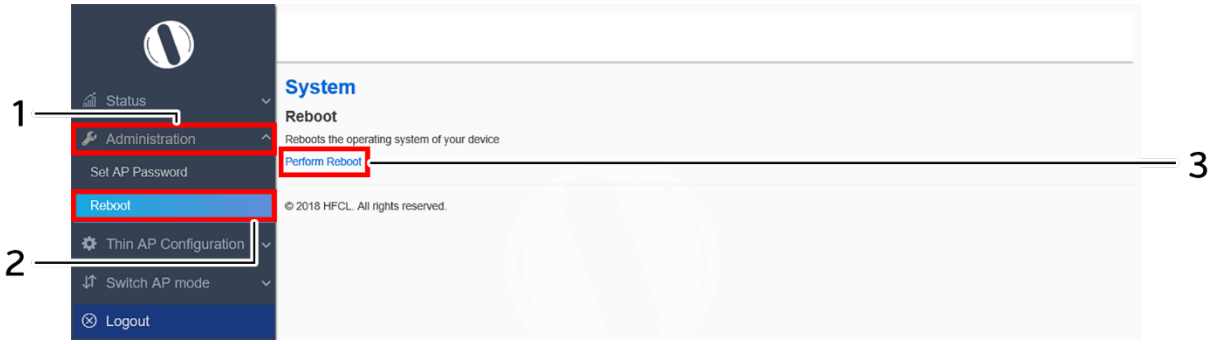


Figure 23: Basic overview of the reboot screen

Follow the steps given below and reboot the AP:

Table 11: List of actions to reboot the AP

Callout	Name	Description
1.	Administration	Click on "Administration" dropdown
2.	Reboot	Click on "Reboot" option
3.	Perform Reboot	Click on "Perform Reboot" option. Device will boot from current partition, and the firmware version present in the current partition will be in use

10 Thin AP Configuration

The user can configure the network interface of the thin AP and the same is discussed in further section.

10.1 Interfaces

A basic overview of the interface screen is given below:

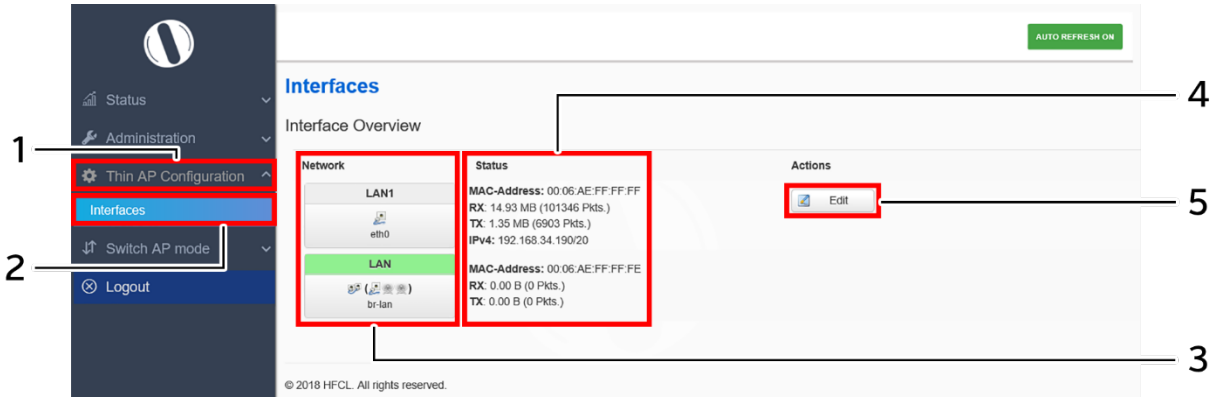


Figure 24: Basic overview of the interface configuration screen

Follow the steps given below to view/edit the interface configuration:

Table 12: List of actions to view/edit the network configuration

Callout	Name	Description
1.	Thin AP Configuration	Click on "Thin AP Configuration" dropdown
2.	Interfaces	Click on "Interfaces" option
3.	Network/Interface overview	Displays the type of network interface available in the device. The above figure shows the LAN interface overview
4.	Status	Displays the status of the LAN interface with the respect to the parameters shown in above figure
5.	Edit	Click on "Edit" option to configure the LAN-interface settings

The user can click on "edit" option to further modify the following configurations:

1. General setup
2. Advanced settings