User Guide

Home Mesh Router-UI

HFCL

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1 Introduction

This document provides information about **Home Mesh Router** from HFCL, to manage and monitor their Wi-Fi **HMRs**. It simplifies the complete process of installing, provisioning, and activating home mesh routers remotely without any external help. The document also helps to understand the user flow of the thick UI of **HMR** Dashboard.

1.1 Overview

The aim of this document is to give brief descriptions of the various features reflected in the thick UI dashboard of HMR devices (HFCLION4xi_HMR v2.0.4.24) with respect to the end users accessing it.

1.2 Terms & Abbreviations

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

Term	Description
HFCL	Himachal Futuristic Communications Limited
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
FAQs	Frequently Asked Questions
HMR	Home Mesh Router
iOS	Iphone Operating System
ISP	Internet Service Provider
OS	Operating System
OTP	One-Time Password
PPPoE	Point-To-Point Protocol Over Ethernet
QR Code	Quick Response Code
Wi-Fi	Wireless Fidelity
WPS	Wi-Fi Protected Setup
ZTP	Zero-Touch Provisioning

2 IO Weave Device

2.1 Front View

Figure 1: IO Weave Front View

Call Out	Name
1.	LED Indication
2.	Device Body

Table 1: IO Weave Front View Description

2.2 Connector View:

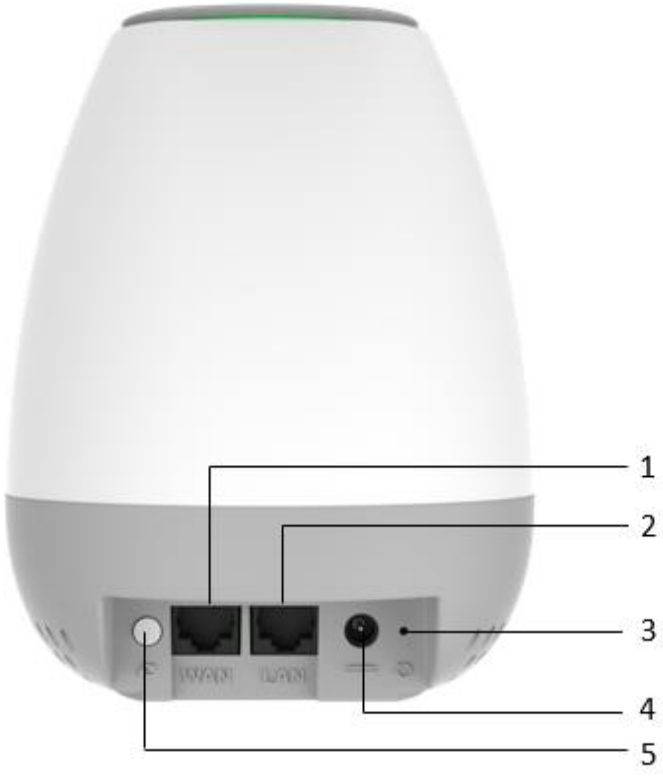


Figure 2: IO Weave Connector View

Call Out	Name
1.	WAN port 2.5 Gbps
2.	LAN port 1 Gbps
3.	Reset Button
4.	DC Adapter Point
5.	WPS/Sync button

Table 2: IO Weave Connector View Description

2.3 Bottom View:

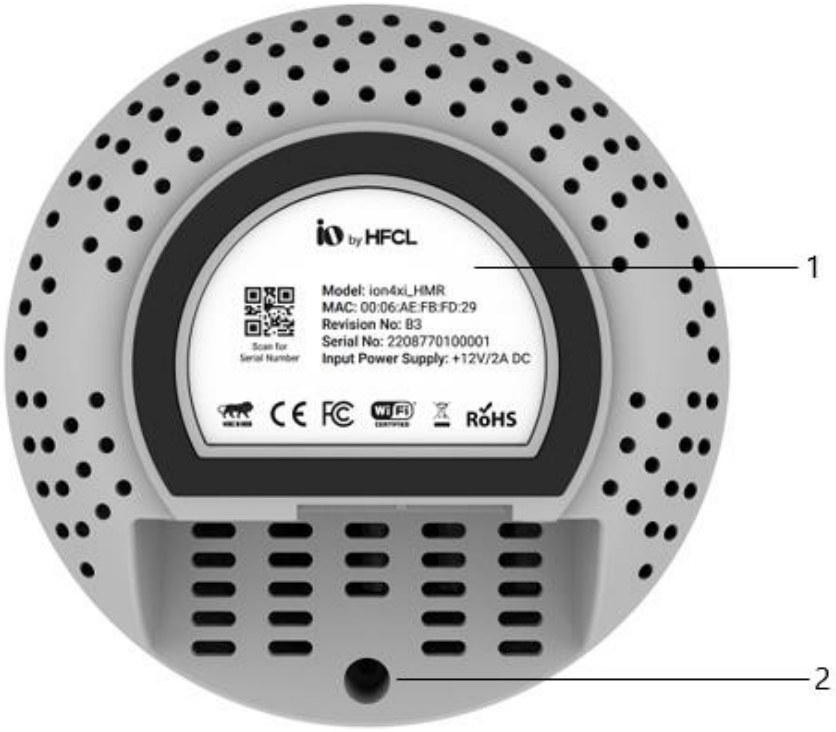


Figure 3: IO Weave Bottom View

Call Out	Name
1.	Device Label
2.	Reset Button

Table 3: IO Weave Bottom View Description

3 Dashboard

On the successful login the

- Status
- System
- Network
- Parental Controls
- Wi-Fi Schedule
- Statistics
- Diagnostic
- Switch AP Mode
- Logout

4 Status

The **Status** page provides a summary of the system, software, hardware, and wireless configurations under **Overview**.

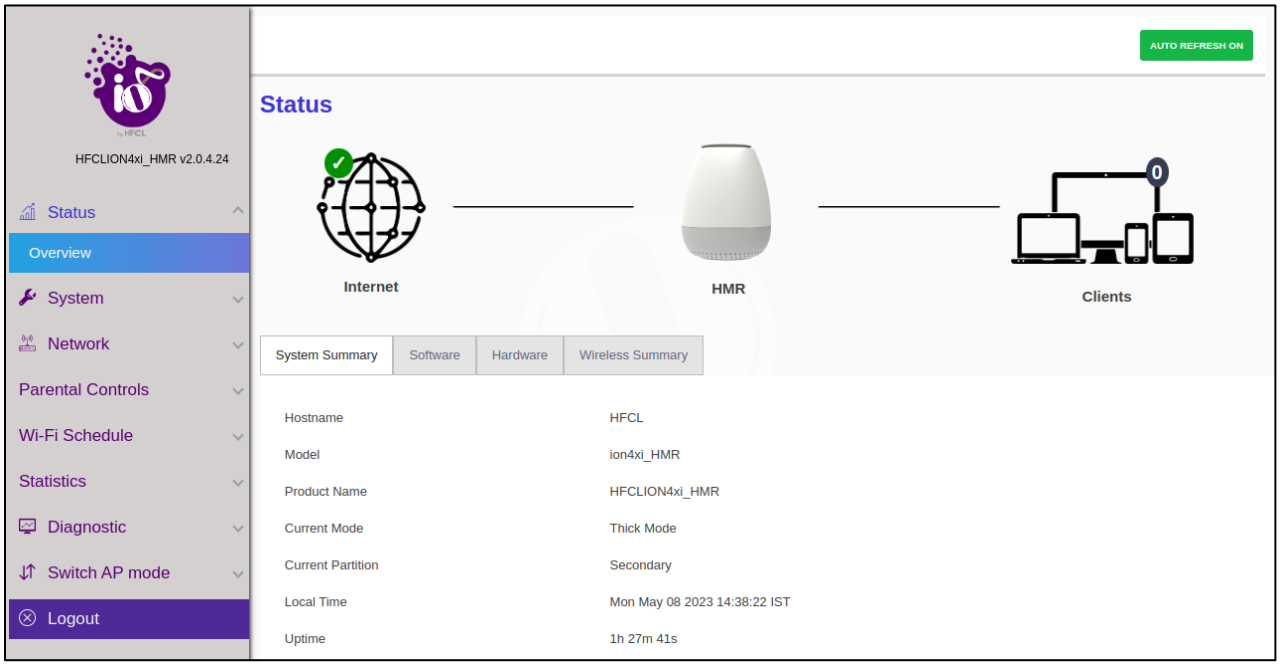


Figure 4: Status Screen

4.1 System Summary

The **System Summary** provides a brief overview of the system specifications pertaining to model number, product name, uptime along with a basic insight to the memory allocation and network specifications (IPv4 and IPv6).

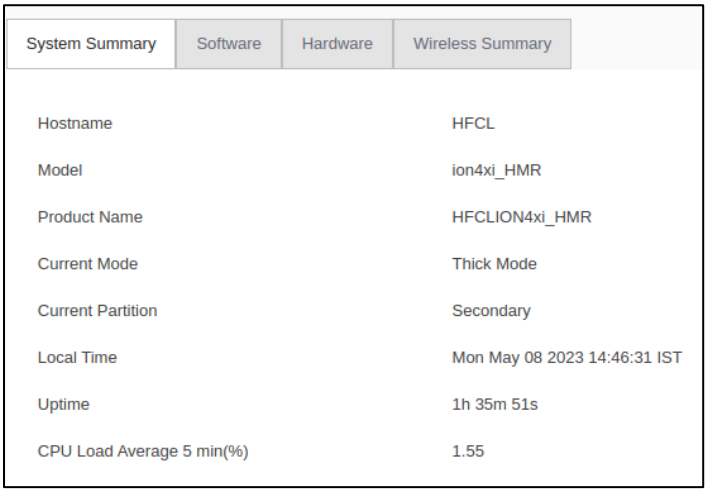


Figure 5: System Summary Screen

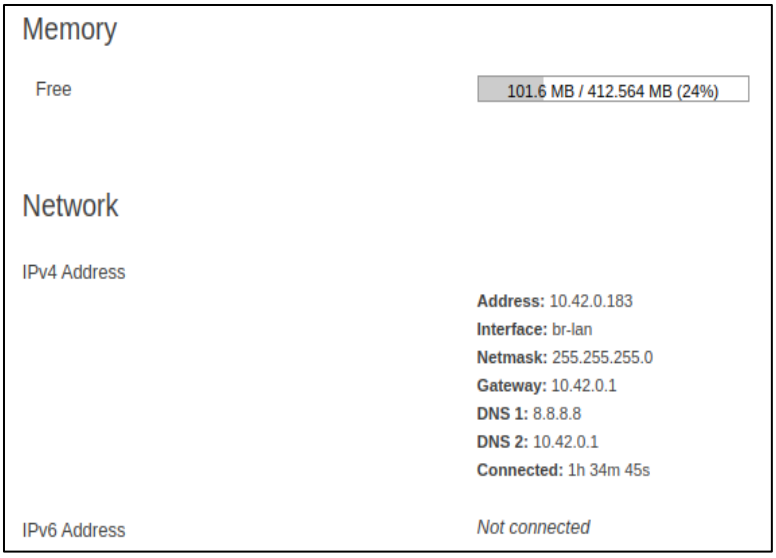


Figure 6: Memory & Network Allocations

4.2 Software

The **Software** option provides the **Current Firmware Version** of the device and an **Alternate Firmware Version**.

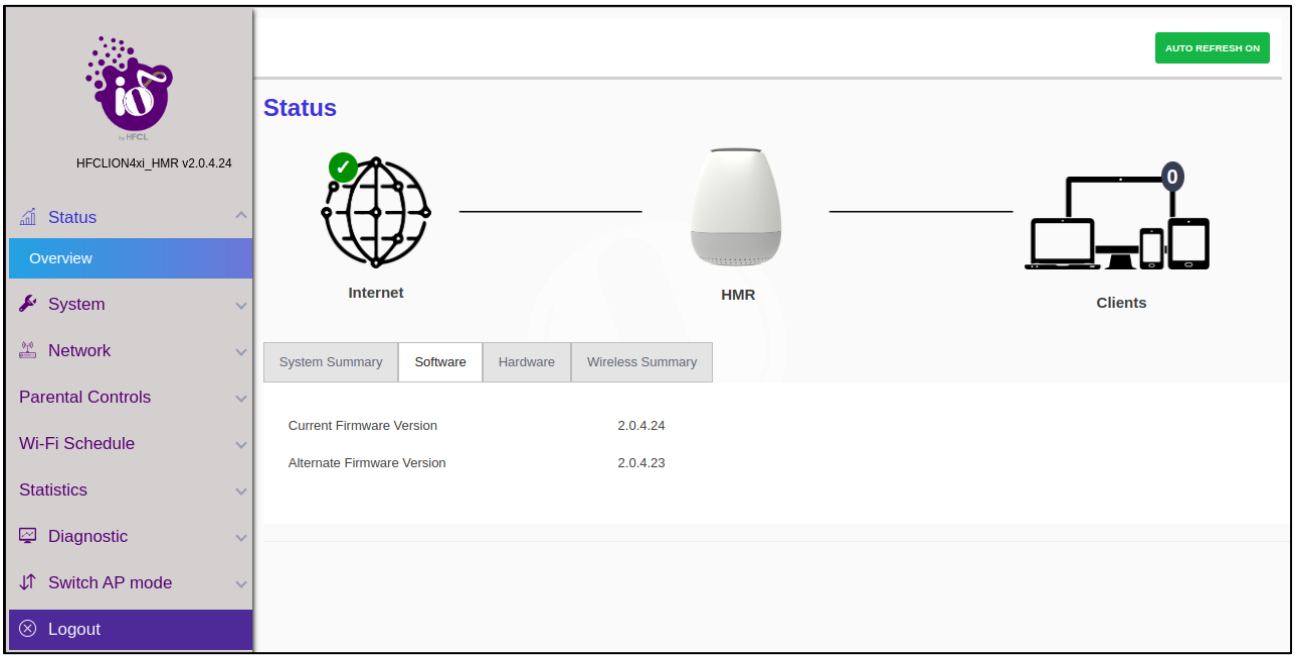


Figure 7: Software Screen

4.3 Hardware

The **Hardware** option provides the specifications pertaining to the specific device deployed like **Hardware Version**, **Device Type**, **MAC Address** of the particular device and its **Serial Number**.

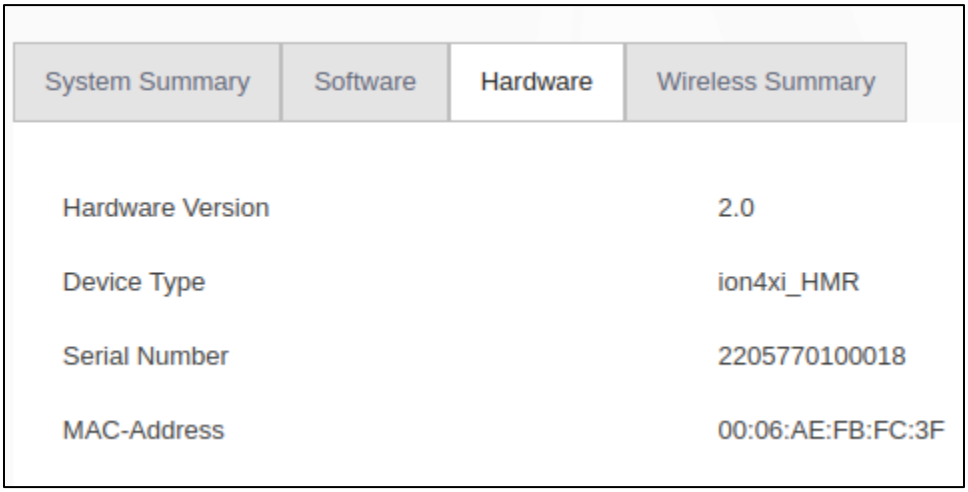


Figure 8: Hardware Screen

4.4 Wireless Summary

The **Wireless Summary** provides specification such as **SSID**, **Mode** (Master/Client), **Channel**, **BSSID**, **Bitrate** and **Encryption** enforced on the wireless frequency bands of both Radio 2.4 GHz 802.11b/g/n/ax (Wi-Fi0) and Radio 5 GHz 802.11a/n/ac/ax (Wi-Fi1) are depicted.

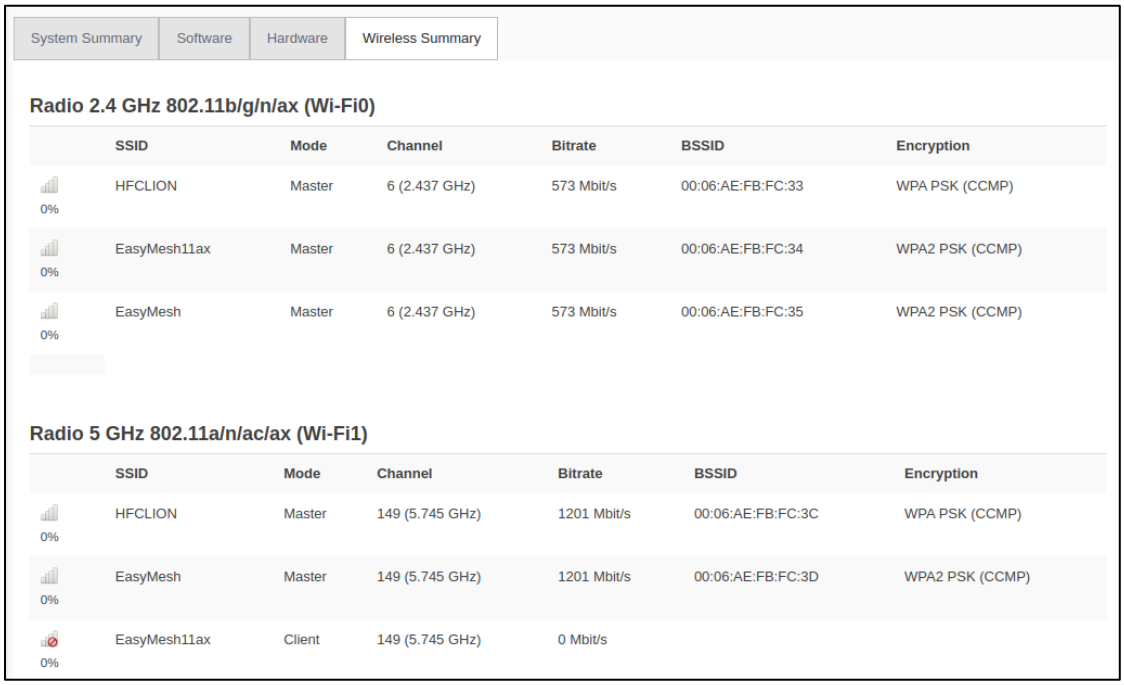


Figure 9: Wireless Summary Screen

5 System

Allows the end users to configure the system settings for the device. The system tab has been segregated into 6 tabs. Enables end users to configure the system settings, such as administrator password, factory reset option and to apply updated firmware with backups.

- System Settings
- Set AP Password
- Backup/ Upgrade Firmware
- Reboot
- Factory Reset
- Syslog

5.1 System Settings

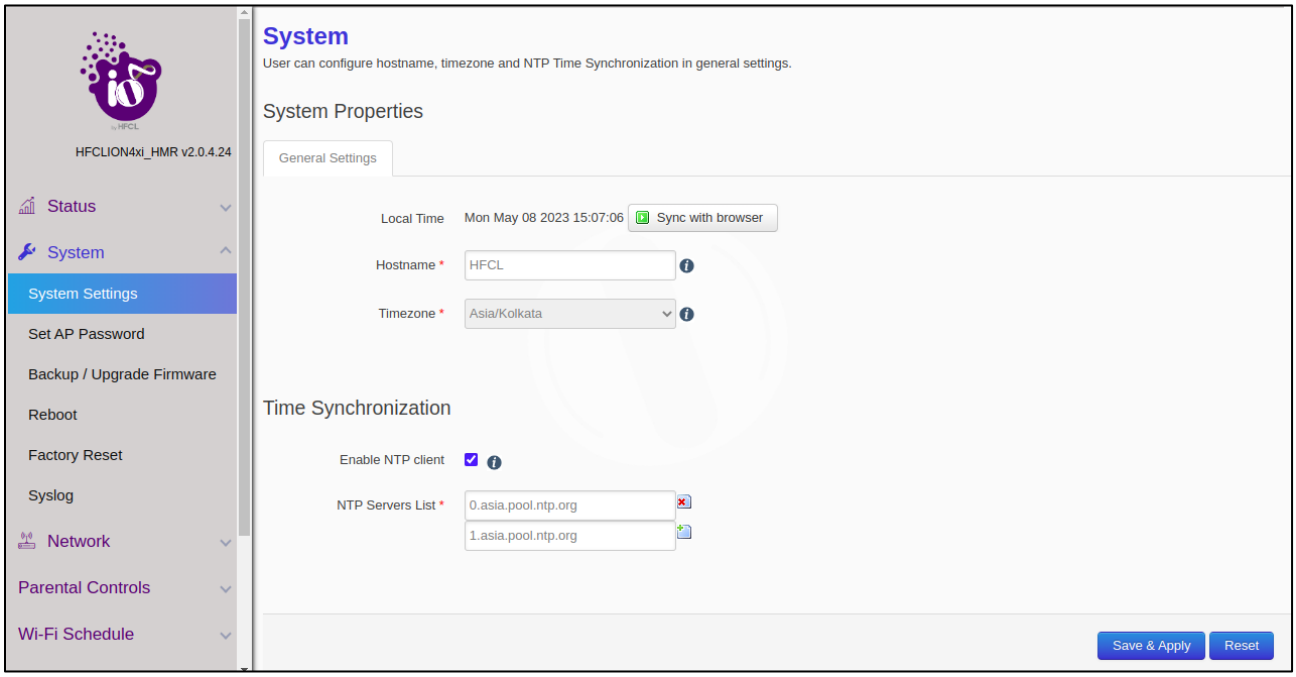


Figure 10: System Settings

- Users can configure the hostnames, (can enable syncing local time with browser) and time zones under the General Settings tab.
- Users can enable NTP Client where a maximum of 5 NTP servers can be enabled by the user. The NTP servers list can be populated according to the user specification.

5.2 Set AP Password

Administrator password can be configured here to access the devices.

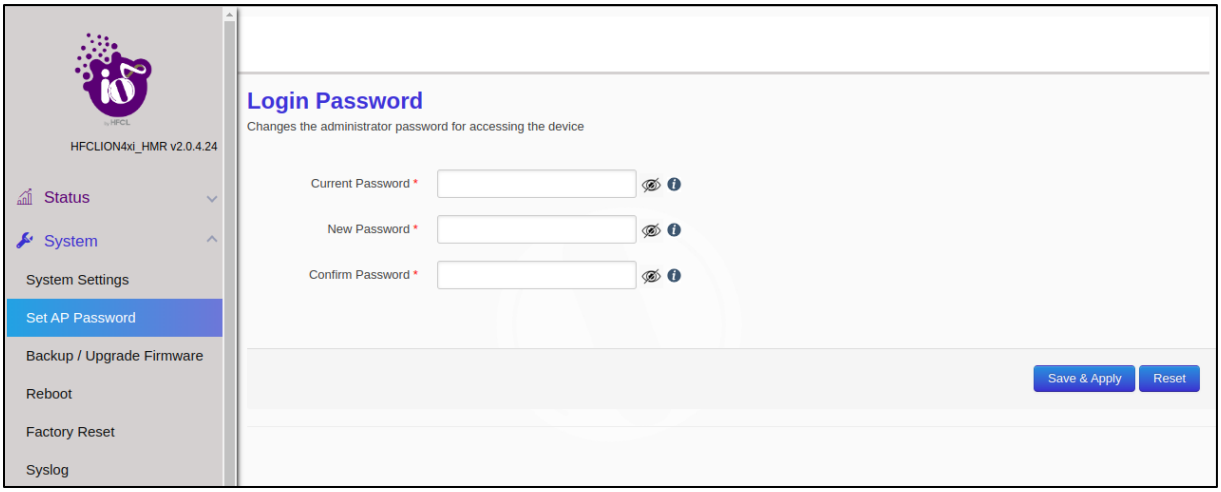


Figure 11: Set AP Password Screen

5.3 Backup/ Upgrade Firmware

5.3.1 Backup/ Restore

- Enables users to perform actions such as restoring configuration files by uploading previously generated backup archives.
- Users can also create an archive of the current configuration files which can be used to implement backups in case of failovers.

5.3.2 Firmware Upgradation

- Users can upgrade the firmware of the devices through a new firmware image.

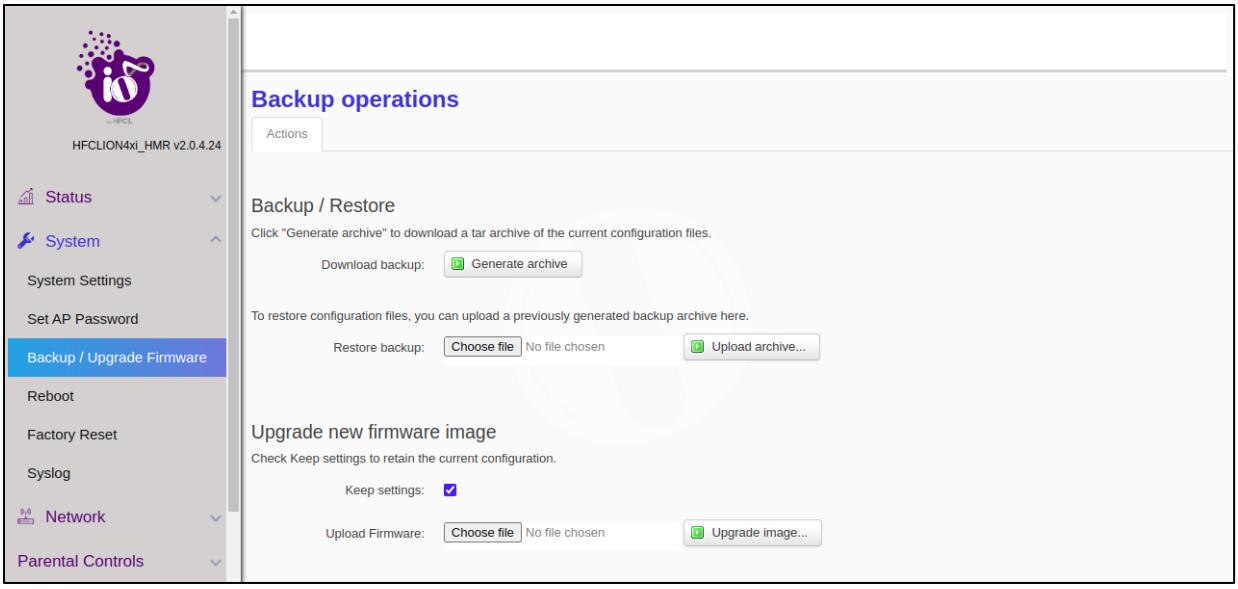


Figure 12: Backup/Upgrade Firmware

5.4 Reboot

Renders information such as the number of partitions, its status (primary/secondary), firmware versions and enables users to reboot the system according to current or alternate partitions.

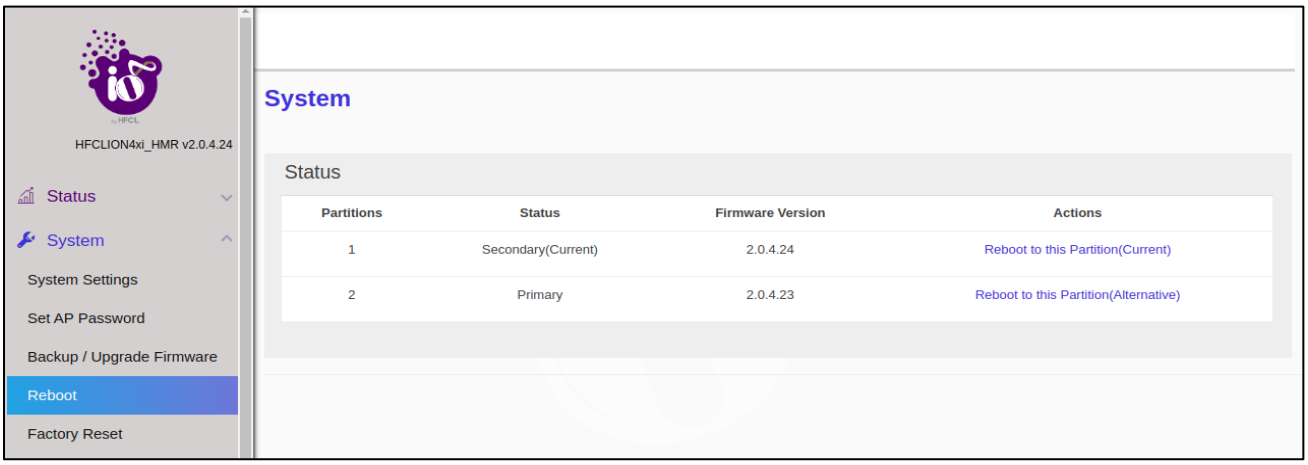


Figure 13: Reboot Screen

5.5 Factory Reset

Enables the end users to perform factory settings to revert the device back to its default settings

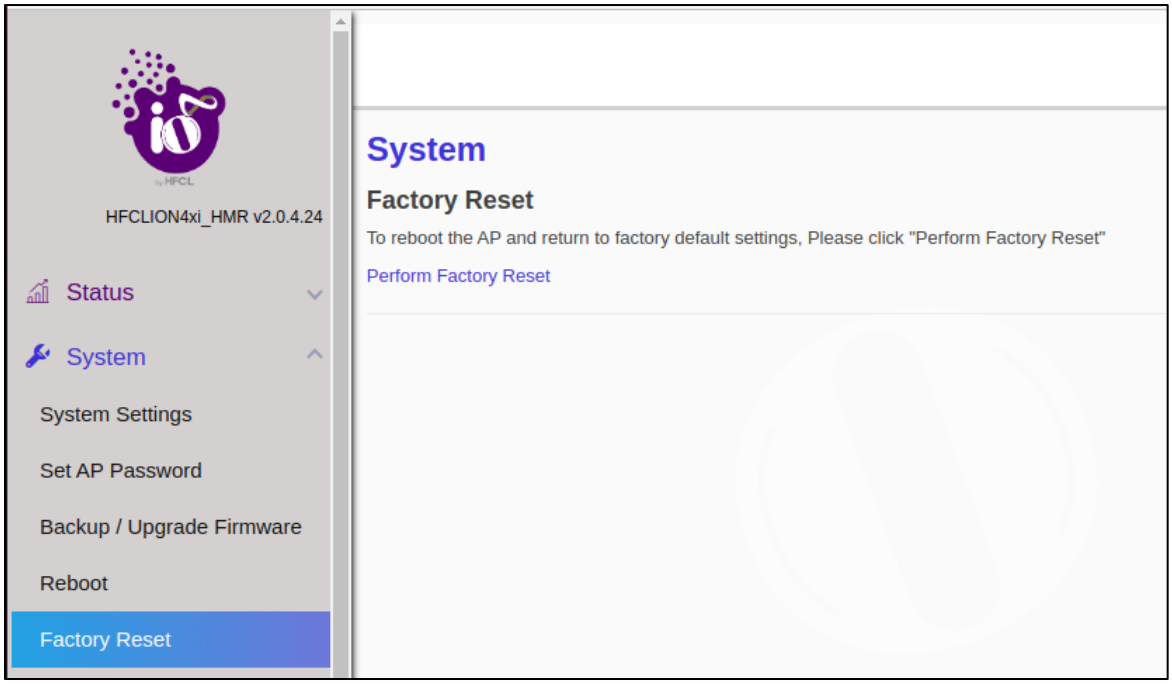


Figure 14: Factory Reset Screen

5.6 Syslog

This page enables users to create their own syslog.

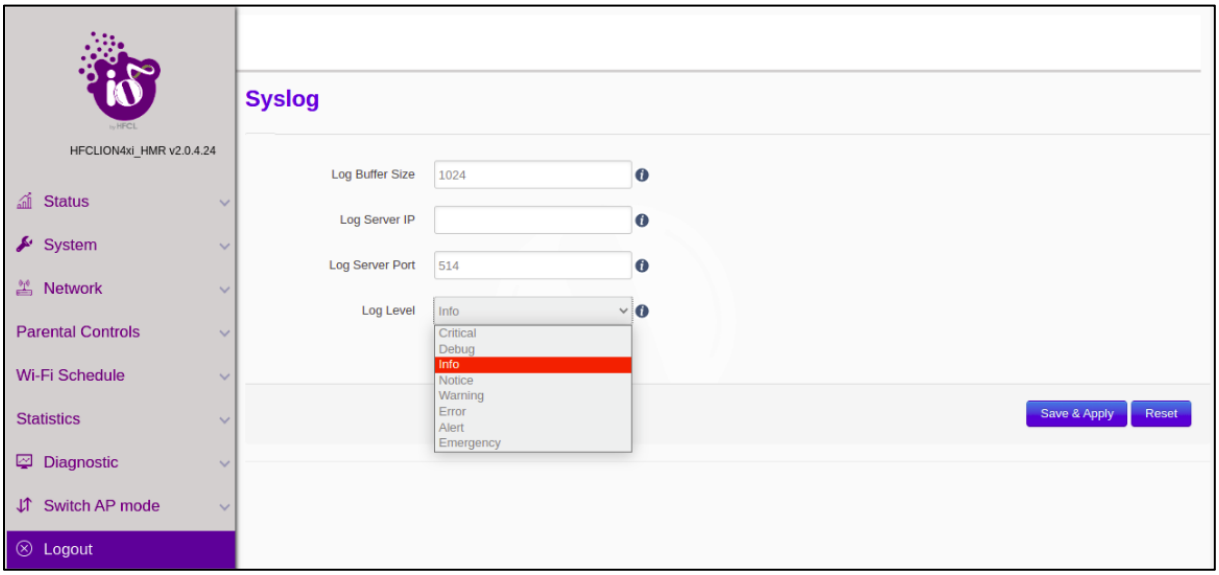


Figure 15: Syslog Screen

Enables users to create their own syslog according to the user specified parameters; such as

- Log Buffer Size: Create buffer size with range of 16 to 1024 kB, with a default value of 1024 kB.
- Log Server IP: Server IP where the syslog are to be rendered. Both IPv4 and IPv6 can be configured.
- Log Server Port: Users can specify the port within the range of 0 to 65353; default port as 514.
- Log Level: Logs all messages with a level greater than or equal to the selected one. For example, setting the priority threshold to DEBUG (lowest priority) causes all messages to be logged.

  - Critic
  - Debug
  - Info
  - Notice
  - Warning
  - Error
  - Alert
  - Emergency

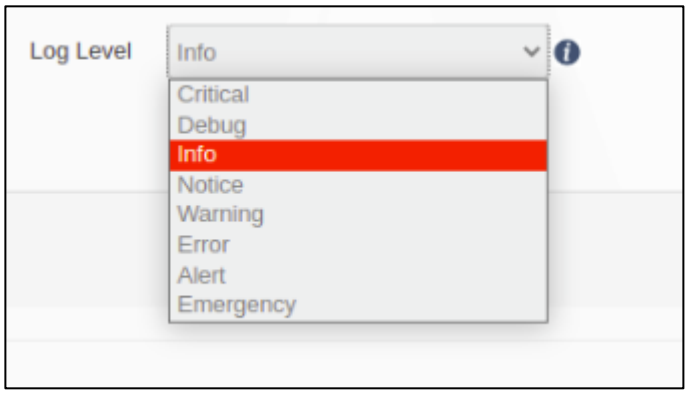


Figure 16: Log Level

6 Network

The Network tab, has been further segregated into 5 divisions:

- Wireless
- Interfaces
- Easy Mesh Configuration
- DHCP Server configuration
- Static Routes

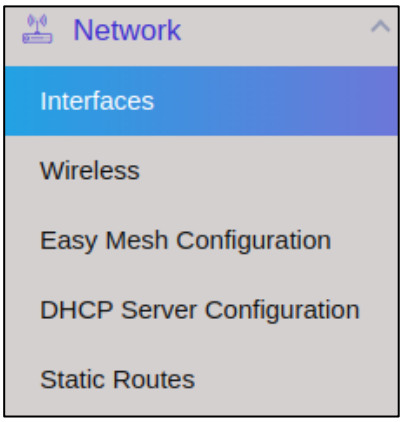


Figure 17: Network Screen

6.1 Interfaces

The Interface tab depicts the Interface overview and the Ethernet Port status.

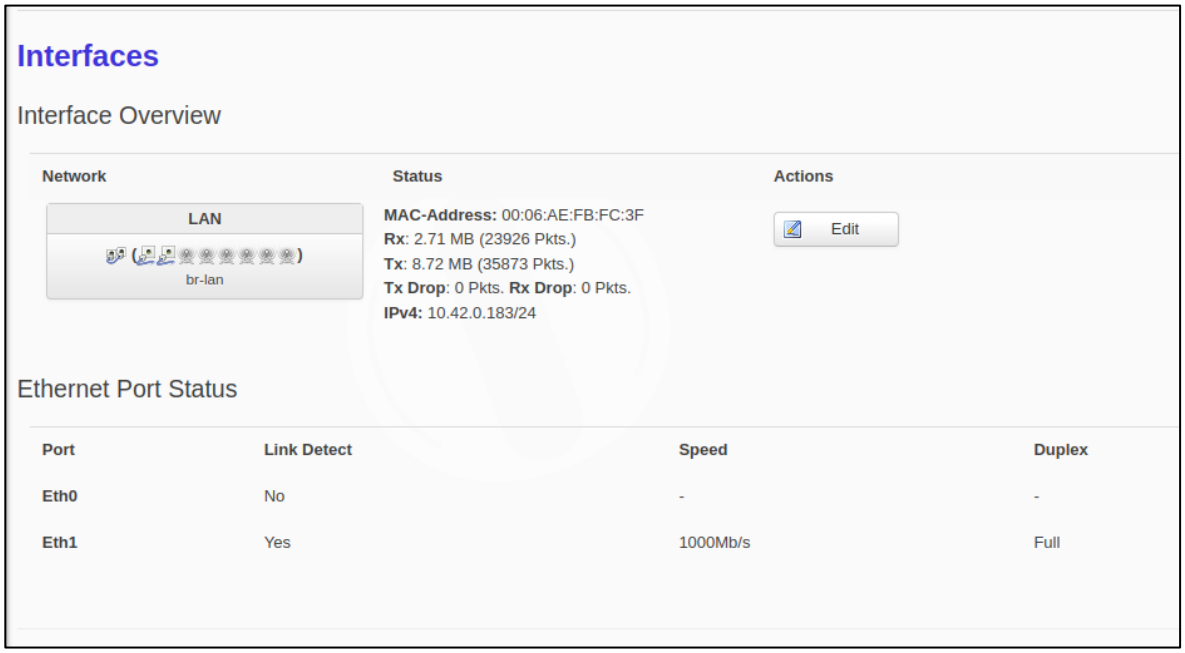


Figure 18: Interface Screen

- Information regarding the network connected, its status (MAC address, Transaction information and IPv4) is displayed.
- Users can also edit the interface and can configure the same according to their requirements.

6.1.1 Network Interfaces – LAN

In this Interface page of setting, user can configure the network interfaces.
It has two sub divisions:

- General Setup
- Management VLAN Settings

6.1.1.1 Network Interface: General Setup

Figure 19: General Setup Setting

6.1.1.2 Network Interface: Management VLAN Settings

Figure 20: Management VLAN Setting

6.1.2 Ethernet Port Status

Ethernet Port Status tab displays the Link detection & the Port Status (Speed and Duplex valve).

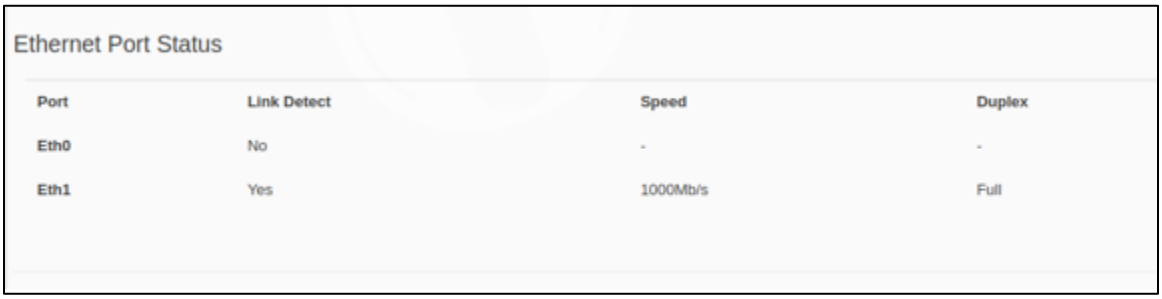


Figure 21: Ethernet Port Status

6.2 Wireless

In this page, User can make changes in the existing configuration and can make new SSIDs of devices under the Radio bands.

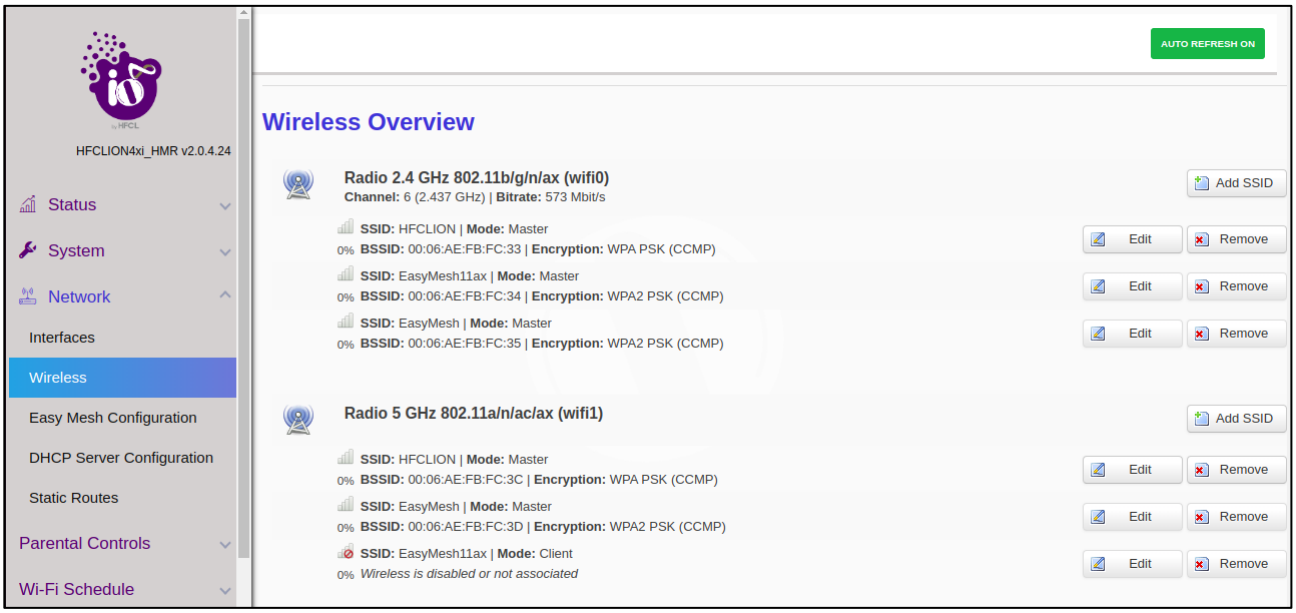


Figure 22: Wireless Overview Screen

- Detailed overview of wireless configurations are displayed for both Radio 2.4 GHz 802.11b/g/n/ax (wifi0) and Radio 5 GHz 802.11a/n/ac/ax (wifi1).
- Users can also make changes in the existing configuration and can also add new SSID of devices under the two radio bands; unlike the brief display of configuration under the System Tab of Dashboard. (Refer to Figure: 7 Wireless Summary Screen)
- On clicking **"Add SSID"**, user gets two sets of setting configuration

➢ Radio Configuration
➢ SSID Configuration

6.2.1 Radio Configurations

In Radio Configurations settings, there are two sub-categories: General Settings & Advanced Settings

6.2.2 Radio Configuration: General Settings

- Radio Status: Enable the radio status to make SSID visible to allow users to connect.
- Transmit power: Supported range from 6dBM to 23dBM
- Mode: Wireless standard to be selected which is compatible with the device.
- Channel width: Channel bandwidth in which radio needs to operate.
- Channel: Selecting 'Auto' will automatically select one of the available channels.

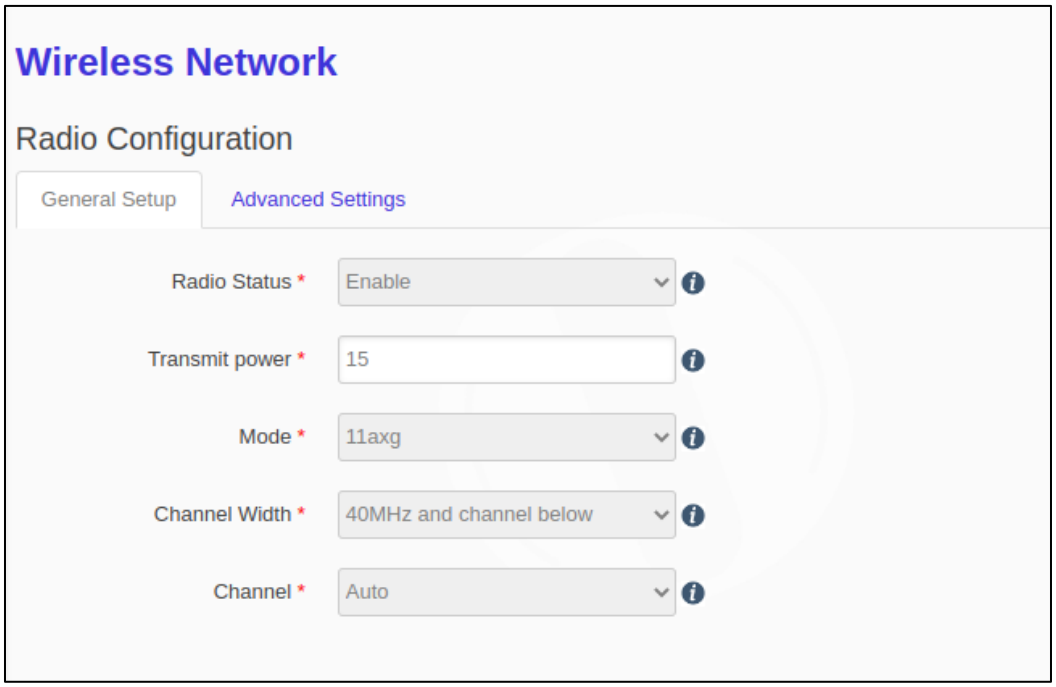


Figure 23: Radio Configuration General Settings

6.2.3 Radio Configuration: Advanced Settings

- MU-MIMO: By enabling MU-MIMO, multiple clients connected to the access point will be able to send acknowledgement responses (ack) simultaneously, thus saving airtime. This ultimately improves network throughput and efficiency
- TWT: It allows devices to negotiate when and how often they will wake up to send or receive data. TWT increases device sleep time and, in turn, substantially improves battery life.
- UL OFDMA: the total bandwidth is divided into several bundles of sub-carriers (denoted by resource units (RUs)) and each station transmits its UL frames through the allocated RU.
- DL OFDMA: the total bandwidth is divided into several bundles of sub-carriers (denoted by resource units (RUs)) and AP transmits its DL frames through the allocated RU.

- BSS Color: This helps mitigate overlapping Basic Service Sets (OBSS). In turn, this enables a network to more effectively – and concurrently – transmit data to multiple devices in congested areas.
- TX/RX Antenna Chain Mask: Users can select Tx/Rx Antenna Chain Mask 1x1 or 2x2.
- Country Code
- Max Client Allowed status: Enable Max Client Allowed to use Max Client Allowed.

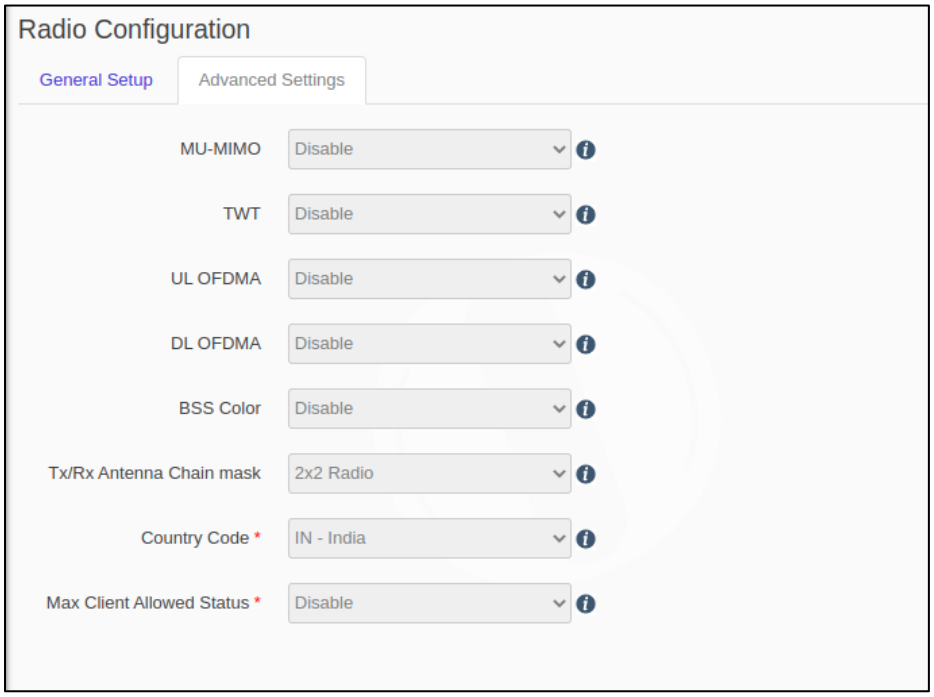


Figure 24: Radio Configuration Advanced Settings

6.2.4 SSID Configurations

In SSID Configuration page, user gets four further types of settings to configure SSIDs.

- General Setup
- Advanced Settings
- Wireless Security
- MAC Filter

6.2.4.1 SSID Configuration: General Settings

- VAP Status: Select enable/disable to change the VAP status.
- SSID: Users can give the SSID of the device.
- Mode: In Access Point mode, Device can be connected to a wired network and transform the wired access into wireless that multiple devices can share together, especially for a home, office, or hotel where only wired network is available.

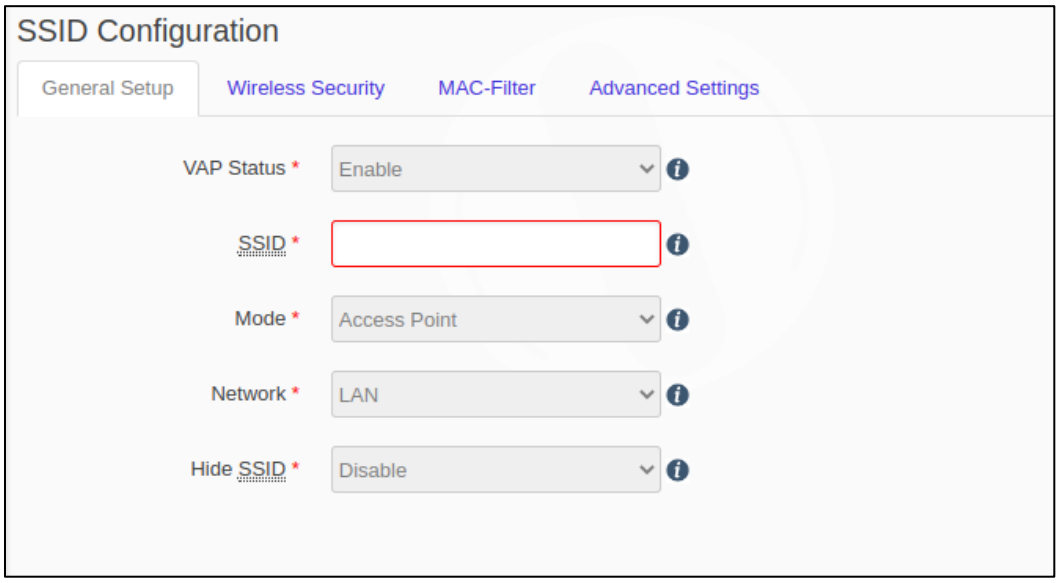
- Network: If DHCP Server is enabled then the network will be NAT if DHCP Server is disabled then the network will be LAN.
- Hide SSID: Users can select enable/disable to change the Hide SSID status.
- 

Figure 25: SSID Configuration General Settings

6.2.4.2 SSID Configuration: Wireless Security

Users can choose the type of network authentication (data encryption) that is required to connect to the SSID.

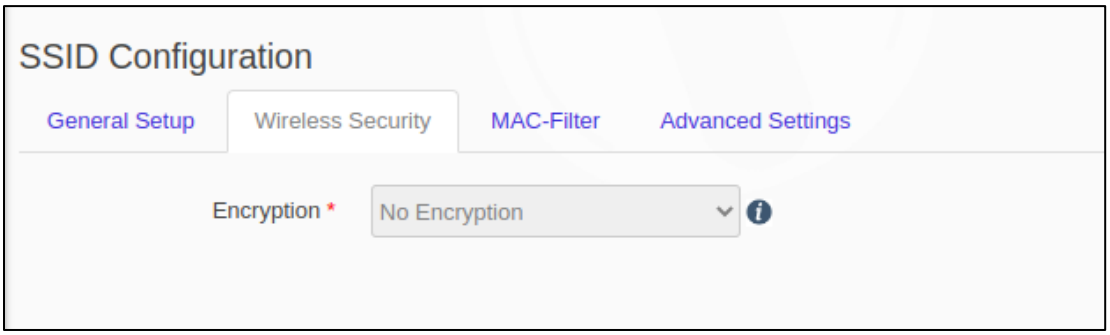


Figure 26: SSID Configuration Wireless Security

6.2.4.3 SSID Configuration: MAC Filter

Users can select disable/Allow all listed/Allow all except listed.

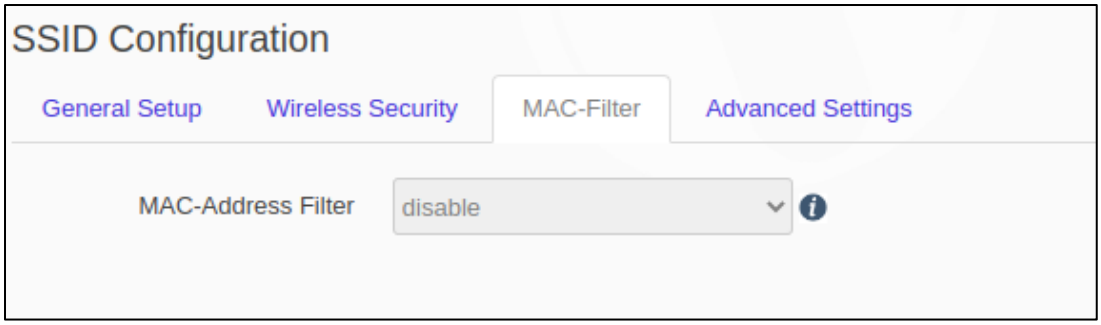


Figure 27: SSID Configuration MAC Filter

6.2.4.4 SSID Configuration: Advanced Settings

- Client Isolation: Prevents client-to-client communication
- RTS Status: Users can enable RTS Status to configure RTS.
- DTIM Interval: Specify the period of time to wake up clients from sleep mode to receive traffic at the right time. Allowed range is from 1ms to 255ms
- Beacon Interval: Specify time interval in which beacon packets have to be transmitted. Allowed range is from 100ms to 300ms
- Wi-Fi Multimedia: Enabling the WMM will control the upstream traffic flow from Wi-Fi device to AP and downstream traffic flow from AP to Wi-Fi device.
- Max Client Limit: Supported range from 1-128.
- Wi-Fi multimedia Power Save: WMM-Power Save increases the efficiency and flexibility of data transmission. Specifically, the client device can doze between packets to save power, while the access point buffers downlink frames. The application chooses the time to wake up and receive data packets to maximize power conservation without sacrificing Quality of Service.
- VLAN Status: VLAN status enable/disable, if VLAN will be enabled then VLAN value 1 will be set by default.
- Option 82: This will add client VLAN ID in Option82 field (IPv4).
- Option 18: This will add client VLAN ID in Option18 field (IPv6)
- Rate Limit: Enable Rate Limit per VAP or Rate Limit per Client to select Upload Limit and Download Limit.
- ATF Enable: Enable ATF to use ATF feature.
- TX STBC: Space time block coding (STBC) transmits multiple copies of one data flow in wireless communication. STBC uses many antennas to produce multiple receive versions of data, improving data transmission reliability.
- Number of spatial streams: Spatial Streams 1-2 is supported.

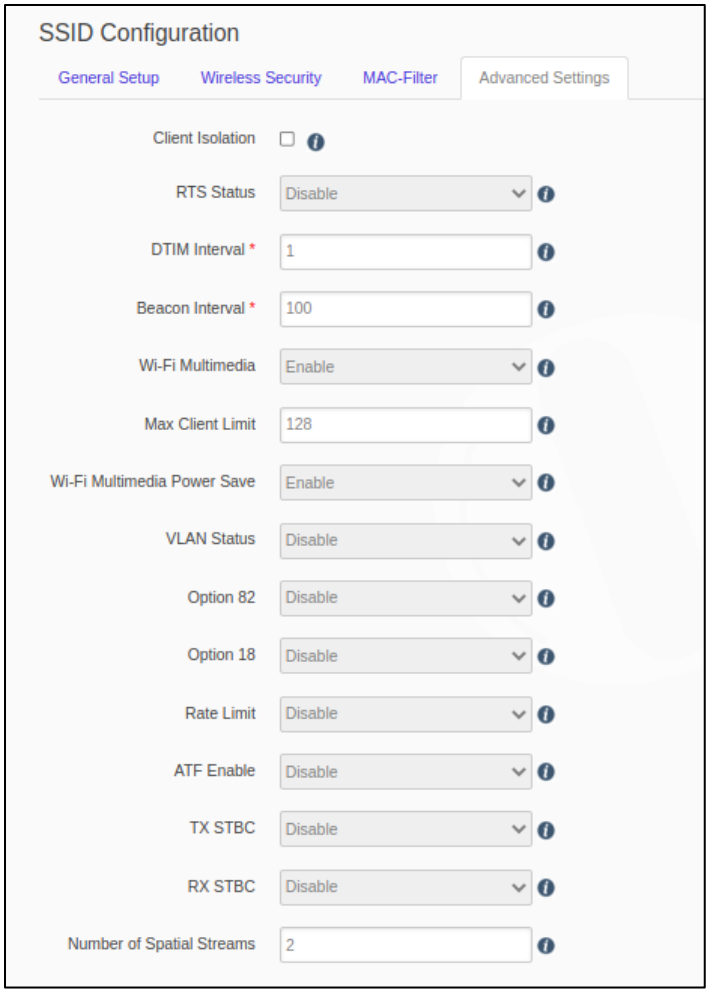


Figure 28: SSID Configuration Advanced Setting

6.3 Easy Mesh Configuration

Easy mesh configurations can be set by the user.

The feature to generate a WPS event is also provided to the end user.

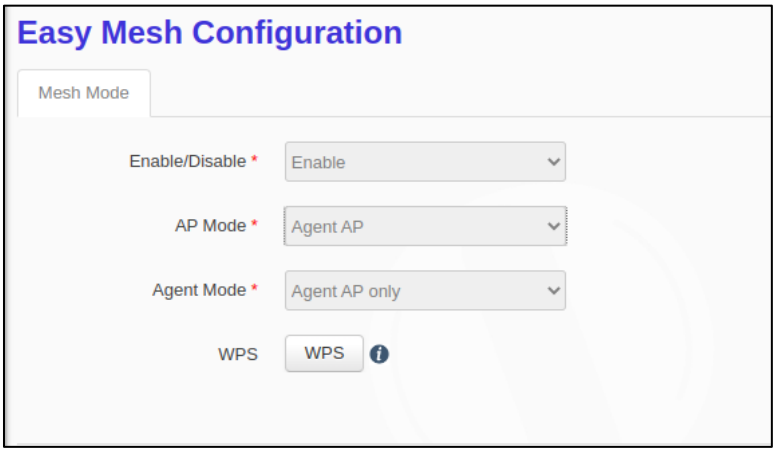


Figure 29: Easy Mesh Configuration

6.4 DHCP Server Configuration

DHCP server can be enabled or disabled according to the user requirements.

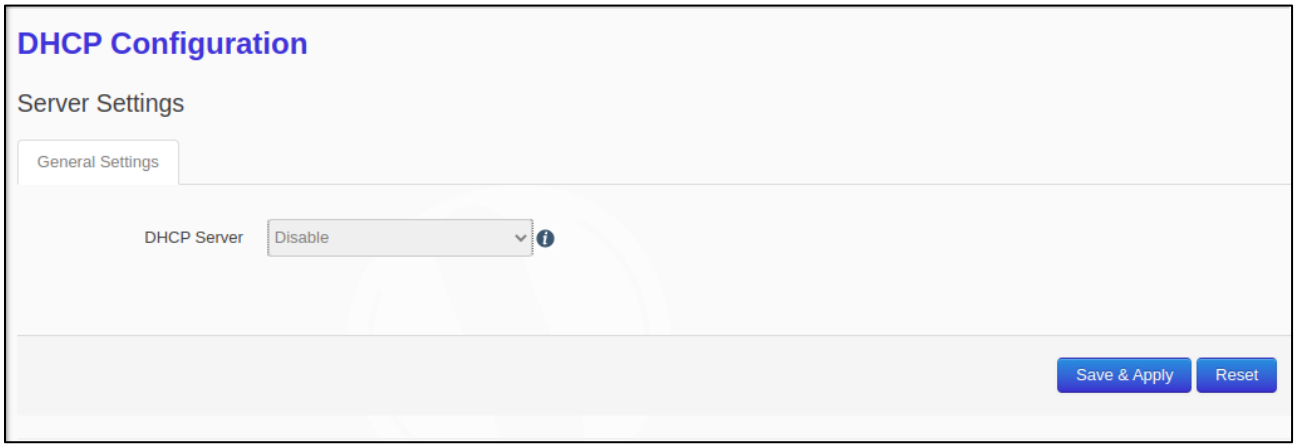


Figure 30: DHCP Configuration

6.5 Static Routes

Users can specify the interface and gateway a certain host or network can be reached in the Route Configuration tab.

Both static IPv4 and static IPv6 routes can be configured by the user.

Before clicking the **Add** Button, the page looks like:

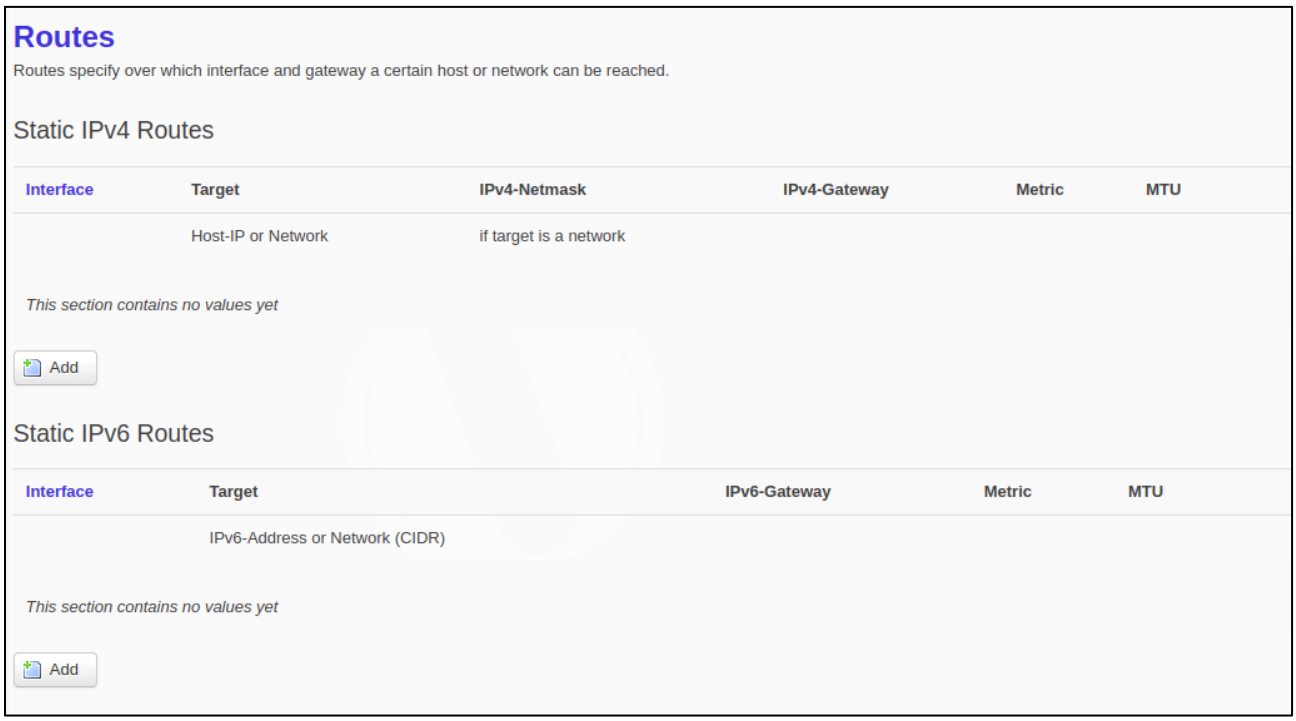


Figure 31: Static Routes (1)

After clicking **Add** Button, the page looks like:

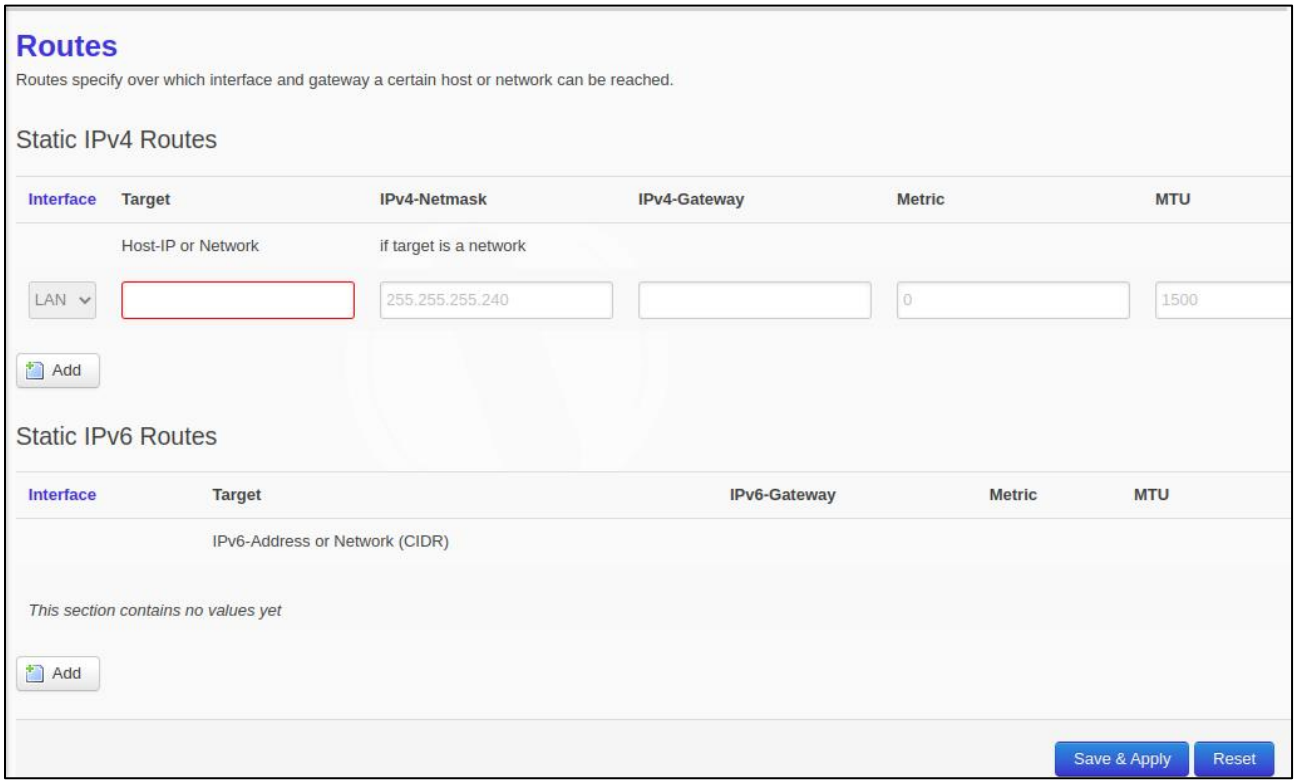


Figure 32: Static Routes (2)

7 Parental Control

Parental controls can be configured by the user. It helps user to Enable/Disable the iProtect.

Figure 33: Parental Control

8 Wi-Fi Schedule

Wi-Fi schedules can be created and viewed by the user as per their own configurations. It has two categories: **Create Schedule & View Schedule**

8.1 Create Schedule

The current status of the Wi-Fi on the AP is displayed.
User can enter the Wi-Fi Schedule profile name. This profile name should not be the same as an existing profile name. This is not case sensitive.

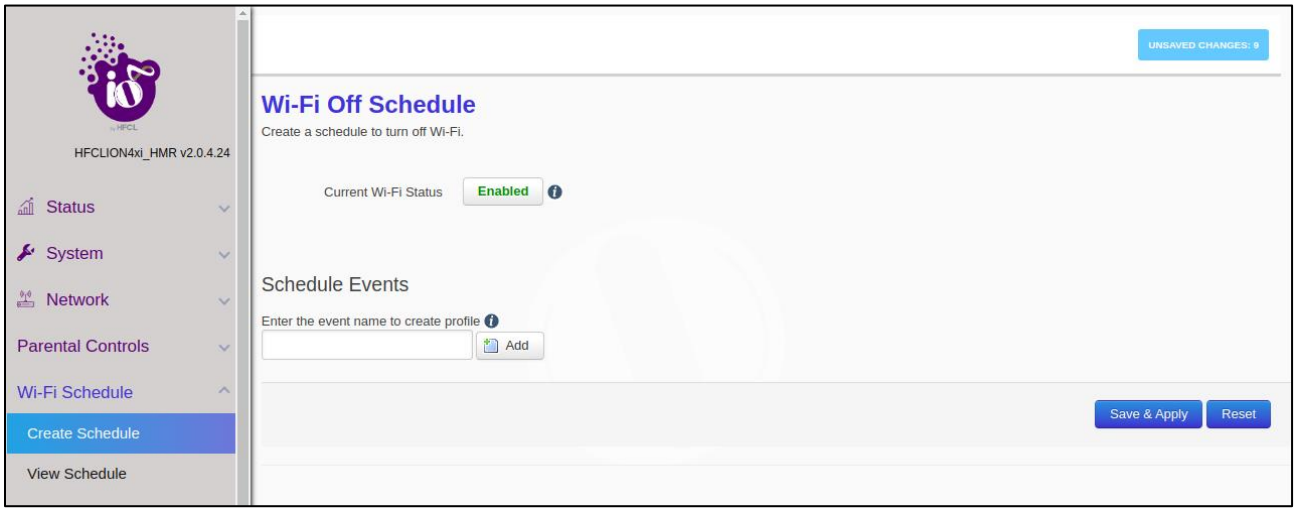


Figure 34: Create Wi-Fi Schedule

8.2 View Schedule

Any schedule created will be populated on the screen under the 'View Schedule' Tab.

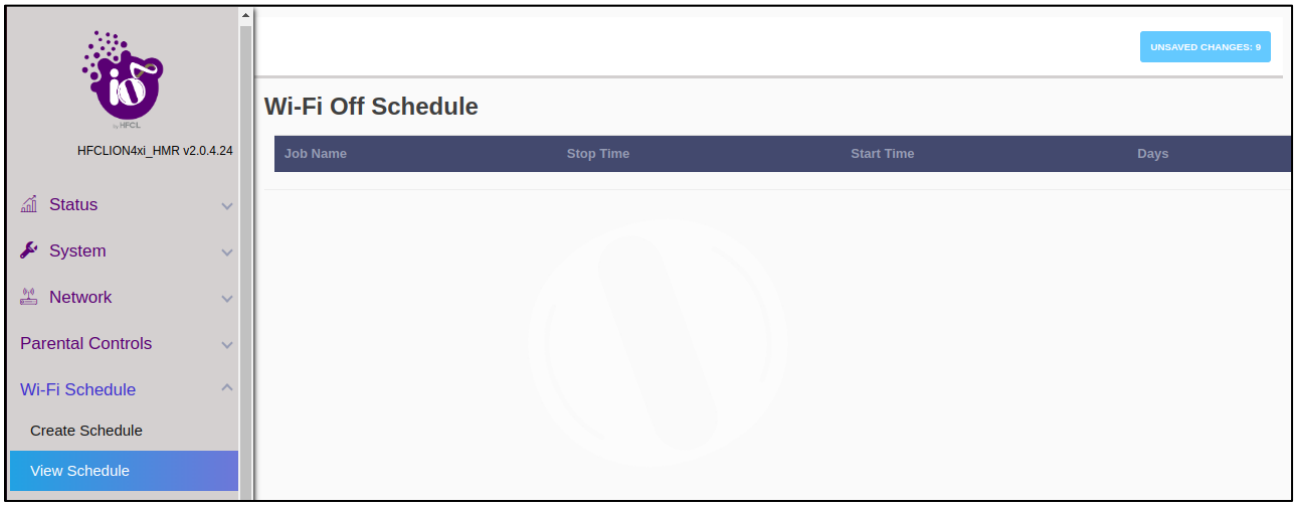


Figure 35: View Wi-Fi Schedule

9 Statistics

All statistical information such as reports and statistical graphs will be rendered to the user. It includes Realtime Graphs & Reports.

9.1 Realtime Graphs

In these graphs, user can view the Realtime Load and Realtime Traffic through graphical presentation.

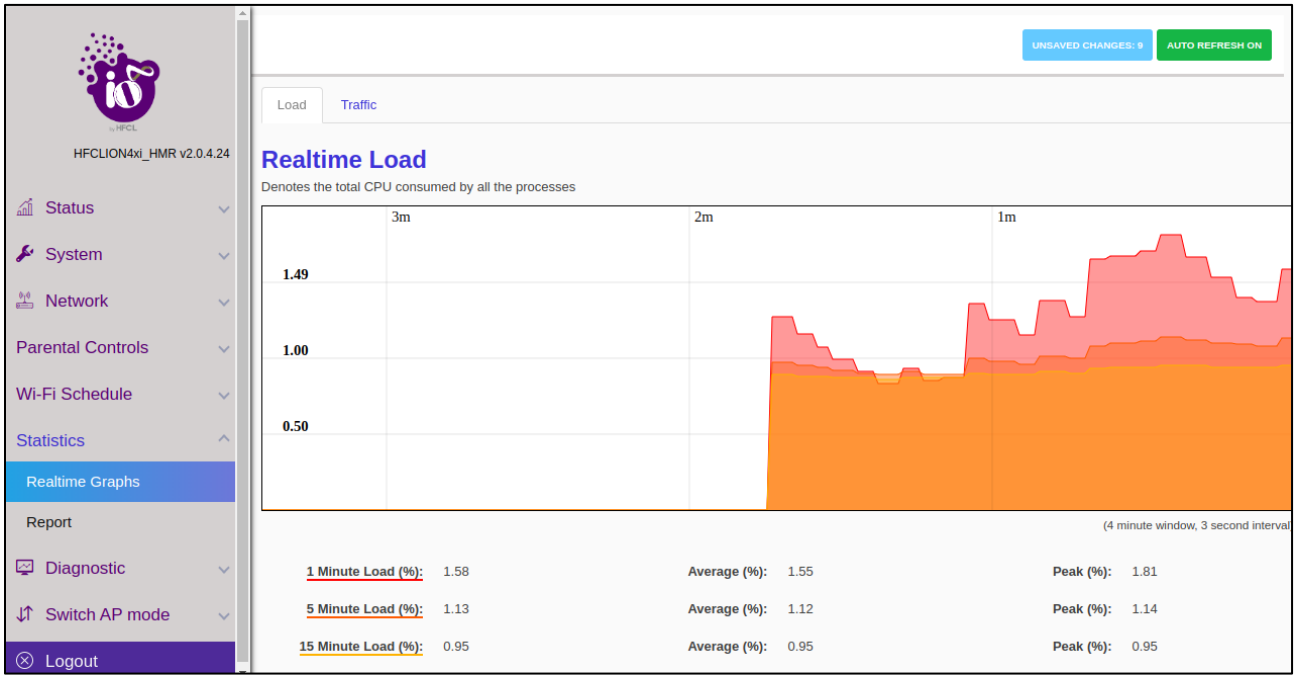


Figure 36: Real Time Load

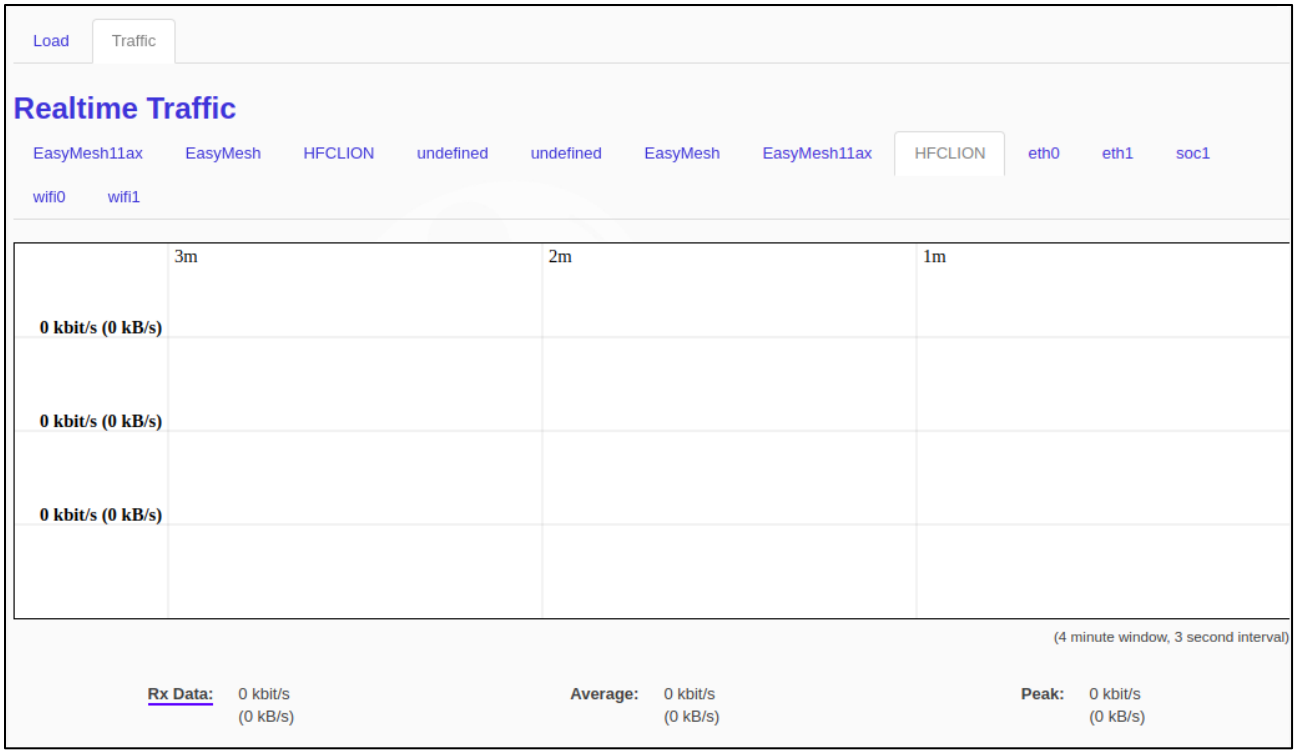


Figure 37: Real Time Traffic

9.2 Reports

All the reports generated by the user can be downloaded for their perusal.

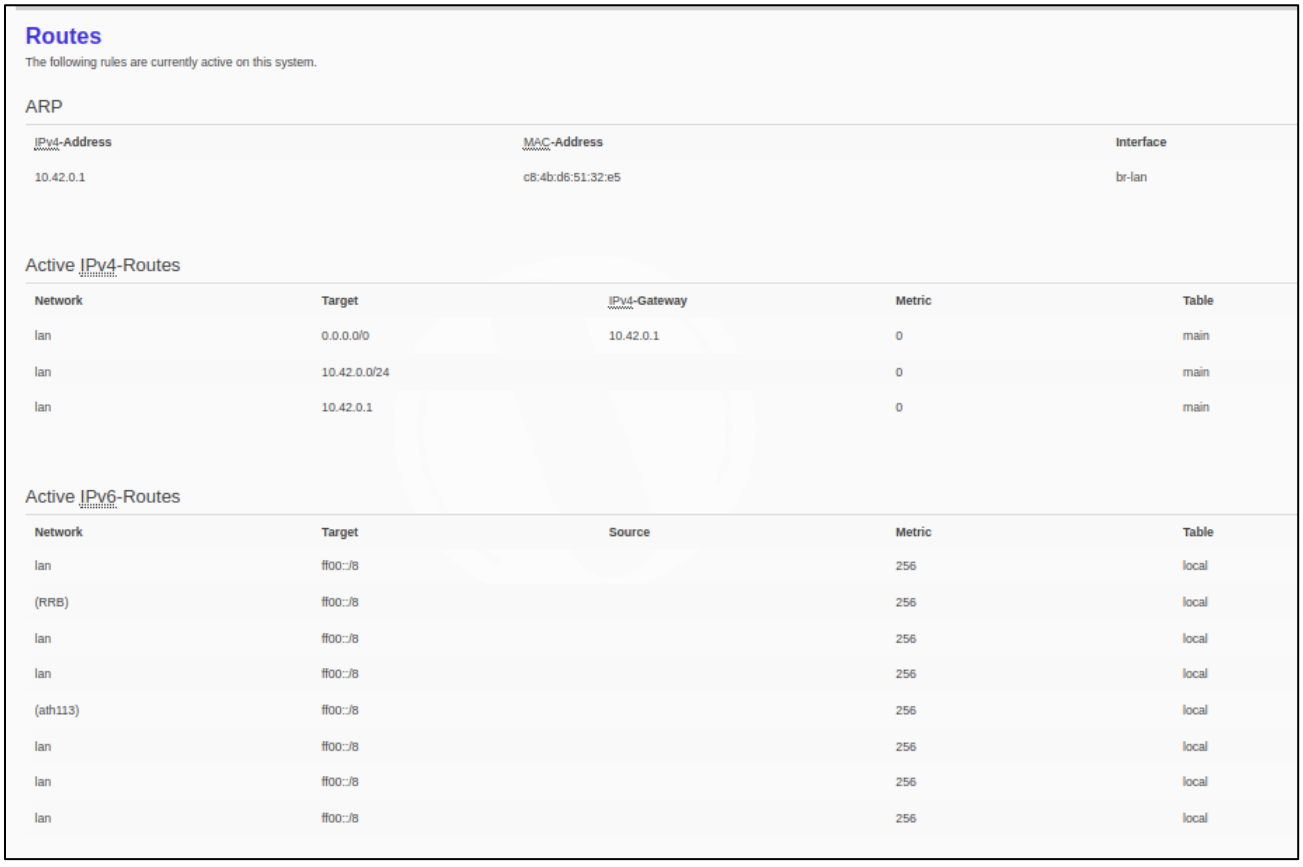
Figure 38: Report

10 Diagnostics

All the diagnostics services will be rendered to the user:

- Routes
- System Log
- Kernel Log
- Tools
- Associated stations
- AP snapshots

10.1 Routes



Routes

The following rules are currently active on this system.

ARP

IPv4-Address	MAC-Address	Interface
10.42.0.1	c8:4b:d6:51:32:e5	br-lan

Active IPv4-Routes

Network	Target	IPv4-Gateway	Metric	Table
lan	0.0.0.0/0	10.42.0.1	0	main
lan	10.42.0.0/24		0	main
lan	10.42.0.1		0	main

Active IPv6-Routes

Network	Target	Source	Metric	Table
lan	ff00::/8		256	local
(RRB)	ff00::/8		256	local
lan	ff00::/8		256	local
lan	ff00::/8		256	local
(ath113)	ff00::/8		256	local
lan	ff00::/8		256	local
lan	ff00::/8		256	local
lan	ff00::/8		256	local

Figure 39: Routes Tab

10.2 System Log

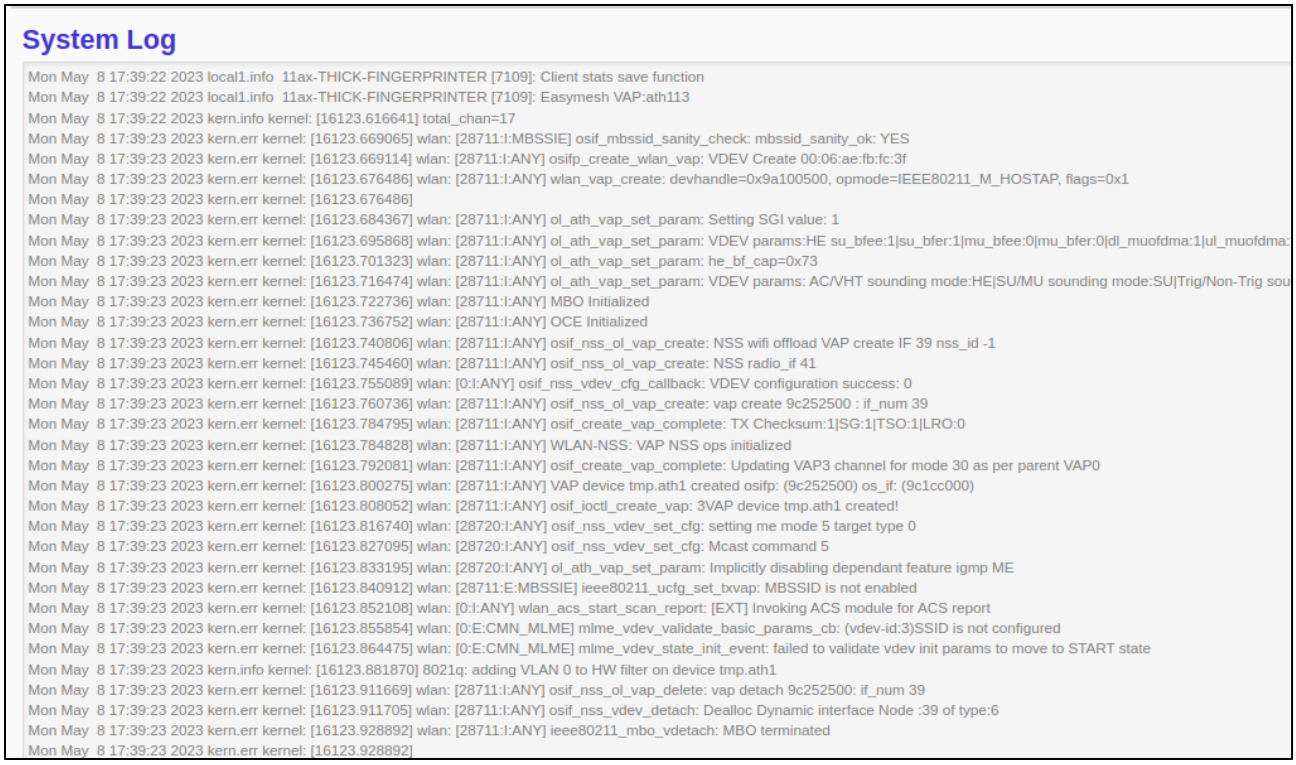


Figure 40: System Log Tab

10.3 Kernel Log

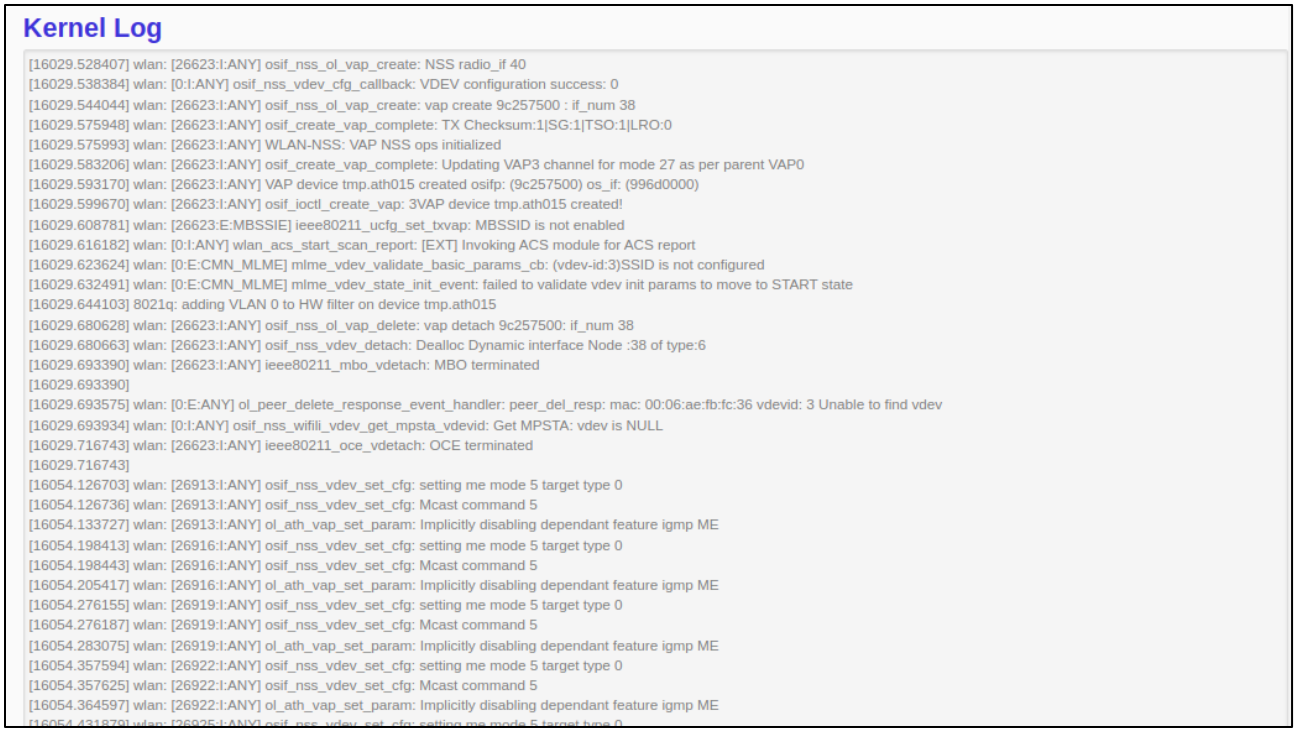


Figure 41: Kernel Log Tab

10.4 Tools

10.5 Associated Stations

10.6 AP Snapshots

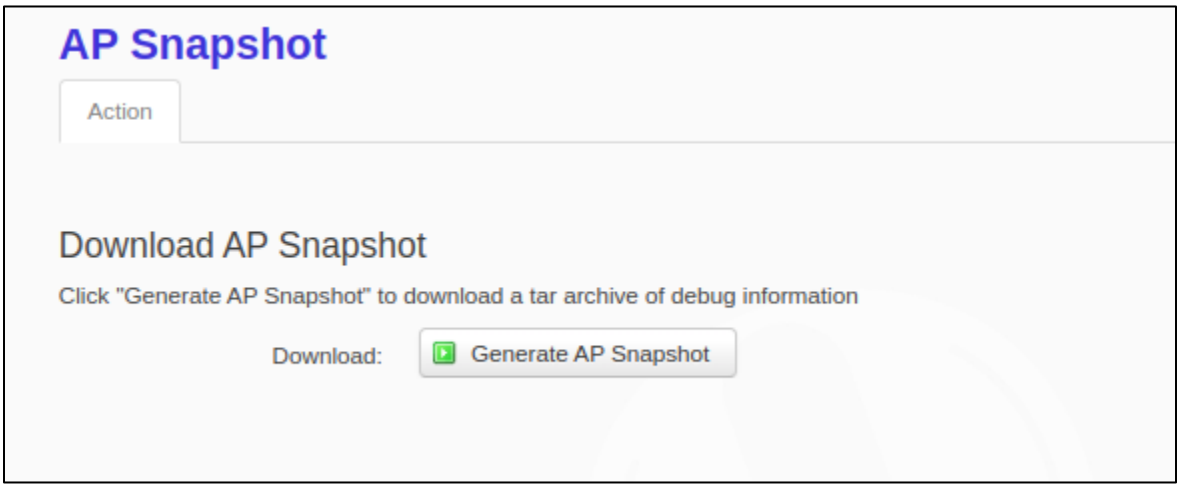


Figure 42: Download AP Snapshots

11 Switch AP Mode

12 Logout

13 Disclaimer

This draft is subjected to change or further modifications as and when required.

Federal Communication Commission Certified:

This equipment is 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:

This 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 comply 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

About HFCL Limited

HFCL is a leading technology company specializing in creating digital networks for telcos, enterprises, and governments. Over the years, HFCL has emerged as a trusted partner offering sustainable high-tech solutions with a commitment to provide the latest technology products to its customers. Our strong R&D expertise coupled with our global system integration services and decades of experience in fibre optics enable us to deliver innovative digital network solutions required for the most advanced networks.

The Company's in-house R&D Centers located at Gurgaon & Bengaluru along with invested R&D Houses and other R&D collaborators at different locations in India and abroad, innovate a futuristic range of technology products and solutions. HFCL has developed capabilities to provide premium quality Optical Fiber and Optical Fiber Cables, state-of-the-art telecom products including 5G Radio Access Network (RAN) products, 5G Transport Products, WiFi Systems (WiFi 6, WiFi 7), Unlicensed Band Radios, Switches, Routers and Software Defined Radios.

The Company has state-of-the-art Optical Fiber and Optical Fiber Cable manufacturing plants at Hyderabad, Optical Fiber Cable manufacturing plant in Goa and in its subsidiary HTL Limited at Chennai.

We are a partner of choice for our customers across India, Europe, Asia Pacific, Middle East, Africa, and USA. Our commitment to quality and environmental sustainability inspires us to innovate solutions for the ever-evolving customer needs.

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8 May, 2023	A0-01	Initial Draft	HFCL
22 May 2023	A0-02	Revised Draft	HFCL