

ASiaRF
AP7688-WHM
Wi-Fi HaLow
Gateway



ASiaRF AP7688-WHM Wi-Fi HaLow Gateway User Manual

[Home](#) » [ASiaRF](#) » ASiaRF AP7688-WHM Wi-Fi HaLow Gateway User Manual 

Contents

- 1 ASiaRF AP7688-WHM Wi-Fi HaLow Gateway
- 2 Product Usage Instructions
- 3 Introduction
- 4 Hardware Information
 - 4.1 LEDs And Interfaces
- 5 Software Information
- 6 Trouble Shooting
- 7 FCC STATEMENT
- 8 Contact
- 9 FAQ
- 10 Documents / Resources
 - 10.1 References



ASiaRF AP7688-WHM Wi-Fi HaLow Gateway



Specifications

- Product Name: Wi-Fi HaLow Gateway
- Model Number: AP7688-WHM
- Dimensions: 9 x 11.5cm
- Operating Frequency: Wi-Fi 4 & Wi-Fi HaLow
- Throughput: 20Mbps
- Linking Distance: >1 KM for Wi-Fi HaLow
- Additional Features: RS232 console, optional support for Matter/BLE/Zigbee

Product Usage Instructions

Hardware Information

The package includes:

1. Wi-Fi HaLow Gateway x 1
2. Wi-Fi HaLow Antenna x 1
3. 12V / 1A Power Adapter x 1

LEDs and Interfaces

LED display meaning:

Name	Power (Blue)	Wi-Fi (Orange)	Ethernet (Green)		
Booting (Green)	Action	We	Blinking	Blinking	Off

Interfaces:

- Power on: System booting
- Wi-Fi ready: System Ready

Software Information

HaLow Access Point (AP) and HaLow Station (STA)

- The gateway consists of Wi-Fi 4 Router and Wi-Fi HaLow, operating individually. One gateway acts as the HaLow AP (master data center), while others are HaLow Stations (STA).

HaLow AP settings

- You can link the HaLow AP Gateway with Main Home Router by LAN cable or Wi-Fi linking, but not both simultaneously to avoid network lock.

Introduction

AP7688-WHM is a small-size 9 x 11.5cm, Wi-Fi4 & Wi-Fi HaLow IoT Gateway with RS232 console for industrial control.

The Main parts are Wi-Fi 4 Router and Wi-Fi HaLow, each one operates individually.

Wi-Fi HaLow is the best solution for long distance IoT applications and Video stream transmission. Wi-Fi HaLow Throughput reaches 20Mbps provide standard surveillance system could have a long distance linking with perfect quality.

Wi-Fi HaLow linking distance is more than 1 KM, which is 10 times farther than 2.4 GHz Wi-Fi4 or Bluetooth along with 100M the coverage of traditional Wi-Fi networks, making it perfect for warehouses, factories, retail stores and other large campus environments.

Matter/BLE/Zigbee is optional in near future.

Operating temperature: -25°C – 65°C

Wi-Fi HaLow™ IoT Gateway



Hardware Information

Contents

1. Wi-Fi HaLow Gateway X 1,
2. Wi-Fi HaLow Antenna X 1
3. 12V / 1A Power Adaptor X 1

For wall mounting, the used screw size should be less than M5 screw, length is 6mm around.
The operation temperature of this sets of products is maximum 40°C.

LEDs And Interfaces

LED display meaning



LED light meaning:



Name	Action	Description
Power (Blue)	On	Power on
Wi-Fi (Orange)	Blinking	Wi-Fi ready
Ethernet (Green)	Blinking	Linked up
Booting (Green)	Blinking	System booting
	Off	System Ready

Interfaces



Software Information

HaLow Access Point (AP) and HaLow Station (STA)

- The Gateway inside have 2 Main parts, which are Wi-Fi 4 Router and Wi-Fi HaLow, each one operates individually.
- We will use one of gateways to be a HaLow AP as a master data center, the rest are
- HaLow Stations (STA), you can call them client devices too.
- HaLow AP gateway and HaLow Station (STA) gateway settings we separate to two sections.

HaLow AP settings

Wi-Fi 4 Router and Main Wi-Fi Router relationship

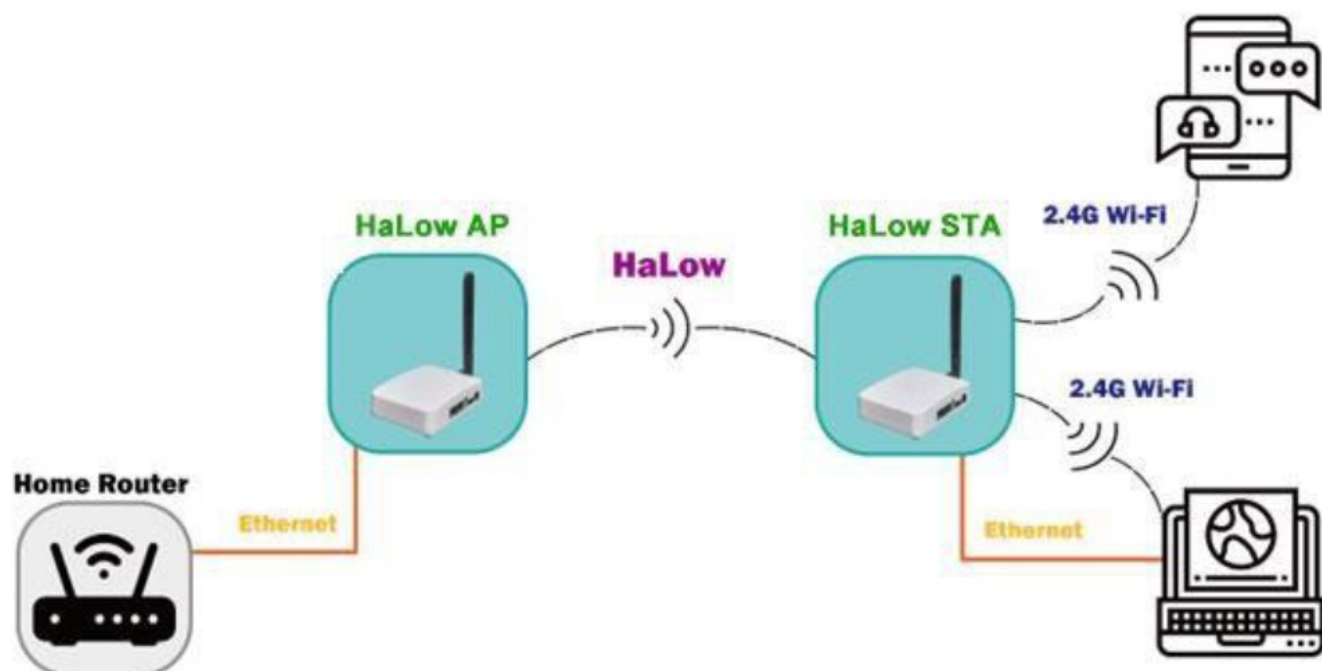
The Gateway inside have 2 Main parts, which are Wi-Fi 4 Router and Wi-Fi HaLow, each one operates individually.

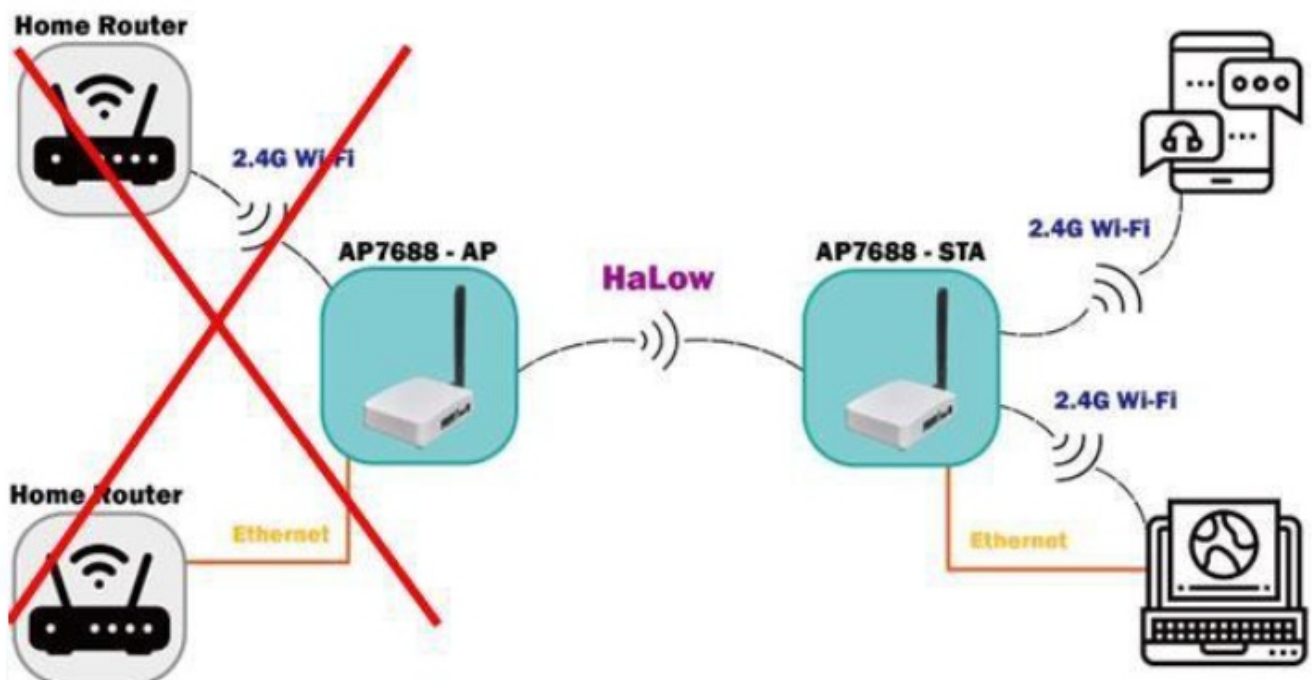
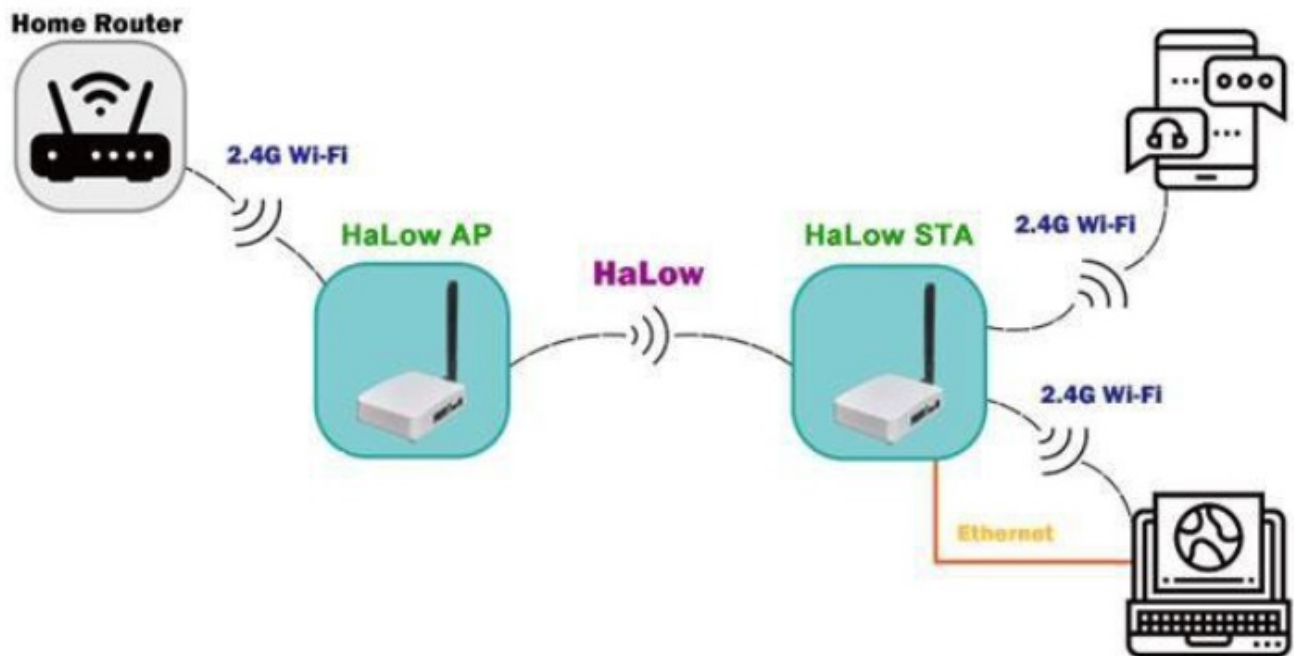
Important:

You can use HaLow AP Gateway to link with Main Home Router by two ways.

1. By LAN cable
2. By Wi-Fi linking

You can choose one way to link only, if you use two ways in the meantime, the network will be locked and can not access internet.





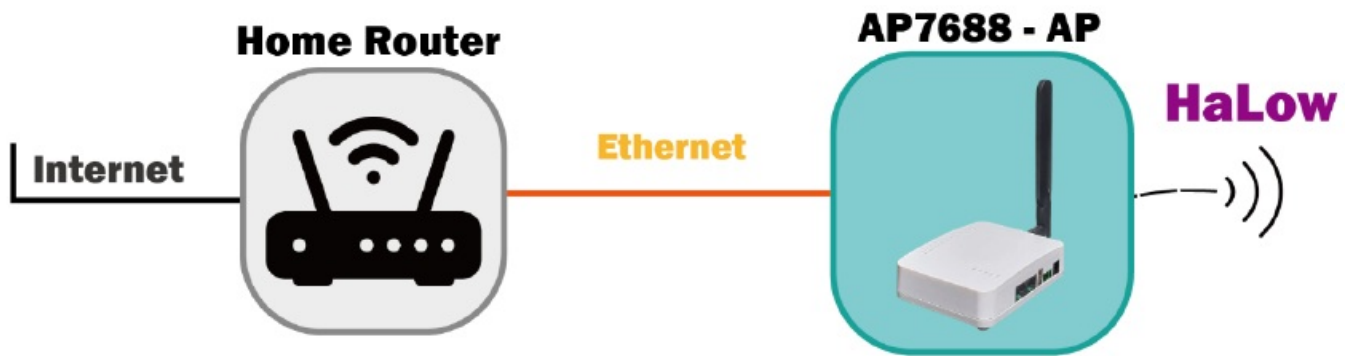
HaLow AP internet linking by LAN cable

Plug in the power and start to setting.

After plug in the power on device and wait for about 2 minutes. Device finish booting once the fourth LED light(green) turns off and second LED light(orange) turns on.

LAN and Wi-Fi two settings need to choose one only.

Switch linking setting you need to power off and power on again!

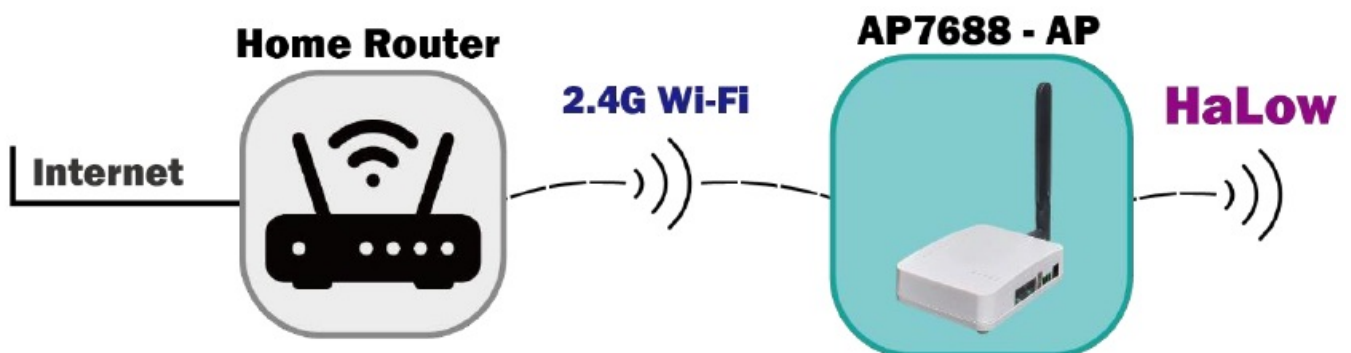


- Use CAT5 / CAT6 Cable plug in the AP mode gateway's RJ45 port.



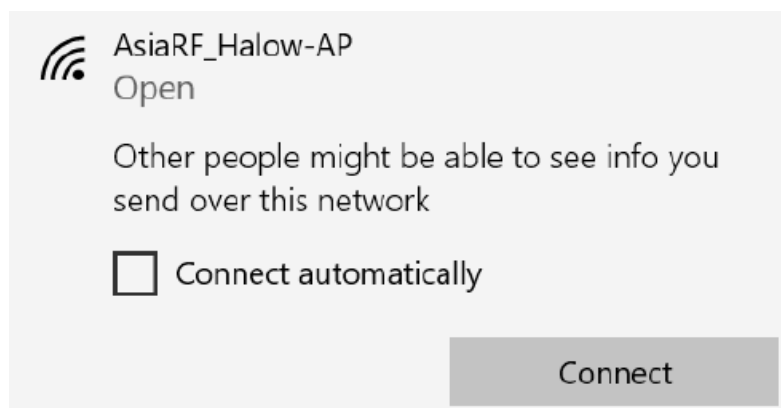
- Use PC or Mobile phone connect to the Wi-Fi (SSID: AsiaRF_Halow-AP, Password: none) and check whether network is operating successfully.

HaLow AP internet linking by Wi-Fi 4 Wireless

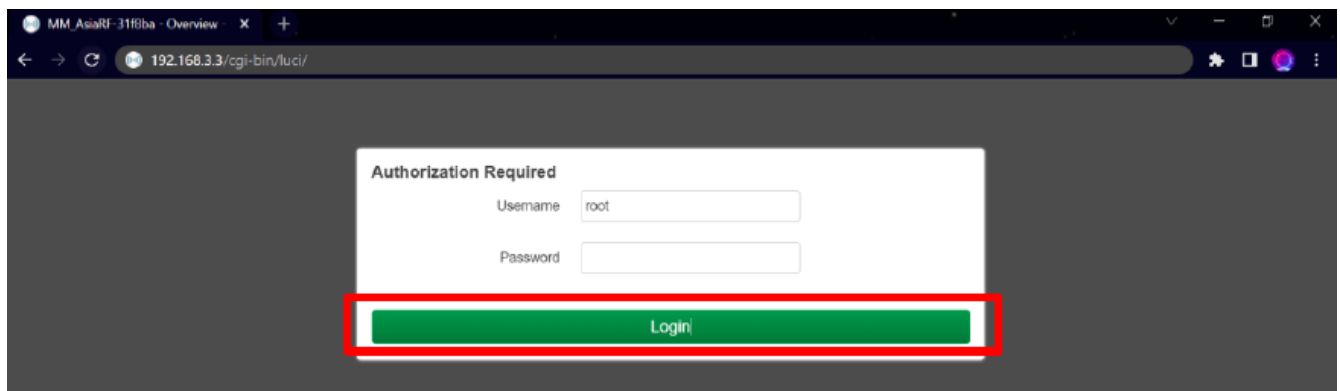


If you are going to re-connect a new Wi-Fi, check the trouble shooting Case 1 first

- Use PC or mobile phone connect to the Wi-Fi (SSID: AsiaRF_Halow-AP, Password: none).



- Open the browser and type "192.168.3.3". Click "Login" (No password in default).



- Click "Wireless" in the "Network" tab.



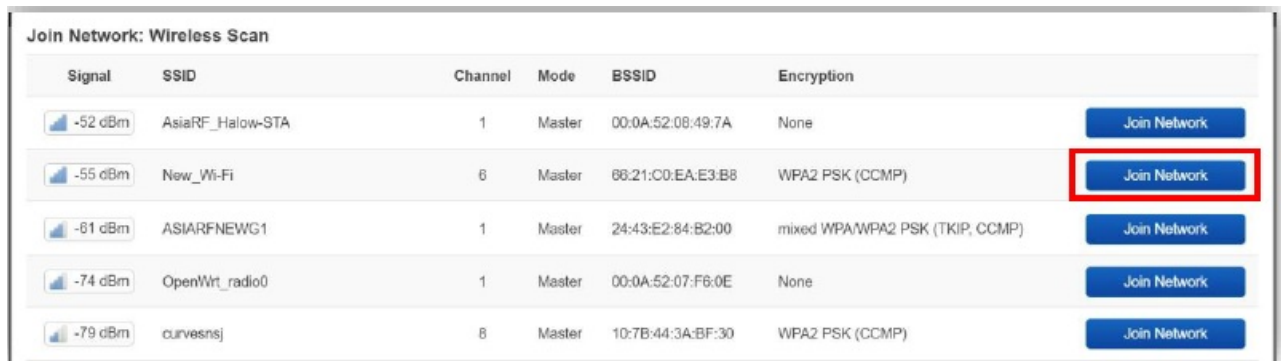
Associated Stations

- Click "Scan" to scan Wi-Fi.

Wireless Overview



- Select the Wi-Fi which you want.



- Input your Home Wi-Fi password in the "WPA passphrase" section and Click "Submit".

Joining Network: "New_Wi-Fi"

Replace wireless configuration ☐

Check this option to delete the existing networks from this radio.

Name of the new network

The allowed characters are: A-Z, a-z, 0-9, and _

WPA passphrase

Specify the secret encryption key here.

Lock to BSSID ☐

Instead of joining any network with a matching SSID, only connect to the BSSID: 66:21:C0:EA:E3:B8.

Create / Assign firewall-zone wan wan: WAN wwan: (empty)

Choose the firewall zone you want to assign to this interface. Select *unspecified* to remove the interface from the associated zone or fill out the *custom* field to define a new zone and attach the interface to it.

Cancel Submit

Interface Configuration

General Setup Wireless Security Advanced Settings

Mode Client

ESSID

BSSID

Network wwan: WAN

Choose the network(s) you want to attach to this wireless interface or fill out the custom field to define a new network.

Dismiss Save

- Click "Save & Apply" to save the configuration.

No password set!

There is no password set on this router. Please configure a root password to protect the web interface.

Wireless Overview

	MediaTek MT76x8 802.11bgn Channel: 1 (2.412 GHz) Bitrate: ? Mbit/s	Restart Scan Add
	SSID: AsiaRF_Halow-AP Mode: Master BSSID: 00:0A:52:08:49:78 Encryption: None	Disable Edit Remove
	SSID: New_Wi-Fi Mode: Client Interface has 7 pending changes	Disable Edit Remove

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
No information available				

Save & Apply Save Reset

HaLow AP's Wi-Fi 4 wireless network setting (Wi-Fi SSID/Wi-Fi Password)

- Click the "Wireless" in the "Network" tab.

MM_AsiaRF-ba10b1 Status ▾ System ▾ Morse ▾ Services ▾ Network ▾ VPN ▾ Help

Logout Interfaces

Wireless

Switch
Routing
DHCP and DNS
Diagnostics
Firewall
MultiWAN Manager
QoS

No password set!
There is no password set on this router. Please configure a root password to protect

Wireless Overview

radio0 **MediaTek MT76x8 802.11bgn**
Channel: 1 (2.412 GHz) | Bitrate: 29.7 Mbit/s

-64 dBm **SSID: AsiaRF_Halow-AP | Mode: Master**
BSSID: 00:0A:52:08:49:7A | Encryption: None

Restart Scan Add

Disable Edit Remove

Associated Stations

- Click the “Edit” button.

-65 dBm **SSID: AsiaRF_Halow-AP | Mode: Master**
BSSID: 00:0A:52:08:49:7A | Encryption: None

Disable **Edit** Remove

- Change ESSID to your new name.

Interface Configuration

General Setup Wireless Security MAC-Filter Advanced Settings

Mode Access Point ▾

ESSID **AsiaRF_My_New_WIFI**

Network lan: ▾

Choose the network(s) you want to attach to this wireless interface or fill out the custom field to define a new network.

Hide ESSID ☐

Where the ESSID is hidden, clients may fail to roam and airtime efficiency may be significantly reduced.

WMM Mode ☒

Where Wi-Fi Multimedia (WMM) Mode QoS is disabled, clients may be limited to 802.11a/802.11g rates.

Dismiss Save

If you don't need to set the Wi-Fi password.
You can press the “Save” button to skip the next step.

- Click “Wireless Security” and choose one of the encryption types.
- Ex. “WPA-PSK/WPA2-PSK Mixed Mode(medium security)” Input your WI-Fi password in “Key” field and don't forget it. Click the “Save” button to save your configuration.

Interface Configuration

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

Encryption: WPA-PSK/WPA2-PSK Mixed IV

Cipher: auto

Key: 12345678

802.11r Fast Transition: ☐

Enables fast roaming among access points that belong to the same Mobility Domain

802.11w Management Frame Protection: Disabled

Note: Some wireless drivers do not fully support 802.11w. E.g. mwlwifi may have problems

Enable key reinstallation (KRACK) countermeasures: ☐

Complicates key reinstallation attacks on the client side by disabling retransmission of EAPOL-Key frames that are used to install keys. This workaround might cause interoperability issues and reduced robustness of key negotiation especially in environments with heavy traffic load.

Enable WPS pushbutton, requires WPA(2)-PSK/WPA3-SAE: ☐

Dismiss **Save**

- Click the “Save & Apply” button to save the configuration.

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate	
Master "AsiaRF_Halow-AP" (wlan0)	12:2C:B1:0B:44:AE	M2101K7BNY.lan (192.168.3.138)	-76 dBm	1.0 Mbit/s, 20 MHz 1.0 Mbit/s, 20 MHz	Disconnect
Master "AsiaRF_Halow-AP" (wlan0)	CE:71:F4:5C:DD:95	192.168.5.155	-51 dBm	72.2 Mbit/s, 20 MHz, MCS 7, Short GI 65.0 Mbit/s, 20 MHz, MCS 7	Disconnect

Save & Apply Save Reset

- It will reset your Wi-Fi interface. Find the new Wi-Fi and enter your password. And it will finish your Configuration.

radio0 Configuration changes applied.

SSID: AsiaRF_Halow-AP | Mode: Master
Interface has 3 pending changes

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
Master "AsiaRF_Halow-AP" (wlan0)	12:2C:B1:0B:44:AE	M2101K7BNY.lan (192.168.5.138)	-76 dBm	1.0 Mbit/s, 20 MHz

ASIA RF NEWG1_5G
AsiaCol500
AsiaRF_My_New_WIFI 安全
正在檢查網路需求

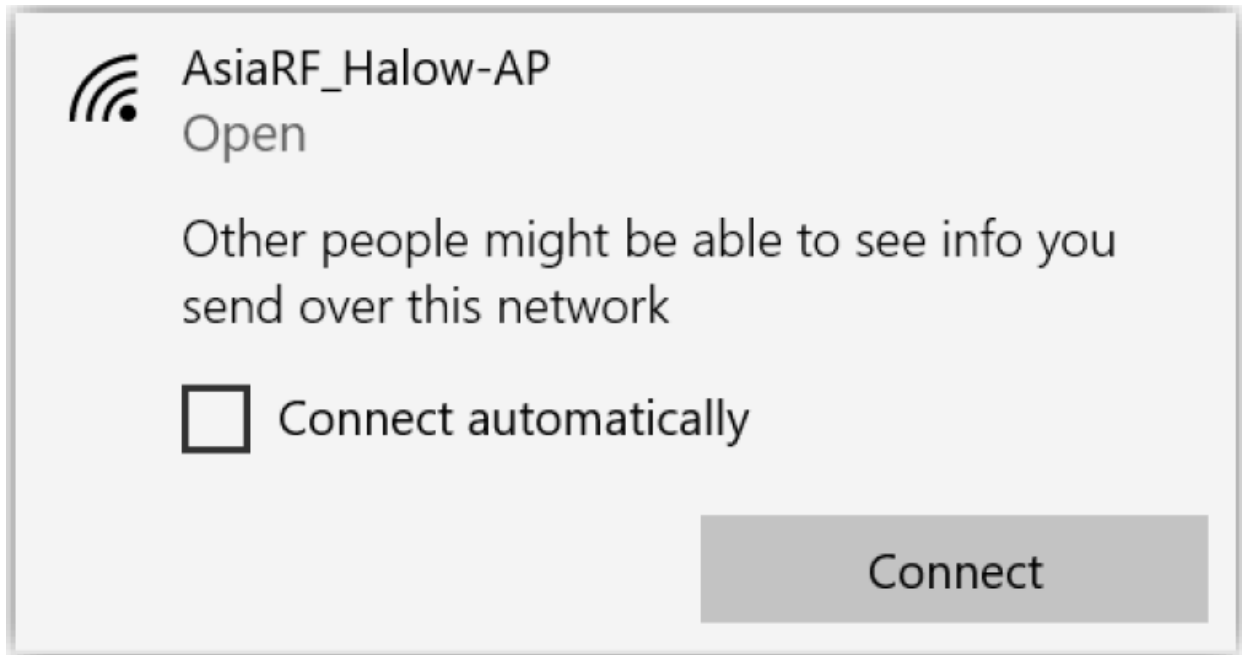
取消

Wi-Fi HaLow AP mode setting

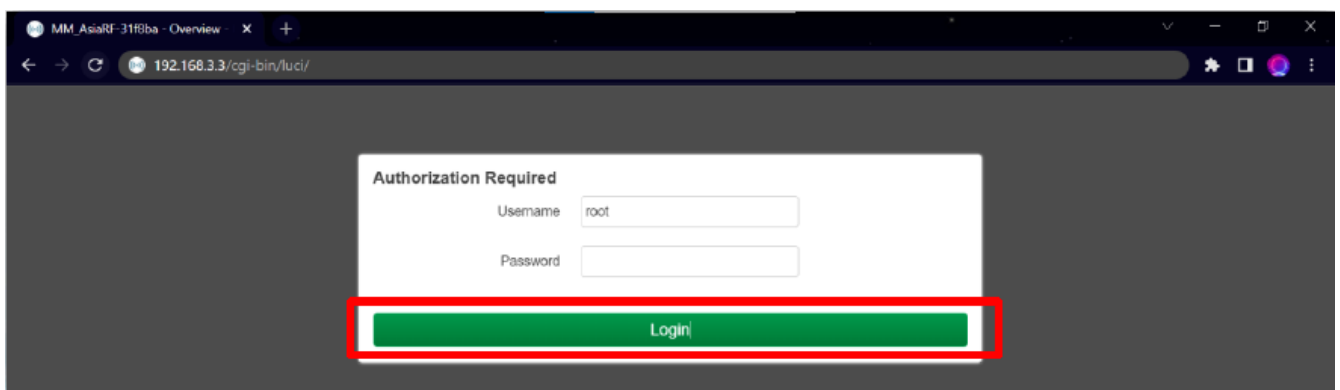
- Our product is a pair of AP7688-WHM. It has default setting with Wi-Fi HaLow. If you don't need to set HaLow in special configuration, you can skip this chapter.

Connect to device

- Use PC or mobile phone and connect to the Wi-Fi (SSID: AsiaRF_Halow-AP, Password: None)

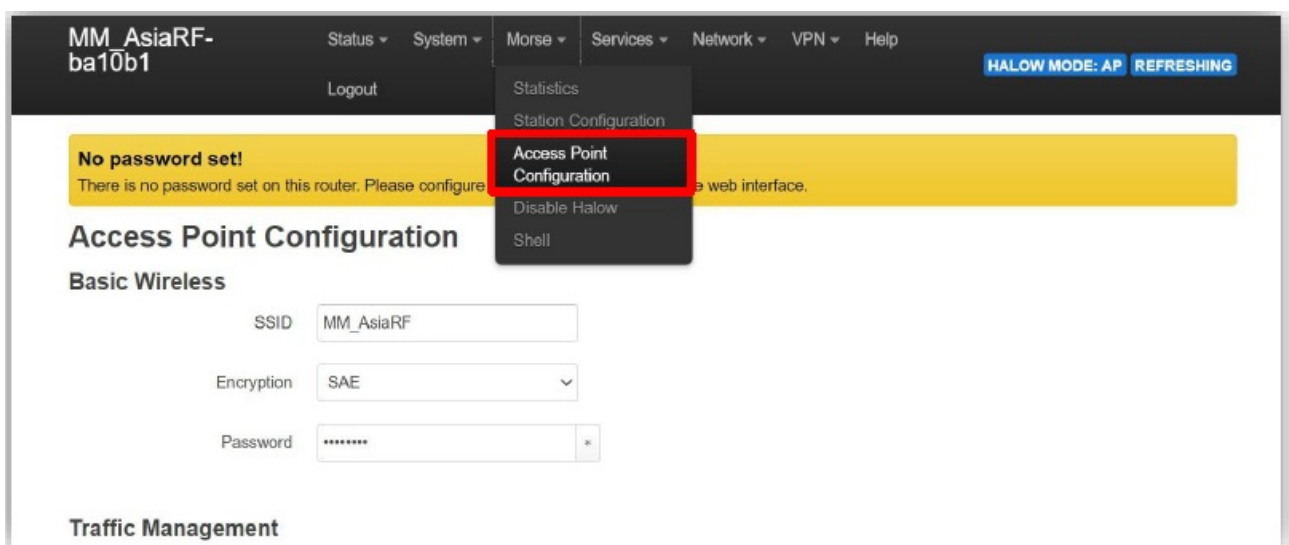


- Open the browser and type "192.168.3.3". Click "Login" (No password in default).



Setting to AP mode

- Click "Access Point Configuration" in the "Morse" tab.



- Setting your Wi-Fi HaLow SSID and password.

Basic Wireless

SSID

Encryption

Password

Beacon Interval (ms)


DTIM Period

Max Inactivity (1-65536)

HaLow Station (STA) Gateway Configuration

HaLow STA Gateway Wi-Fi 4 Wireless Network setting (Wi-Fi SSID/Wi-Fi Password)

- Use PC or mobile phone and connect to the Wi-Fi (SSID: AsiaRF_Halow-STA, Password: None)



AsiaRF_Halow-STA
Open

Other people might be able to see info you send over this network

☐ Connect automatically

- Open the browser and type "192.168.5.5". Click "Login" (No password in default).

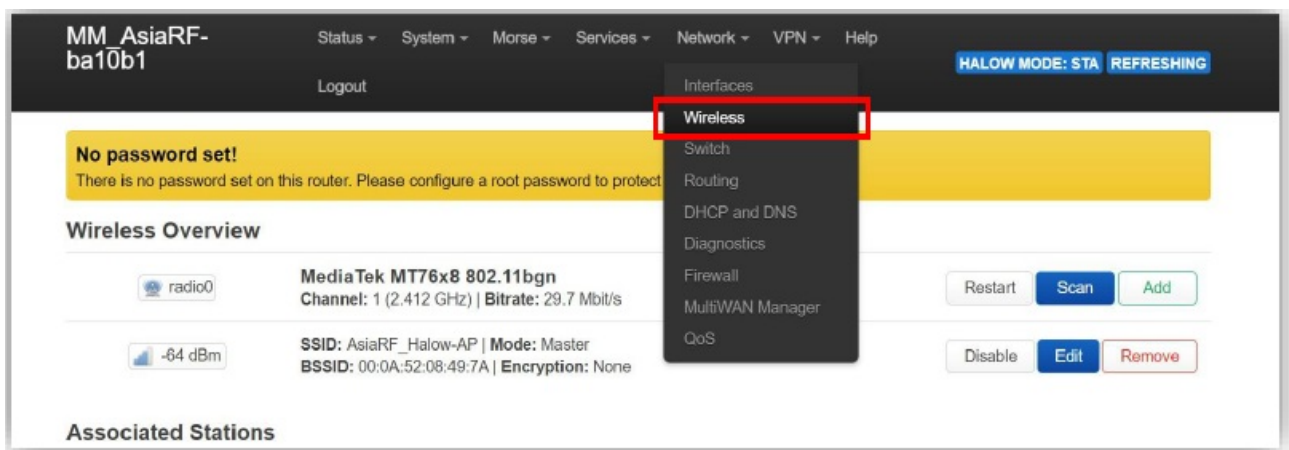
MM_AsiaRF-31f8ba - Overview
192.168.5.5/cgi-bin/luci/

Authorization Required

Username

Password

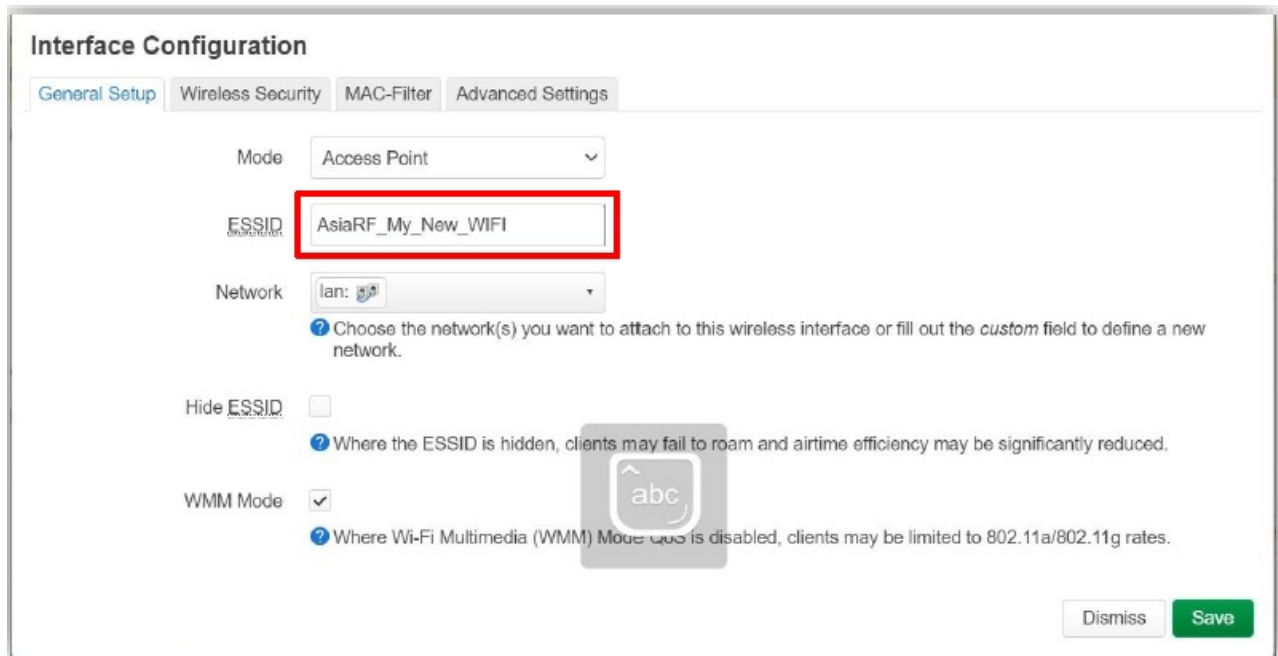
- Click the "Wireless" in the "Network" tab.



- Click the “Edit” button.



- Change ESSID to your new name.



If you don't need to set the Wi Fi password.
You can press the “ ” button to skip the next step.

- Click “Wireless Security” and choose one of the encryption types.
- Ex. “WPA-PSK/WPA2-PSK Mixed Mode(medium security)” Input your WI-Fi password in “Key” field and don't forget it. Click the “Save” button to save your configuration.

Interface Configuration

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

Encryption: WPA-PSK/WPA2-PSK Mixed IV

Cipher: auto

Key: 12345678

802.11r Fast Transition: ☐
 ? Enables fast roaming among access points that belong to the same Mobility Domain

802.11w Management Frame Protection: Disabled
 ? Note: Some wireless drivers do not fully support 802.11w. E.g. mwlwifi may have problems

Enable key reinstallation (KRACK) countermeasures: ☐
 ? Complicates key reinstallation attacks on the client side by disabling retransmission of EAPOL-Key frames that are used to install keys. This workaround might cause interoperability issues and reduced robustness of key negotiation especially in environments with heavy traffic load.

Enable WPS pushbutton, requires WPA(2)-PSK/WPA3-SAE: ☐

Dismiss **Save**

- Click the “Save & Apply” button to save the configuration.

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate	
Master "AsiaRF_Halow-AP" (wlan0)	12:2C:B1:0B:44:AE	M2101K7BNY.lan (192.168.3.138)	-76 dBm	1.0 Mbit/s, 20 MHz 1.0 Mbit/s, 20 MHz	Disconnect
Master "AsiaRF_Halow-AP" (wlan0)	CE:71:F4:5C:DD:95	192.168.5.155	-51 dBm	72.2 Mbit/s, 20 MHz, MCS 7, Short GI 65.0 Mbit/s, 20 MHz, MCS 7	Disconnect

Save & Apply Save Reset

- It will reset your Wi Fi interface. Find the new Wi Fi and enter your password. And it will finish your Configuration.

radio0 Configuration changes applied.

SSID: AsiaRF_Halow-AP | Mode: Master
Interface has 3 pending changes

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
Master "AsiaRF_Halow-AP" (wlan0)	12:2C:B1:0B:44:AE	M2101K7BNY.lan (192.168.3.138)	-76 dBm	1.0 Mbit/s, 20 MHz

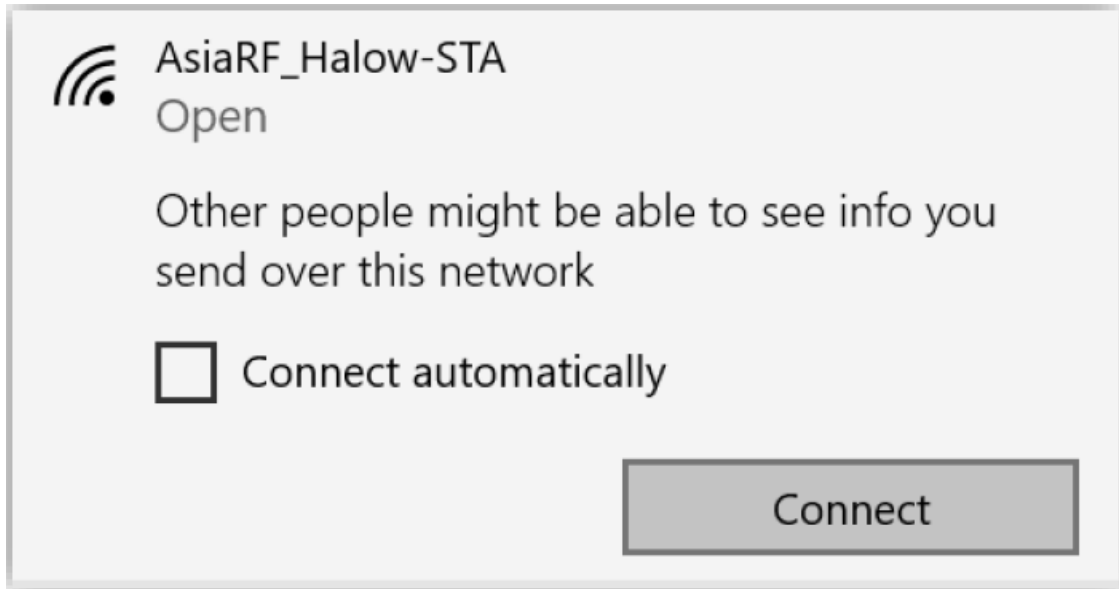
ASIAFNEWG1_5G
AsiaCol500
AsiaRF_My_New_WIFI
安全
正在檢查網路需求
取消

Wi-Fi HaLow STA mode setting

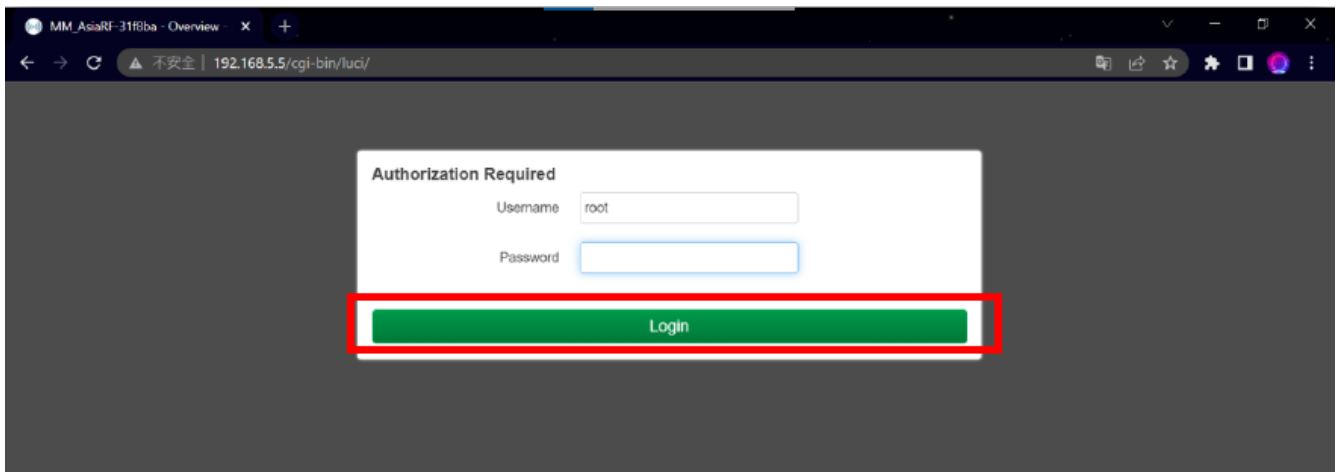
- Our product is a pair of AP7688-WHM. It has default setting with Wi-Fi HaLow. If you don't need to set HaLow in special configuration, you can skip this chapter.

Connect to device

- Use PC or mobile phone and connect to the Wi-Fi (SSID: AsiaRF_Halow-STA, Password: None)

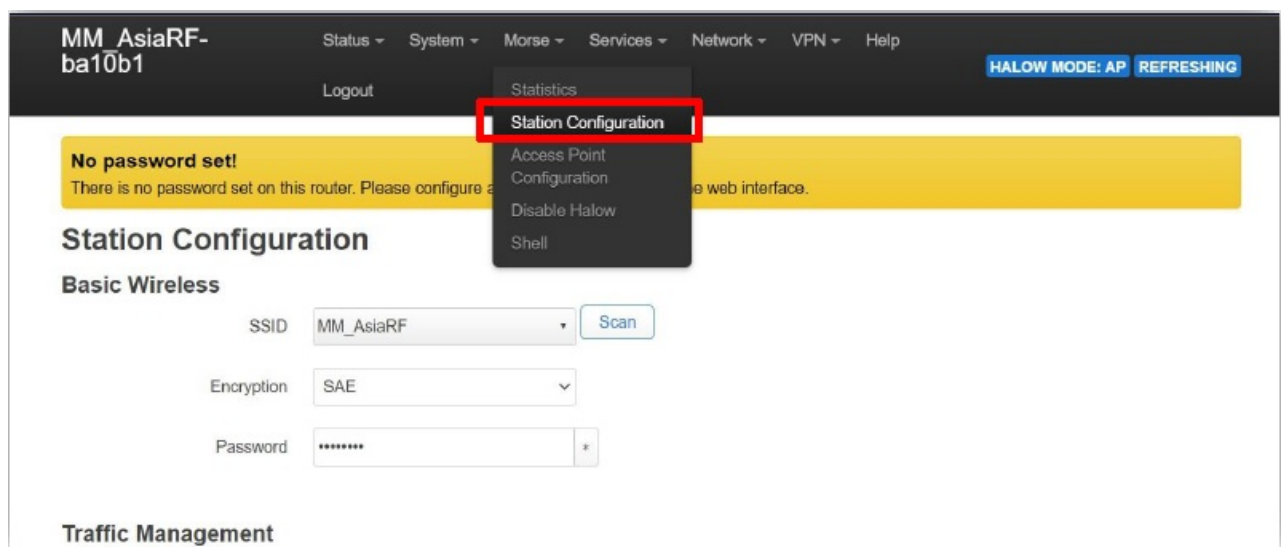


- Open the browser and type "192.168.5.5". Click "Login" (No password in default).



Setting to STA mode

- Click "Station Configuration" in the "Morse" tab.



- The Wi-Fi HaLow default connect SSID is "MM_AsiaRF".

Basic Wireless

SSID

- You can click “Scan” button to scan the Wi-Fi HaLow AP around it.

Basic Wireless

SSID

- It will choose the Wi-Fi HaLow AP around you, or you can choose one in the list. Ex. SSID: MM_AsiaRF_2. Don't forget to input the password.

Basic Wireless

SSID

Encryption

Password

- Change your Wired IP Address to avoid the same IP network segment. Ex. Wired IP Address: 192.168.5.5, Wired Gateway: 192.168.5.1

IP Settings - Ethernet

Wired IP Method

Wired IP Address

Wired Netmask

Wired Gateway

DHCP Range Start

DHCP Range End

- Click “Save” button to save the configuration.

Advanced Wireless

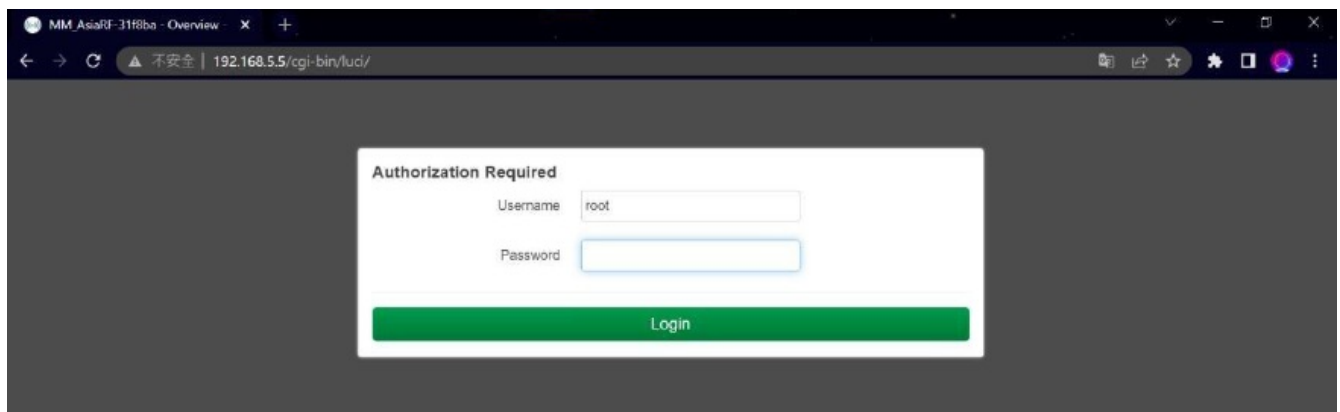
Region

Protected Management Frames ☐

Saving

☐ Applying configuration changes. Forcing a page reload in 58s

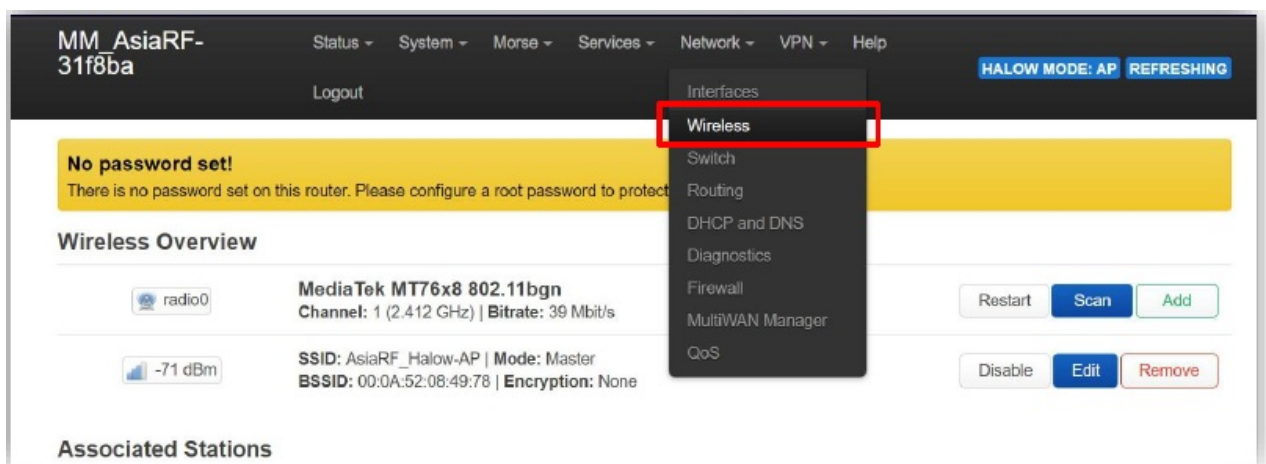
- Enter your new IP address to continue your other service / setting.



Trouble Shooting

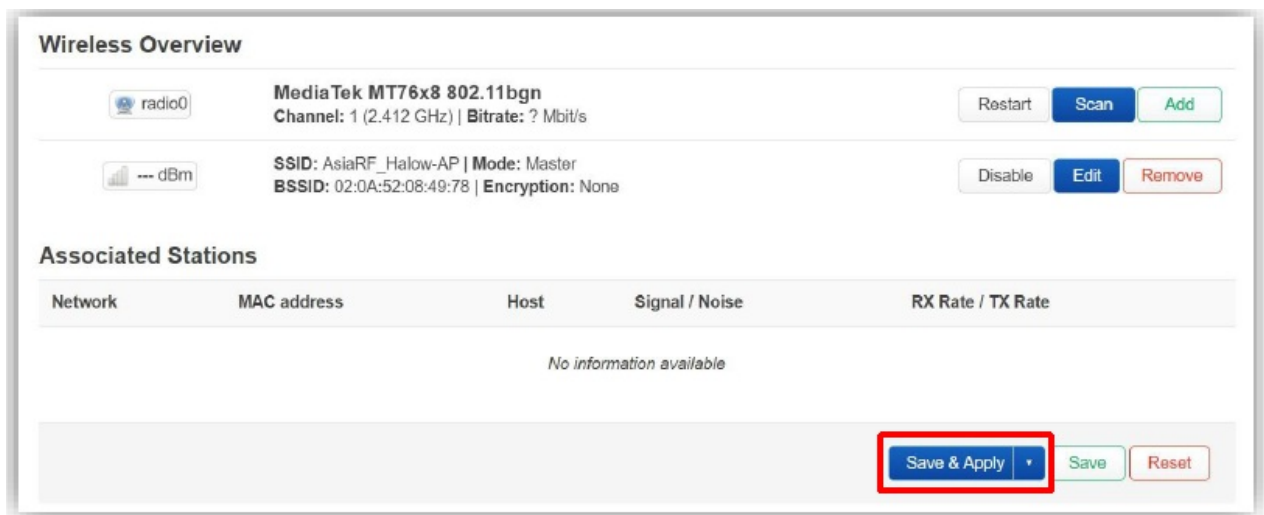
Case 1

- **Problem:** AP gateway re-connect to new Wi-Fi.
- **Solution:** Follow the steps below first to remove the old one and continue the chapter 2.1.3.
 - Use PC or mobile phone and connect to the AP-side Wi-Fi.
 - Click “Wireless” in the “Network” tab.



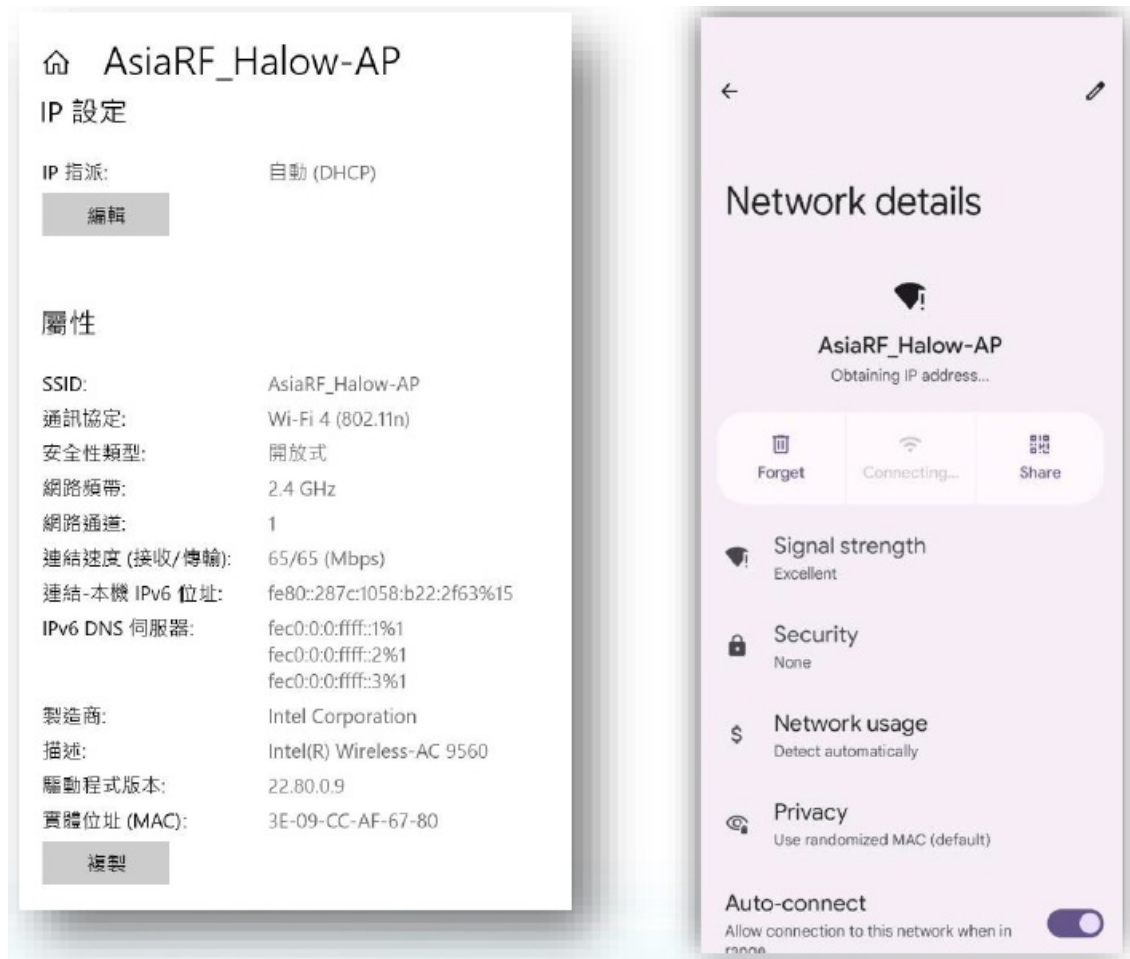
- Check the previous connection of Wi-Fi. Remove the interface with “Mode: Client” at the bottom if it exists.
- And click “Save & Apply” to save your configuration.





Case 2

- **Problem:** Unable to connect to Wi-Fi or failed to get IP address after connecting.



- **Solution:** Restart the device, re-plug the power.

FCC STATEMENT

This equipment has been 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. This 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 this 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 or more of the following measures:

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

ISED Radiation Exposure Statement:

- This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

The transmitter module may not be co-located with any other transmitter or antenna. For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Contact


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- **TEL:** +886-2-29407880
- **FAX:** +886-2-29407800

FAQ

- **Q:** What is the maximum throughput of Wi-Fi HaLow?
 - **A:** The Wi-Fi HaLow throughput reaches 20Mbps.

- **Q:** What is the linking distance for Wi-Fi HaLow?
 - **A:** The Wi-Fi HaLow linking distance is more than 1 KM.
- **Q:** Can the Wi-Fi HaLow Gateway connect with Main Home Router via both LAN cable and Wi-Fi simultaneously?
 - **A:** No, to avoid network lock, choose either LAN cable or Wi-Fi linking to connect the Wi-Fi HaLow Gateway with the Main Home Router.

Documents / Resources

	<p>ASiaRF AP7688-WHM Wi-Fi HaLow Gateway [pdf] User Manual AP7688-WHM, AW7688-WHM, TKZAW7688-WHM, AP7688-WHM Wi-Fi HaLow Gateway, Wi-Fi HaLow Gateway, HaLow Gateway, Gateway</p>
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References

- [🌐 AsiaRF | Global Leader In Wireless Connectivity](#)
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- [User Manual](#)

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