

Wi-Fi HaLow™ Gateway

PN: AP7688-WHM

User Manual

Content

Introduction	3
Hardware Information	4
1.1 Contents	4
1.2 LEDs and Interfaces	5
1.2.1 LED display meaning	5
1.2.1 Interfaces.....	5
Software Information	6
2 HaLow Access Point (AP) and HaLow Station (STA)	6
2.1 HaLow AP settings	6
2.1.1 Wi-Fi 4 Router and Main Wi-Fi Router relationship	6
2.1.2 HaLow AP internet linking by LAN cable	8
2.1.3 HaLow AP internet linking by Wi-Fi 4 Wireless	9
2.2 HaLow AP's Wi-Fi 4 wireless network setting (Wi-Fi SSID/Wi-Fi Password)	12
2.3 Wi-Fi HaLow AP mode setting.....	15
2.4 HaLow Station (STA) Gateway Configuration.....	17
2.4.1 HaLow STA Gateway Wi-Fi 4 Wireless Network setting (Wi-Fi SSID/Wi-Fi Password).....	17
2.5 Wi-Fi HaLow STA mode setting	21
Trouble Shooting	24
Case 1.....	24
Case 2.....	25

Introduction

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

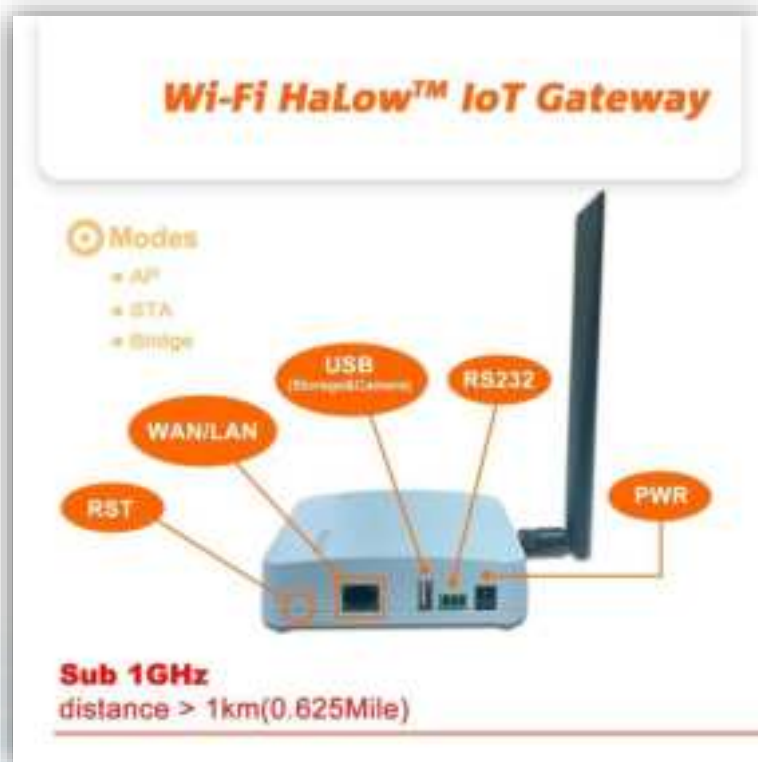
The Main parts are **Wi-Fi 4 Router** and **Wi-Fi HaLow**, each one operates individually.

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



Hardware Information

1.1 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.

1.2 LEDs and Interfaces

1.2.1 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

1.2.1 Interfaces



Software Information

2 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.

2.1 HaLow AP settings

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

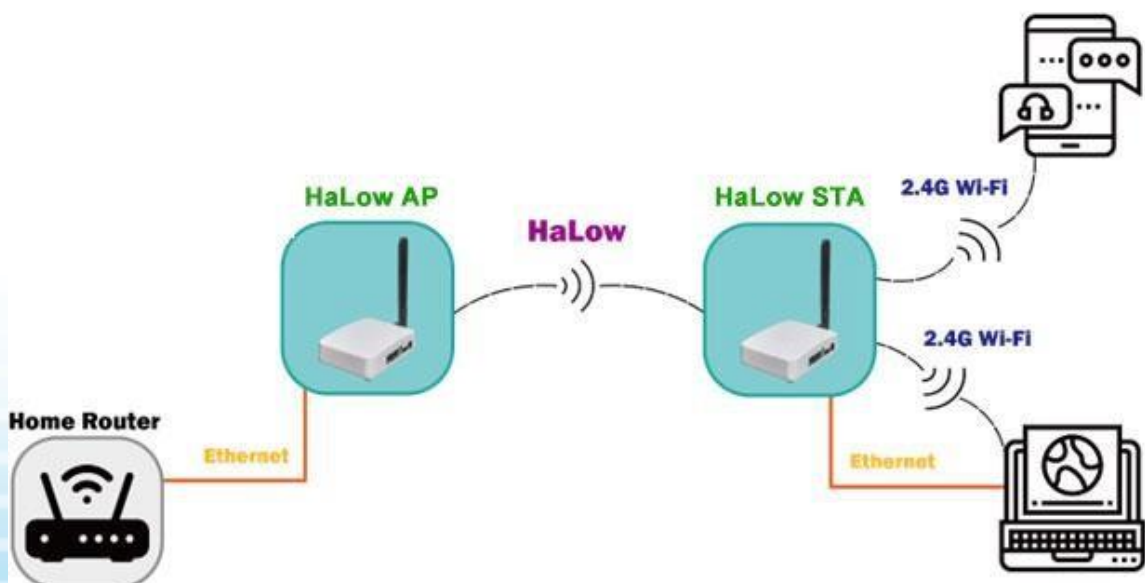
The Gateway inside have 2 Main parts, which are **Wi-Fi 4 Router** and **Wi-Fi HaLow**, each one operates individually.

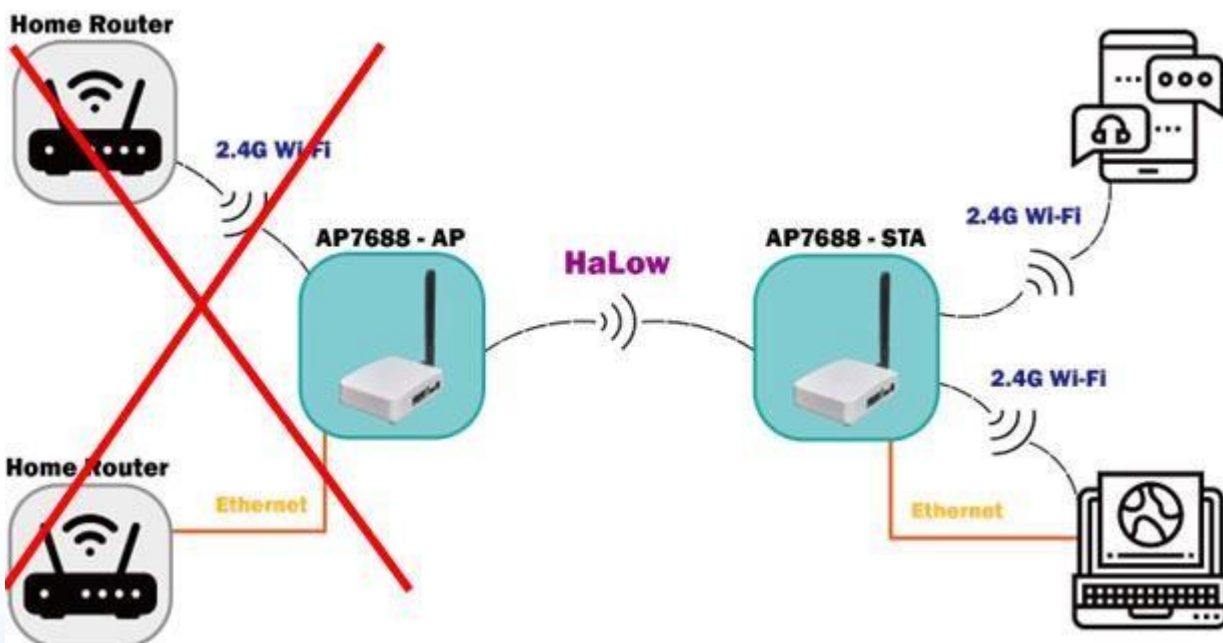
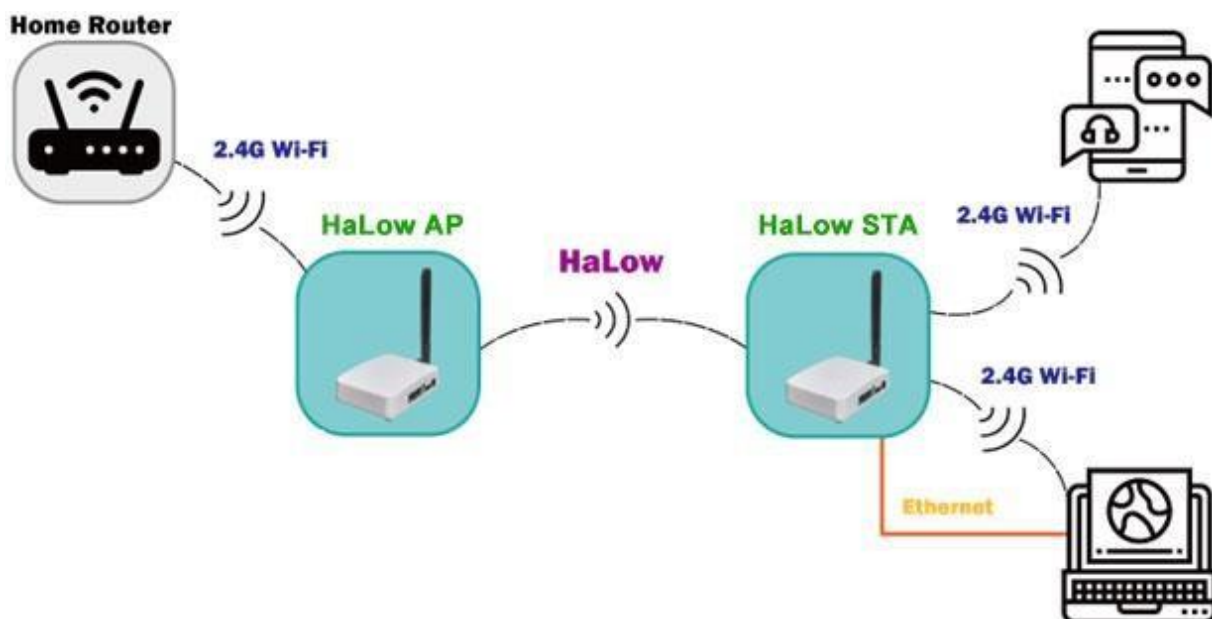
Important:

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.



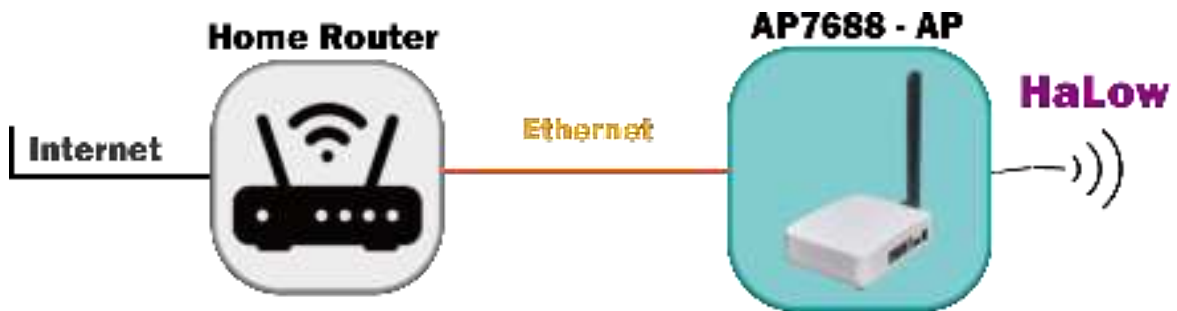


2.1.2 HaLow AP internet linking by LAN cable

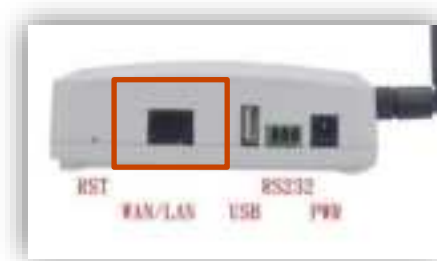
Plug in the power and start to setting.

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! *****

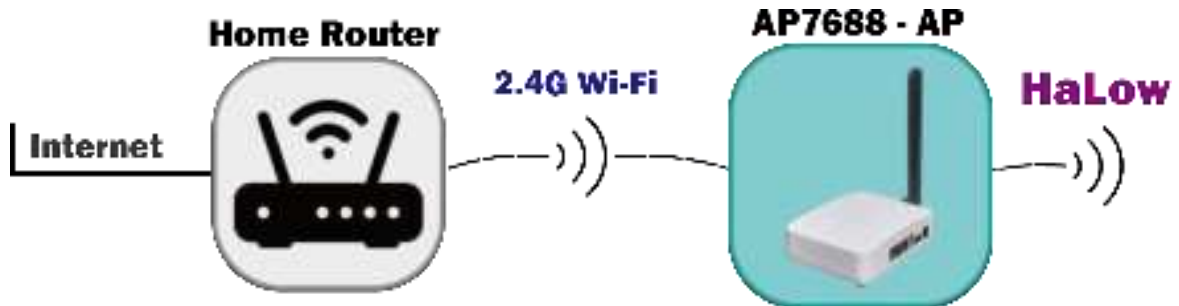


Use CAT5 / CAT6 Cable plug in the AP mode gateway's RJ45 port.



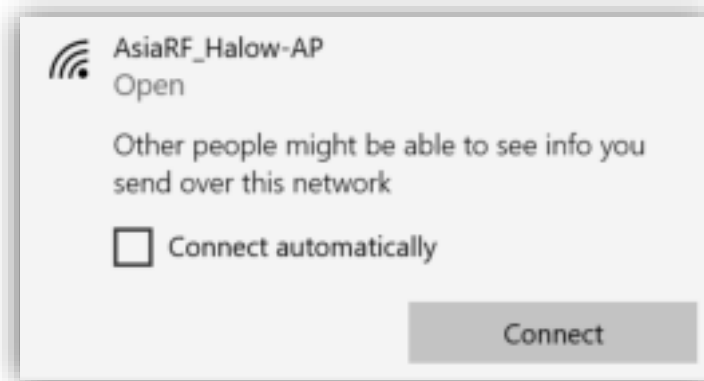
Use PC or Mobile phone connect to the Wi-Fi (SSID: AsiaRF_Halow-AP, Password: none) and check whether network is operating successfully.

2.1.3 HaLow AP internet linking by Wi-Fi 4 Wireless

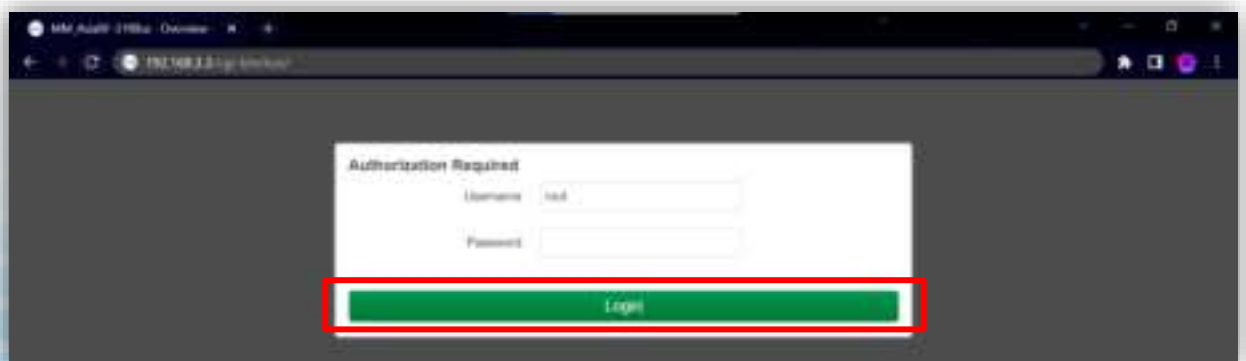


*** If you are going to re-connect a new Wi-Fi, check the [trouble shooting Case 1](#) first ***

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.



Click “Scan” to scan Wi-Fi.



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"

Refresh wireless configuration

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

Name of the new network:

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

WPA passphrase:

- ☒ Specify the secret encryption key here.

Look to WPS:

- ☒ Instead of joining the network with a matching PIN, only connect to the PIN: 00 (00:00:00:00:00:00).

Create & Assign Firewall zone:

- ☒ Choose the firewall zone you want to assign to the interface. Select unspecified to remove the rule rule from the associated zone of IP but the system field to define a new zone and attach the interface to it.

Cancel **Submit**



Interface Configuration

General Setup | Wireless Security | Advanced Settings

Mode:

SSID:

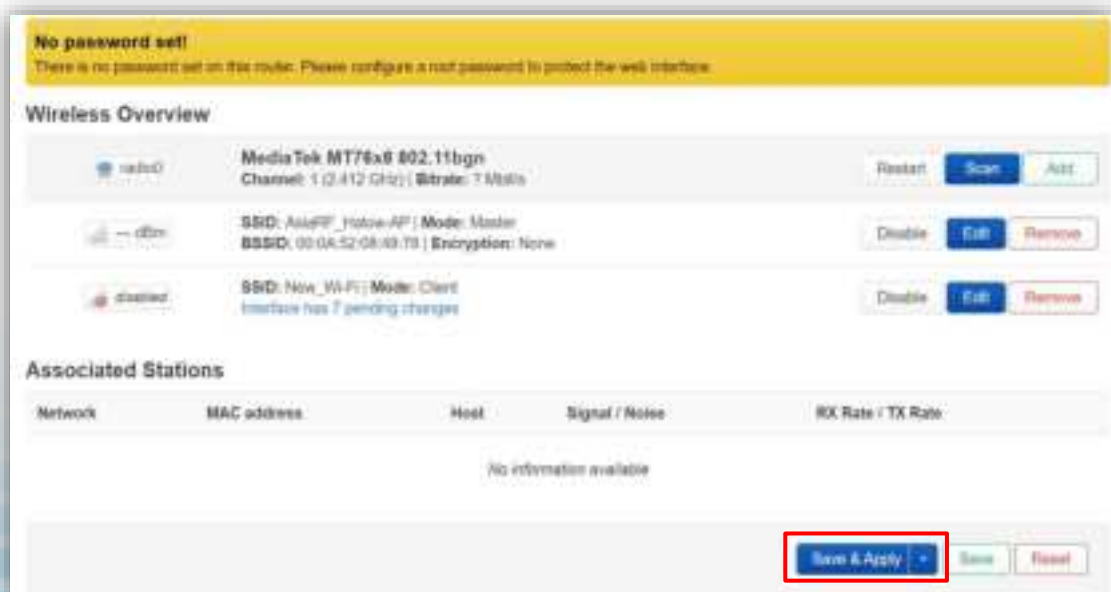
SSID:

Network:

- ☒ Choose the network you want to attach to this wireless interface or IP but the system field to define a new network.

Discard **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) Rate: 7 Mbps	Restart Scan Add
	SSID: AsiaRF_Hotspot Mode: Master BSSID: 00:0A:52:08:03:78 Encryption: None	Disable Edit Remove
	SSID: New_Wi-Fi Mode: Client Interface has 7 pending changes	Disable Edit Remove

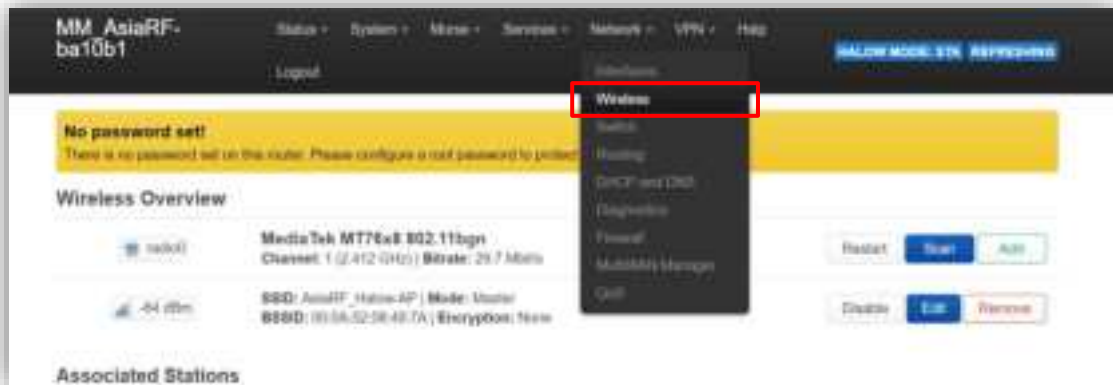
Associated Stations

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

Save & Apply **Save** **Reset**

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

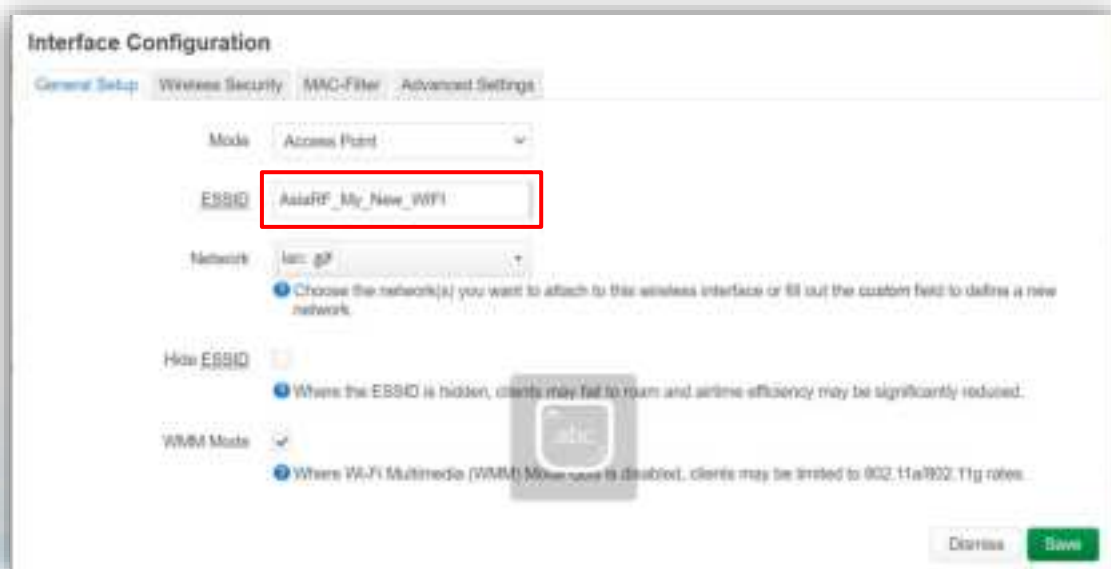
Click the “Wireless” in the “Network” tab.



Click the “Edit” button.

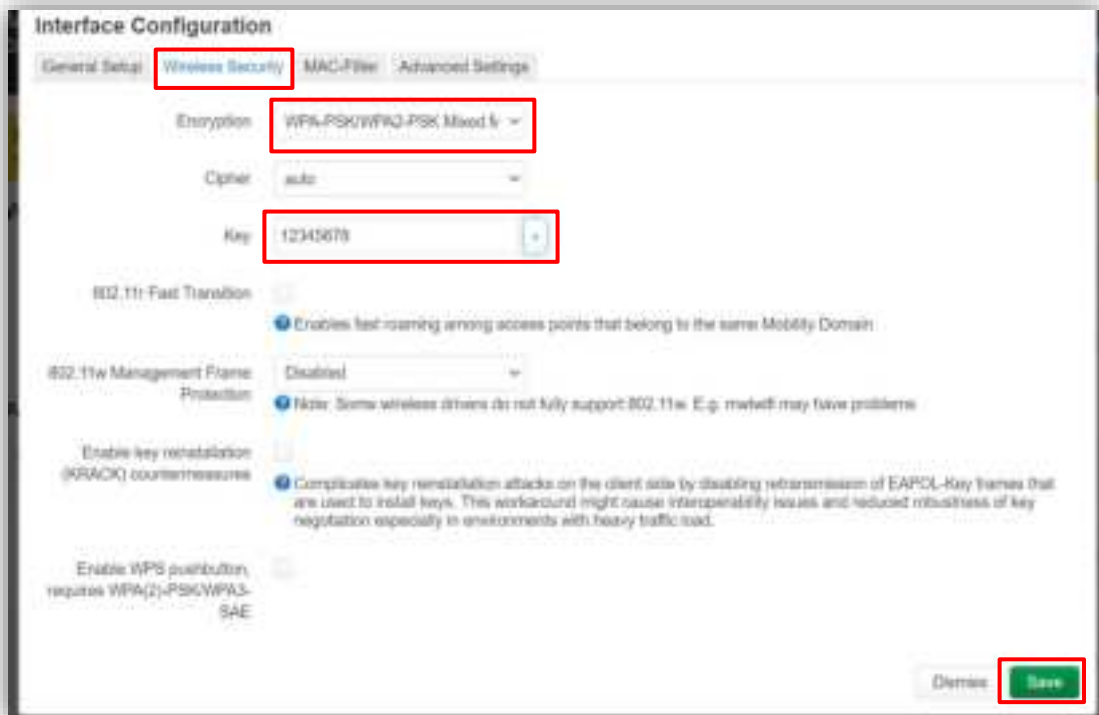


Change ESSID to your new name.



***** If you don't need to set the Wi-Fi password. *****
***** You can press the "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 Mode

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: ☐ Compensates 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 WPA2-PSK/WPA3-SAE: ☐

Buttons: Disable **Save**

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



Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate	
Master "AsiaRF_Helios-AP" (reboot)	12:2C:81:05:44:AE	M210TK75NYJan (192.168.3.138)	-76 dBm	1.0 Mbps, 20 MHz 1.0 Mbps, 20 MHz	Disconnect
Master "AsiaRF_Helios-AP" (reboot)	CE:71:F4:3C:DD:2D	192.168.3.155	-51 dBm	72.2 Mbps, 20 MHz, MCS 7, Short GI 65.0 Mbps, 20 MHz, MCS 7	Disconnect

Buttons: **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.

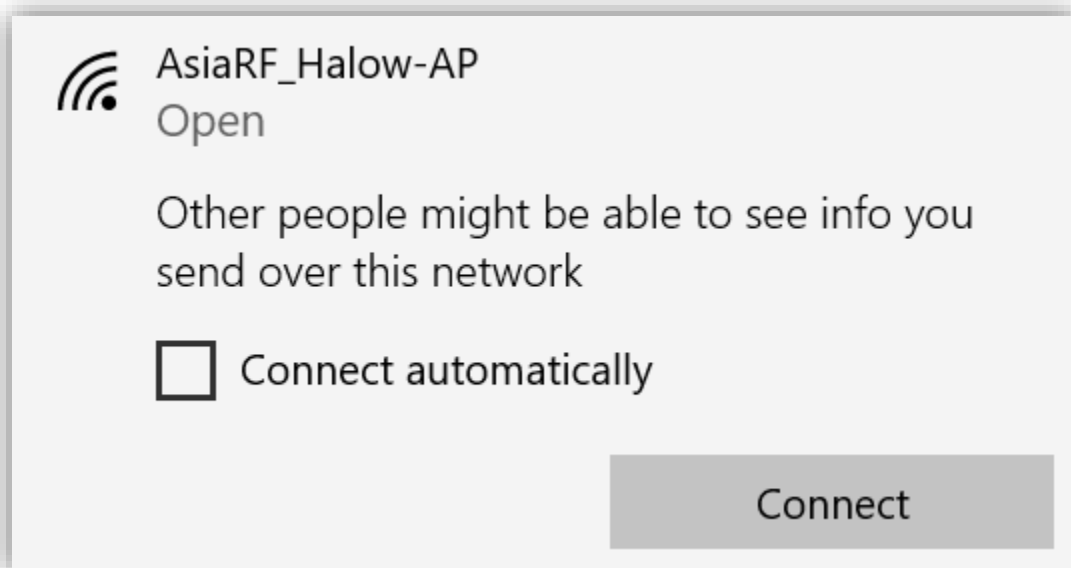


2.3 Wi-Fi HaLow AP mode setting

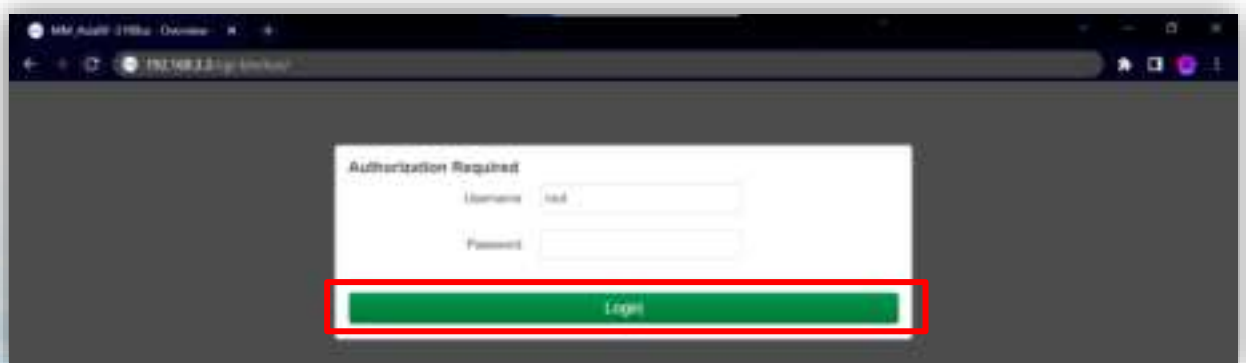
Our product is a pair of AP7688-WHM. It has default setting with Wi-Fi HaLow. If you don't need to set HaLow in special configuration, you can skip this chapter.

2.3.1 Connect to device

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

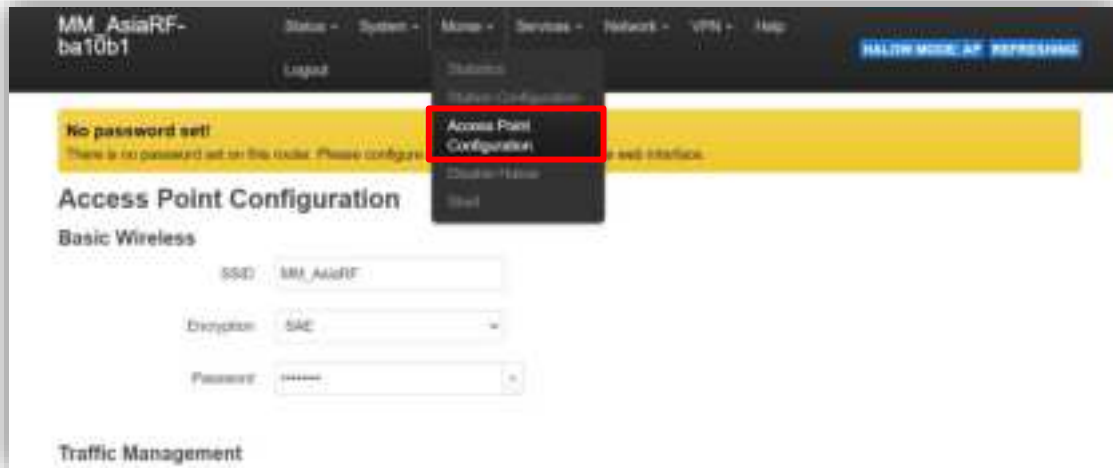


Open the browser and type "192.168.3.3".
Click "Login" (No password in default).

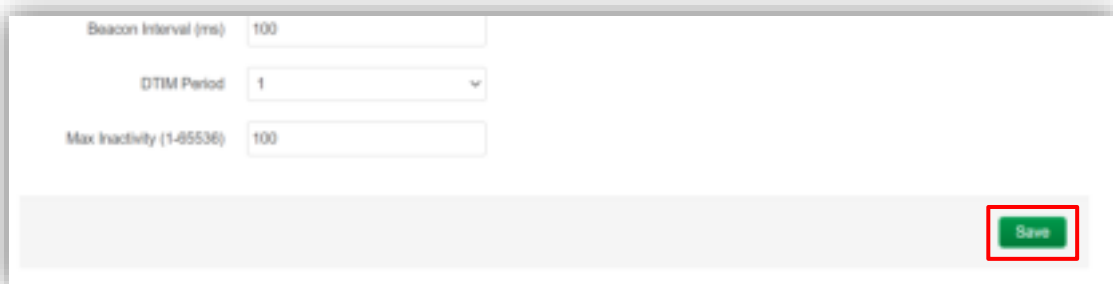
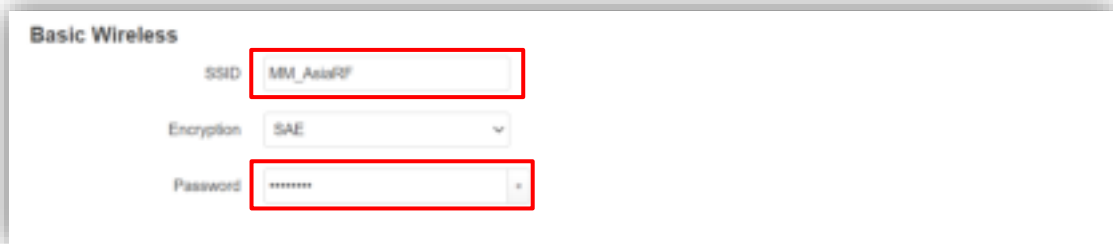


2.3.2 Setting to AP mode

Click “Access Point Configuration” in the “Morse” tab.



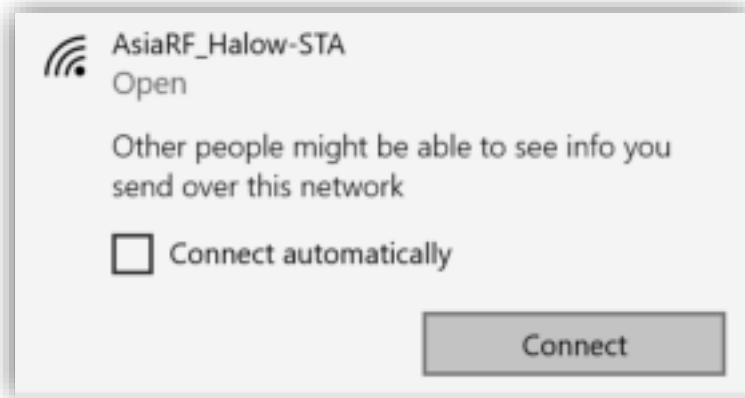
Setting your Wi-Fi HaLow SSID and password.



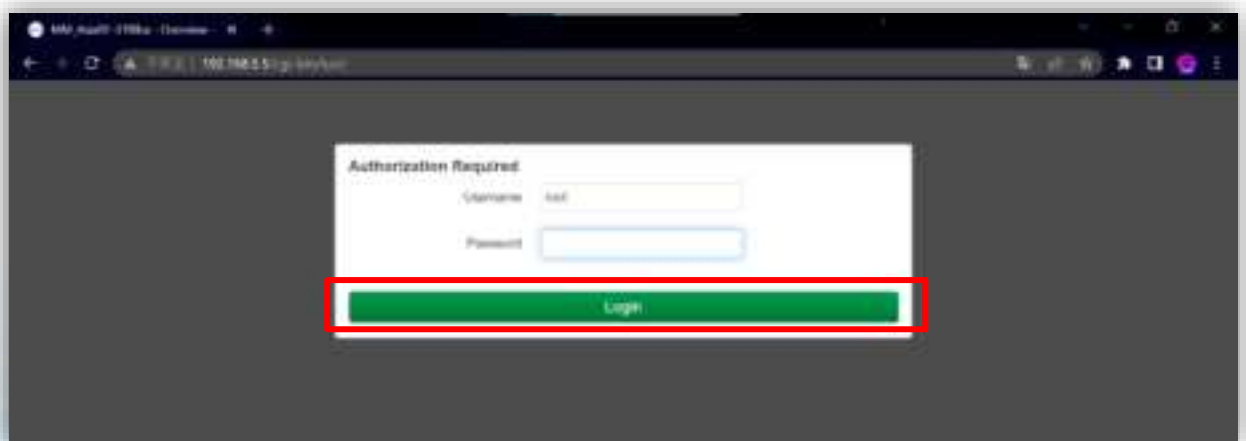
2.4 HaLow Station (STA) Gateway Configuration

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

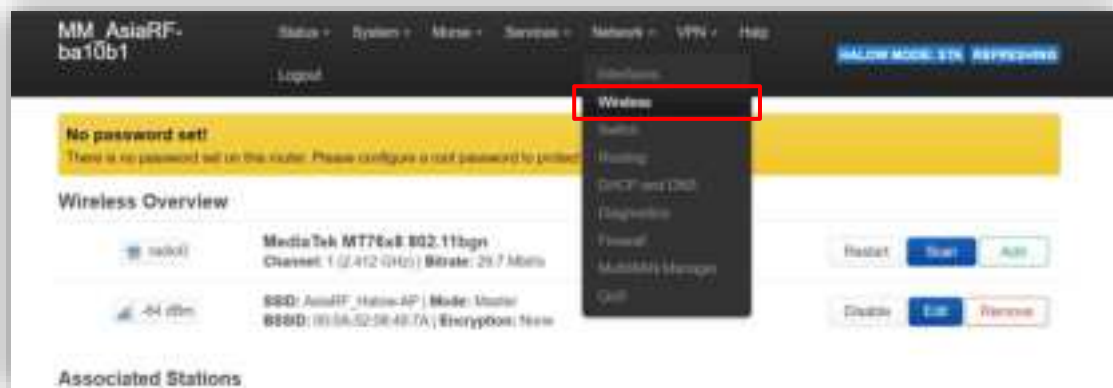
Use PC or mobile phone and connect to the Wi-Fi (SSID: AsiaRF_Halow-STA, Password: None)



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



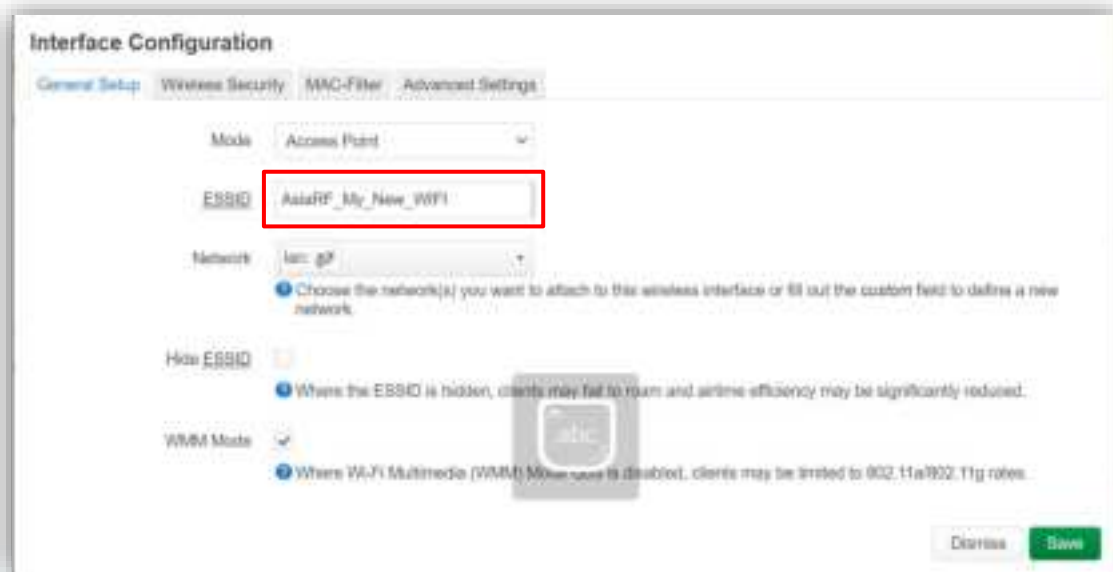
Click the “Wireless” in the “Network” tab.



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 “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 Mode

Cipher: auto

Key: 12345678

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

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

Enable key reinstallation (KRACK) countermeasures: ☐
 Compensates 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: ☐

Buttons: Disable **Save**

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

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate	
Master "AsiaRF_Helios-AP" (reboot)	12:2C:81:0B:44:AE	M211K78NYlan (192.168.3.138)	-76 dBm	1.0 Mbps, 20 MHz 1.0 Mbps, 20 MHz	Disconnect
Master "AsiaRF_Helios-AP" (reboot)	0E:71:F4:3C:DD:2B	192.168.3.155	-51 dBm	72.2 Mbps, 30 MHz, MCS 7, Short GI 65.0 Mbps, 20 MHz, MCS 7	Disconnect

Buttons: **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.

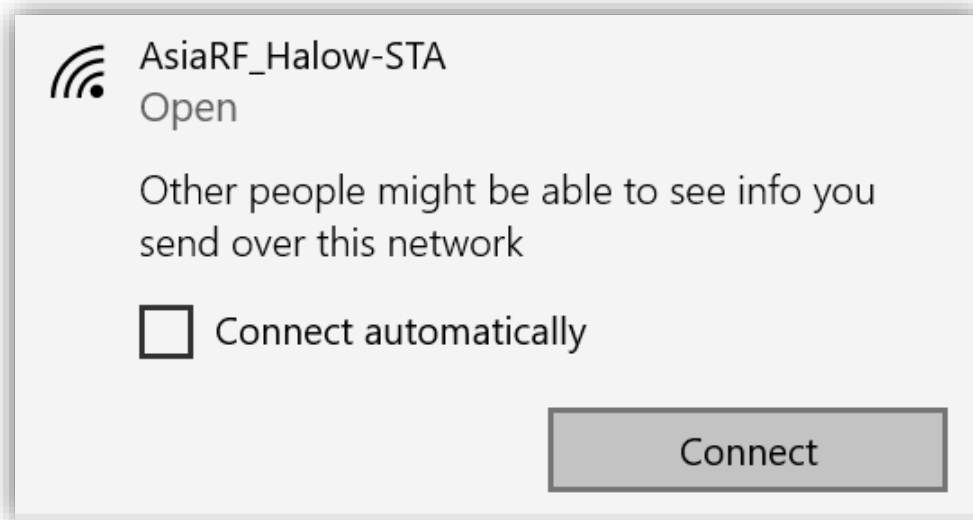


2.5 Wi-Fi HaLow STA mode setting

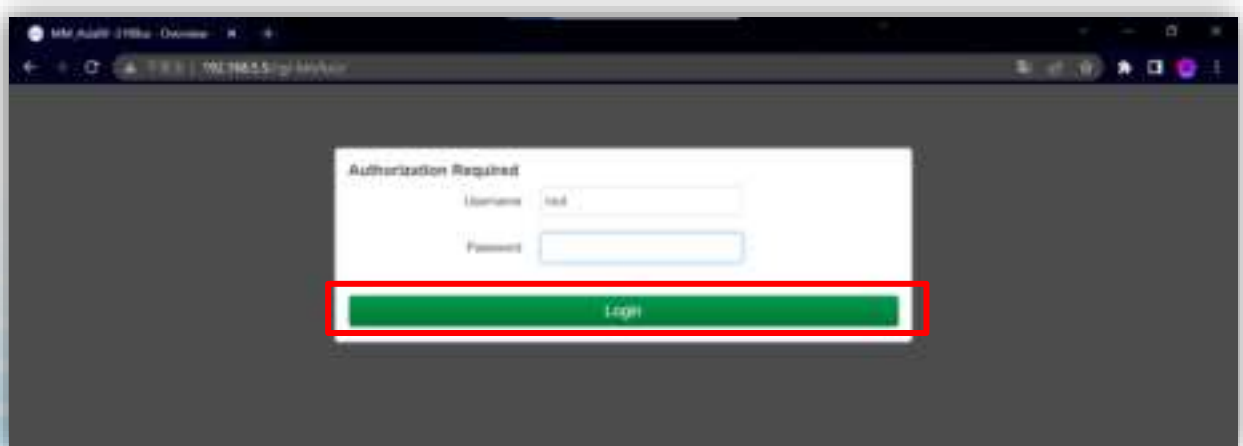
Our product is a pair of AP7688-WHM. It has default setting with Wi-Fi HaLow. If you don't need to set HaLow in special configuration, you can skip this chapter.

2.5.1 Connect to device

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

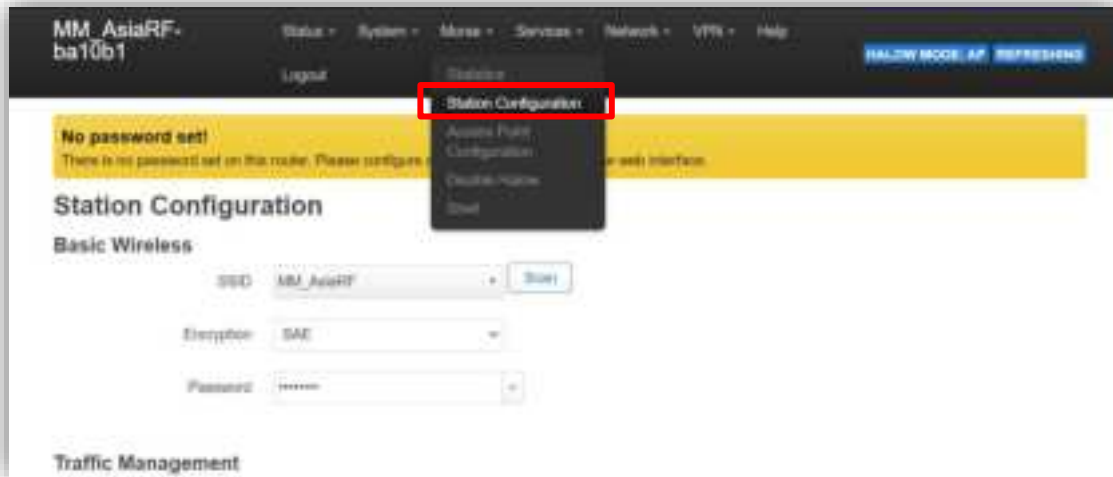


Open the browser and type "192.168.5.5".
Click "Login" (No password in default).



2.5.2 Setting to STA mode

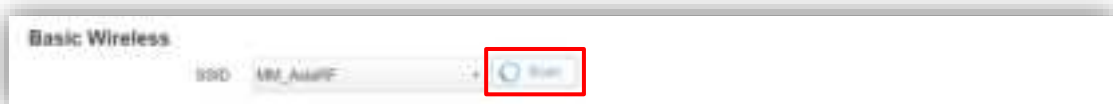
Click “Station Configuration” in the “Morse” tab.



The Wi-Fi HaLow default connect SSID is “MM_AsiaRF”.



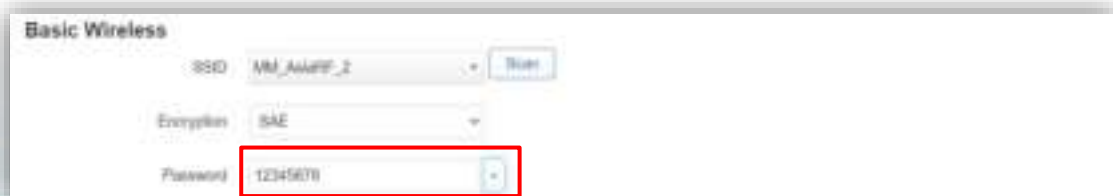
You can click “**Scan**” button to scan the Wi-Fi HaLow AP around it.



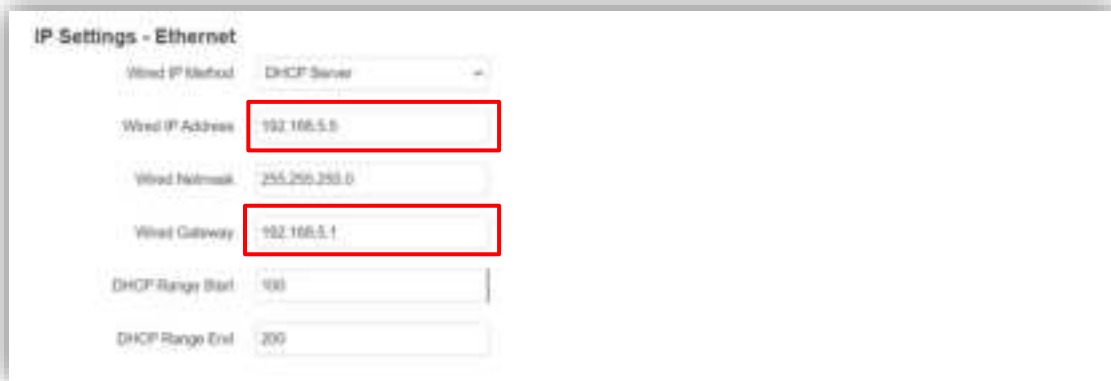
It will choose the Wi-Fi HaLow AP around you, or you can choose one in the list.

Ex. SSID: MM_AsiaRF_2

Don't forget to input the password.



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: DHCP Server

Wired IP Address: 192.168.5.5

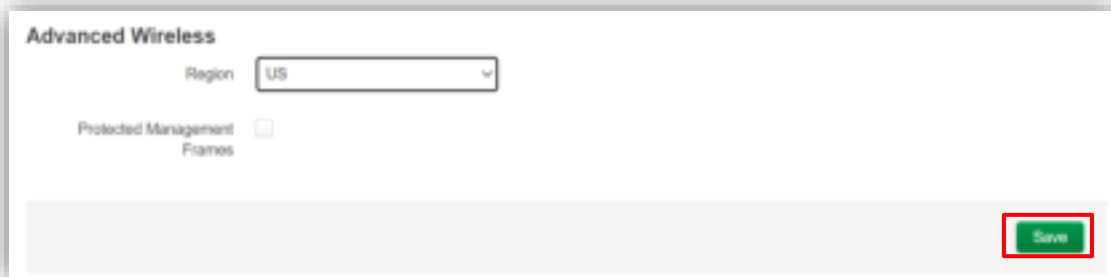
Wired Netmask: 255.255.255.0

Wired Gateway: 192.168.5.1

DHCP Range Start: 100

DHCP Range End: 200

Click "Save" button to save the configuration.

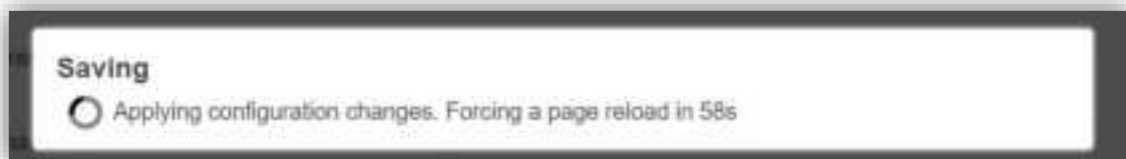


Advanced Wireless

Region: US

Protected Management Frames: ☐

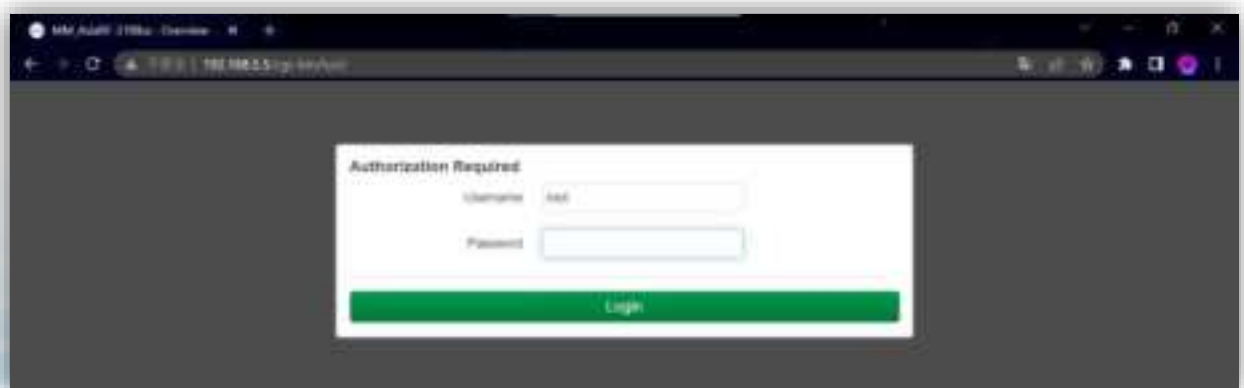
Save



Saving

Applying configuration changes. Forcing a page reload in 58s

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



Authorization Required

Username: admin

Password: [Redacted]

Login

Trouble Shooting

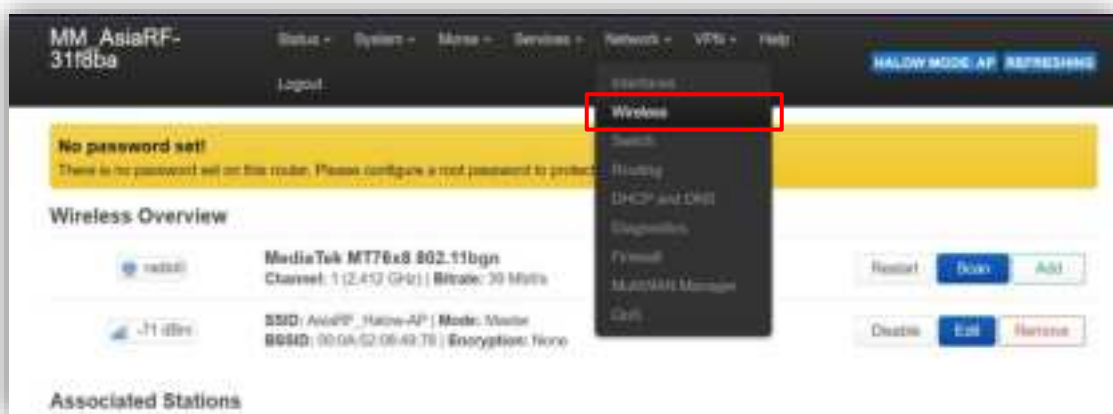
Case 1

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, and (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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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. Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de **20cm** de distance entre la source de rayonnement et votre corps.

The transmitter module may not be co-located with any other transmitter or antenna.
Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.