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Document Number	BQW_02_0046.002

Indoor Femto Lite Gateway

WLRRTES – 106V2

User Manual

Revision History

Revision	Date	Description	Author
.Draft	Nov. 08, 2023	● New naming	Vincent
.001	Jan. 17, 2024	● Add Dual-WAN	Bill Lu
.002	May. 14, 2024	● Login page ● Reset Button function	Sui Fan-Jiang

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Contents

Chapter 1 – Introduction

Purpose and Scope

The purpose of this document is to describe the main functions, supported features, and system architecture of the WLRRTES-106V2 Indoor Femto Lite Gateway based on the latest LoRaWAN® specification.

Product Design

The purpose of this document is to describe the main functions, supported features, and system architecture of the WLRRTES-106V2 Indoor Femto Lite Gateway based on the latest LoRaWAN® specification.

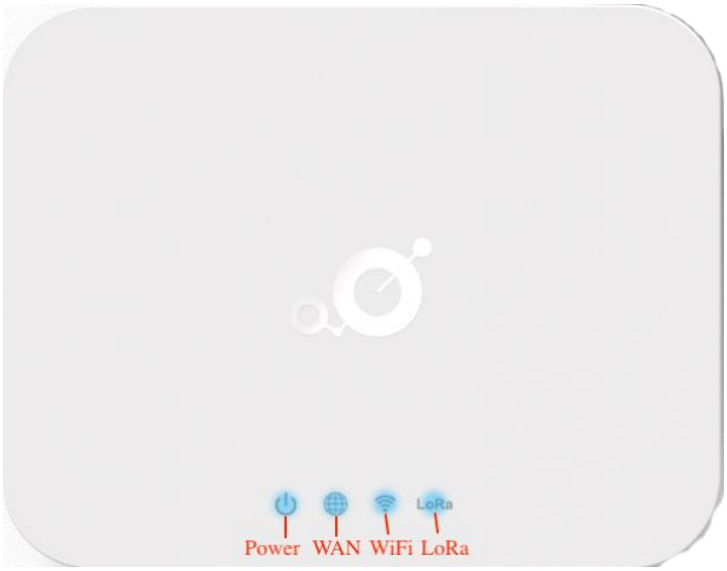
Definitions, Acronyms, and Abbreviations

Item	Description
LPWAN	Low-Power Wide-Area Network
LoRaWAN®	LoRaWAN® is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery-operated Things in a regional, national, or global network.
ABP	Activation by Personalization
OTAA	Over-The-Air Activation
TBD	To Be Defined

Reference

Document	Author
LoRaWAN® Specification v1.0.3	LoRa Alliance®
RP002-1.0.1 LoRaWAN® Regional Parameters	LoRa Alliance®

Chapter 2 – Hardware Details



LED Indicators

- LED sequence: Power(System), WAN, Wi-Fi, LoRa®
- Solid LED is for static status, blanking means the system is upgrading or active devices linked to the corresponding port.

	Solid On	Blinking	Off
Power System (Blue)	Power ON	Booting / Config Mode	Power Off
WAN (Blue)	Ethernet Plugged and got IP Address	Connecting	Unplug
Wi-Fi (Blue)	WiFi Station Mode and got IP Address	Connecting	Wi-Fi Disabled
LoRa® (Blue)	LoRa® is working	Connecting	LoRa does not work

Table 1 LED Behaviors

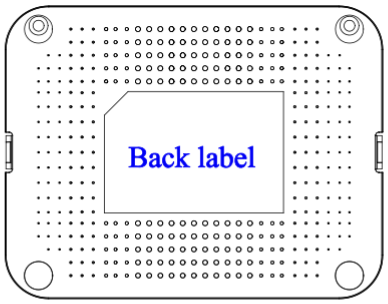
I/O Ports

Port	Count	Description
RJ45	1	WAN port of the device
Reset	1	Reset to default (5 seconds to reset settings to factory default)
Micro USB	1	Power input via USB adaptor(5VDC/2A)

Figure 1 – IO Ports

Back Label

The marking information is located at the bottom of the apparatus.



Back label

Figure 2 – Back Label

Package Label

No.	Item	Description
1	Product BOX	Brown Box
2	Labeling	Model/ MAC/ Serial Number/ Type Approval

Package Content

No.	Description	Quantity
1	The product	1

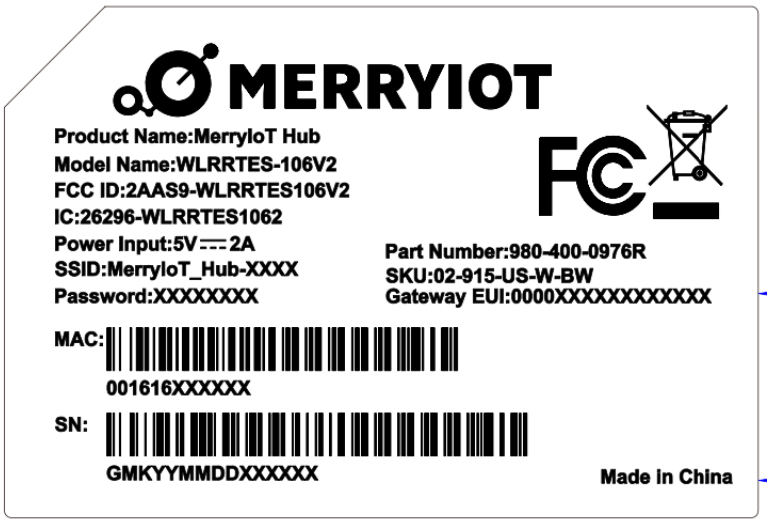
2	Power adapter (100-240VAC 50/60Hz to 5VDC/2A)	1
3	Ethernet Cable 1 meter (UTP)	1

Chapter 3 – User Manual

3.1 Connect Indoor Femto Lite Gateway

You can connect to the gateway via Wi-Fi or Ethernet interface. The WIFI AP SSID and password (for both WIFI and GUI) are printed on the back label by default.

Figure 3 – Back Label



The rule of gateway WIFI AP SSID is **MerryIoT_Hub-XXXX**, where the last digits are the last 4 digits of the MAC address

The WIFI interface of your PC will fetch the IP address of range 192.168.4.x except 192.168.4.1 assigned by the AP.

The Ethernet status of the device in Default or Config mode is static IP: 192.168.55.20/24. The PC could also access the GUI of this device by setting its IP to: 192.168.55.X/24.

3.2 Indoor Femto Lite Gateway Setting

Open the web browser(ex: Chrome) after connecting to the gateway via WIFI AP IP address “192.168.4.1” or Ethernet IP address “192.168.55.20”.

For security purposes, the user also has to input the **Password** on the back label as the GUI password to get into the settings pages.

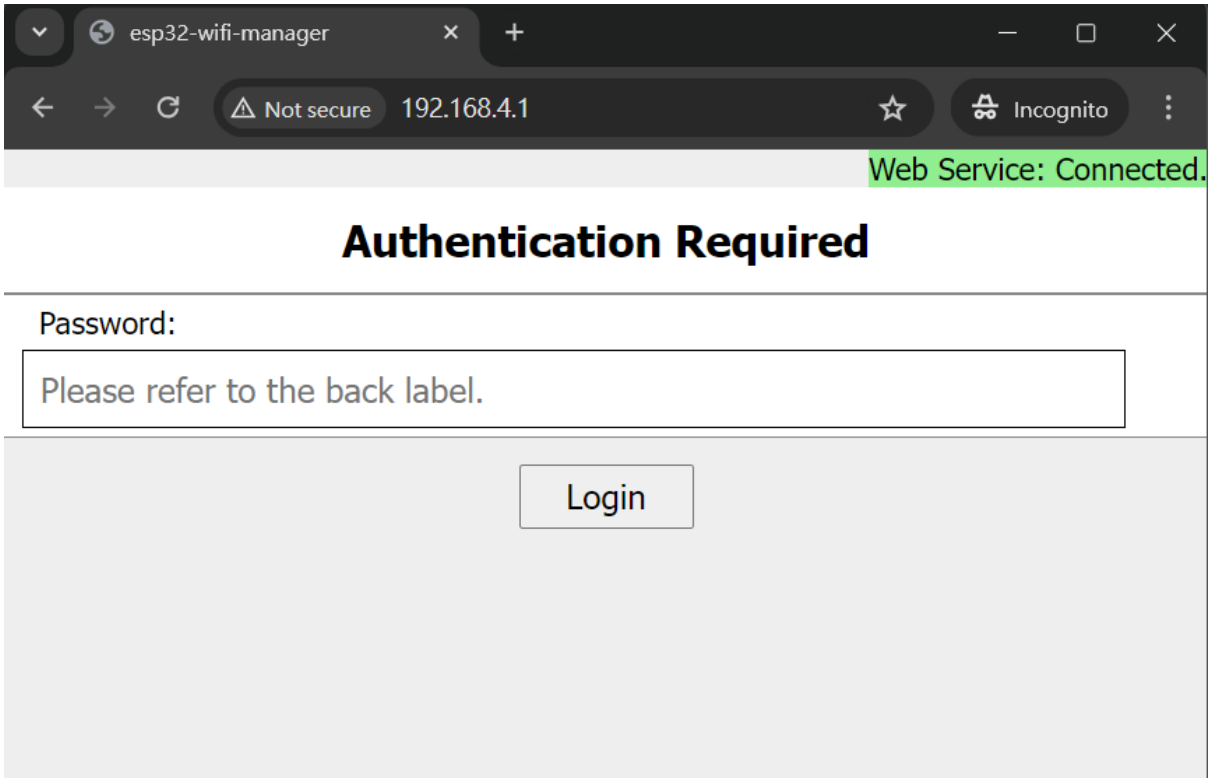


Figure 4 – WEB UI-1

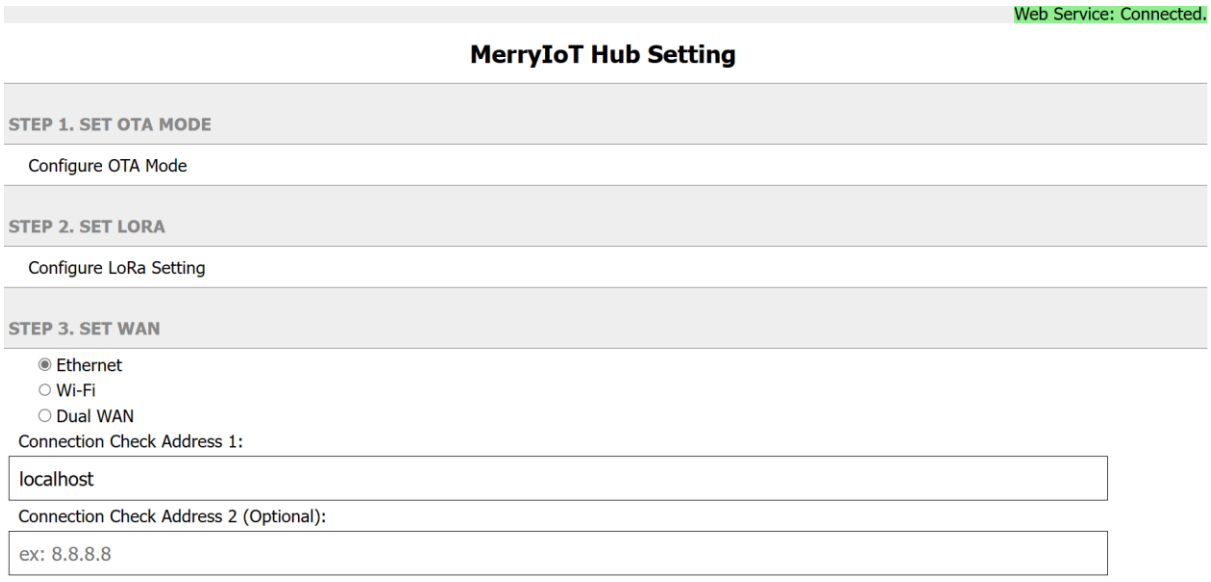


Figure 5 – WEB UI-1

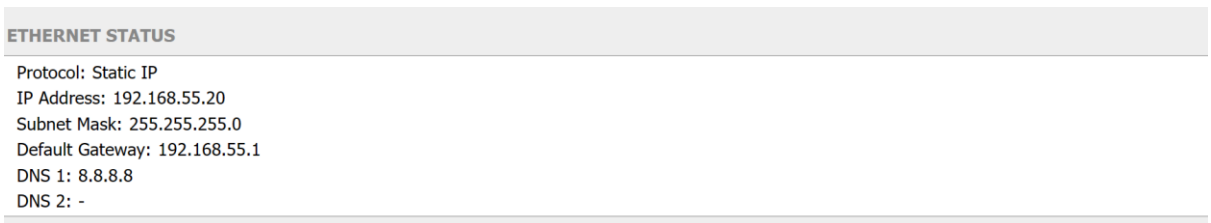


Figure 6 – WEB UI-2

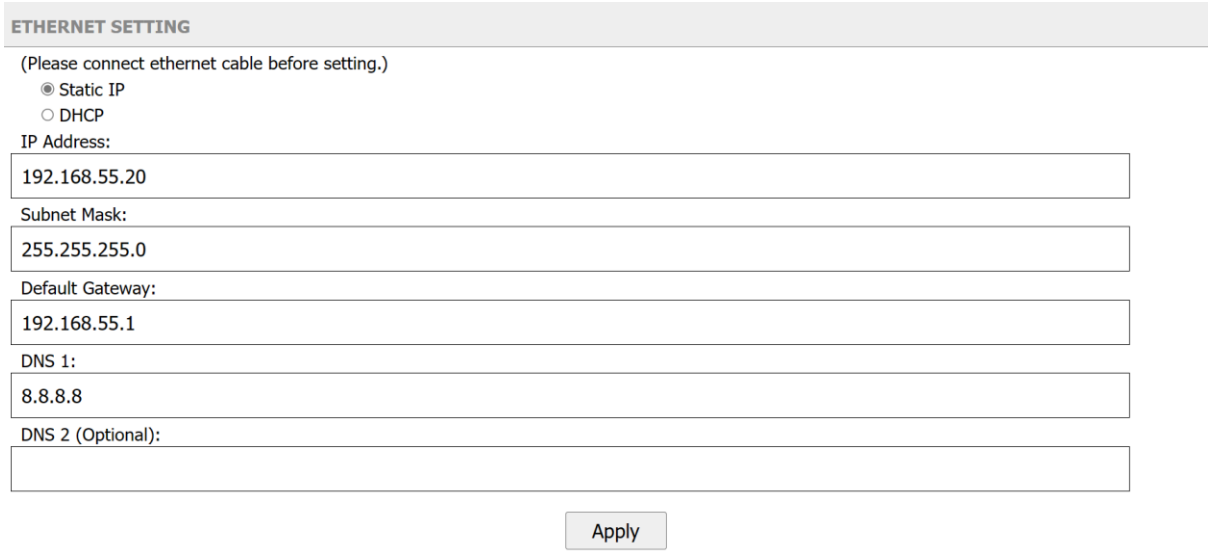


Figure 7 – WEB UI-3

Now you can configure the gateway through the WEB GUI.

STEP 1: Firmware Upgrade

The gateway supports firmware upgrades through the OTA method.

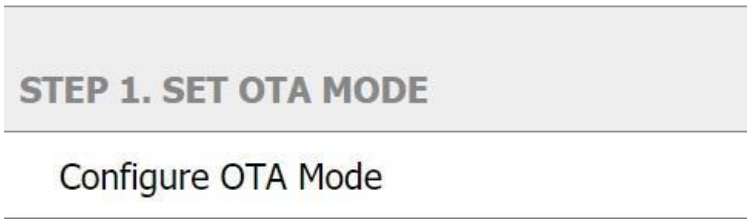


Figure 8 – Configure OTA Mode

Click the “Configure OTA Mode”.

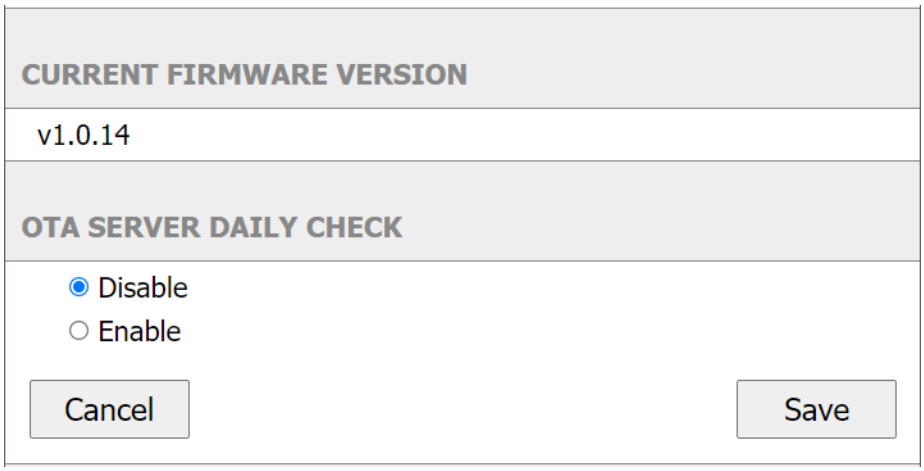


Figure 9 – Configure OTA Mode

CURRENT FIRMWARE VERSION – display the current firmware version.

OTA SERVER DAILY CHECK – Enable or Disable the firmware upgrade through OTA mode. The gateway will check the OTA server every 24 hours interval. It will upgrade automatically if there is the latest firmware on the OTA server.

ⓘ	The OTA server has to be configured by the Python tool. Please contact BROWAN for any support.

Click the “Enable” and “Save” buttons to enable the OTA or “Disable” functions.

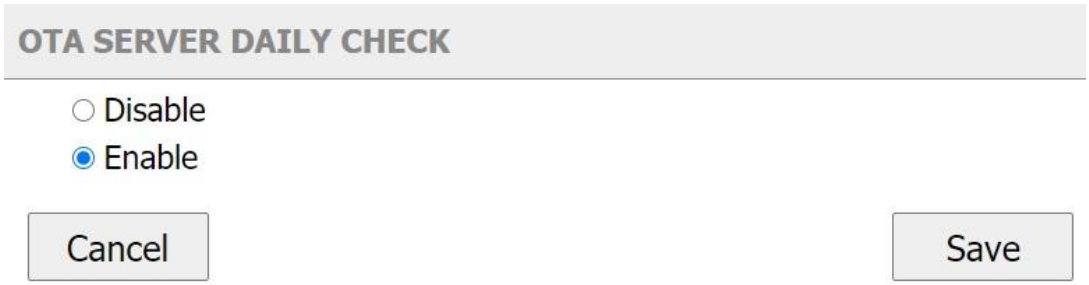


Figure 10 – Enable OTA

STEP 2: SET LORA

Click “Configure LoRa Setting” to configure the LoRa function/parameters.

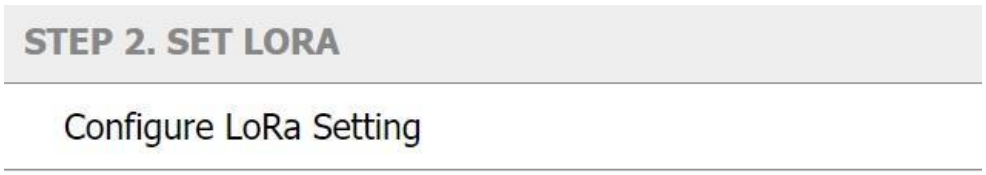


Figure 11 – Configure LoRa Setting

There are two modes for the LoRa configuration.[Basic Station and Packet Forwarder]

Figure 12 – LoRa Mode

STEP 2.1 Basic Station mode

Select the “LoRa Basics Station” mode. The CUPS server and LNS server have to be configured when the gateway is in the Basic Station mode.

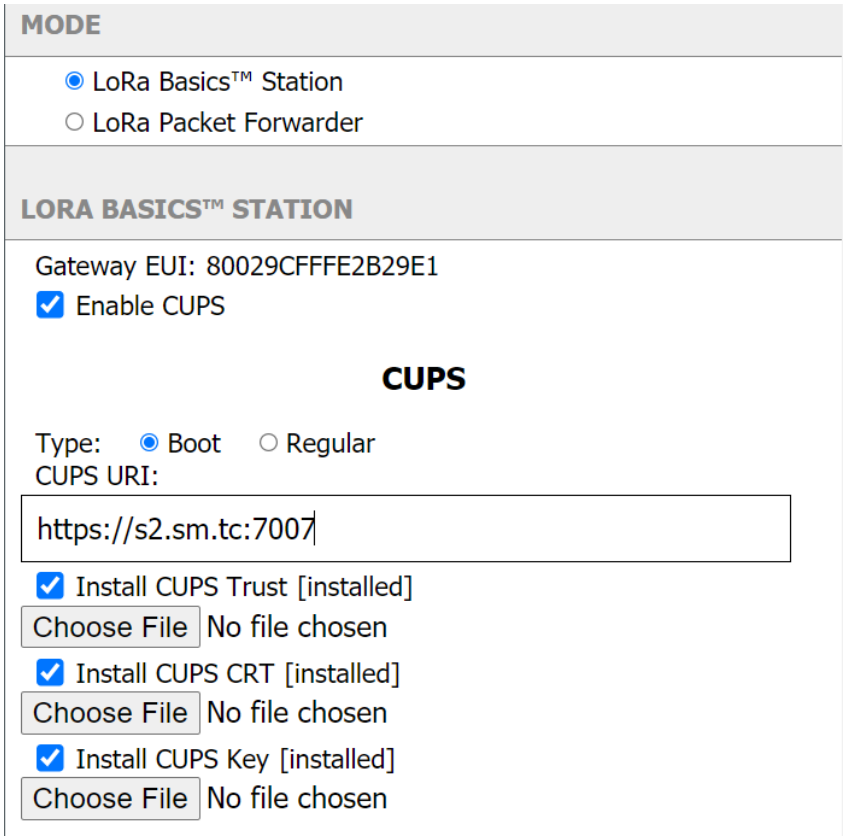


Figure 13 –Basic Station mode

Enable CUPS – The CUPS server is a configuration and update server. Enable or Disable the CUPS server according to the network architecture.

Enable the CUPS server if it is necessary for the network.

Type – The certificate type of the CUPS.[Boot/Regular]

i	The gateway will search “Regular” type of certificate for the priority if you select the “Boot” type. It will search “Boot” type of certificate if the gateway can not find the “Regular” type of certificate.

CUPS URI – The CUPS server address. Enable and install the CUPS trust/CRT/Key if the CUPS server needs a certificate.

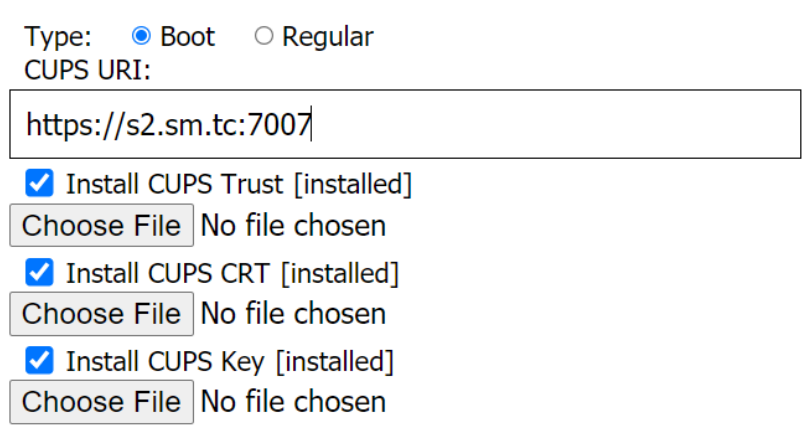


Figure 14 – Install CUPS certificates

LNS Server – The LNS server is the LoRaWAN® Network Server. LNS establishes a data connection between a LoRa Basics™ Station and a LoRaWAN® network server.

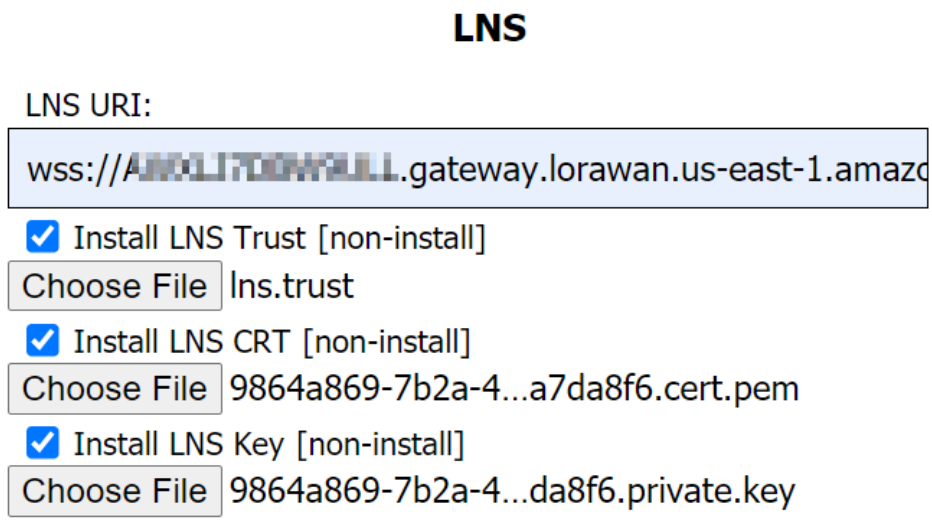


Figure 15 – LNS server/certificates

LNS URI – The LNS server address. Enable and install the LNS server trust/CRT/Key if the certificate is necessary for the LNS server.

STEP 2.2 LoRa Packet Forwarder mode

Select the “LoRa Packet Forwarder” mode.

Figure 16 – LoRa Packet Forwarder mode

Configure the **Gateway Info/Radio setting/Channel Assignment** for the packet forwarder mode.

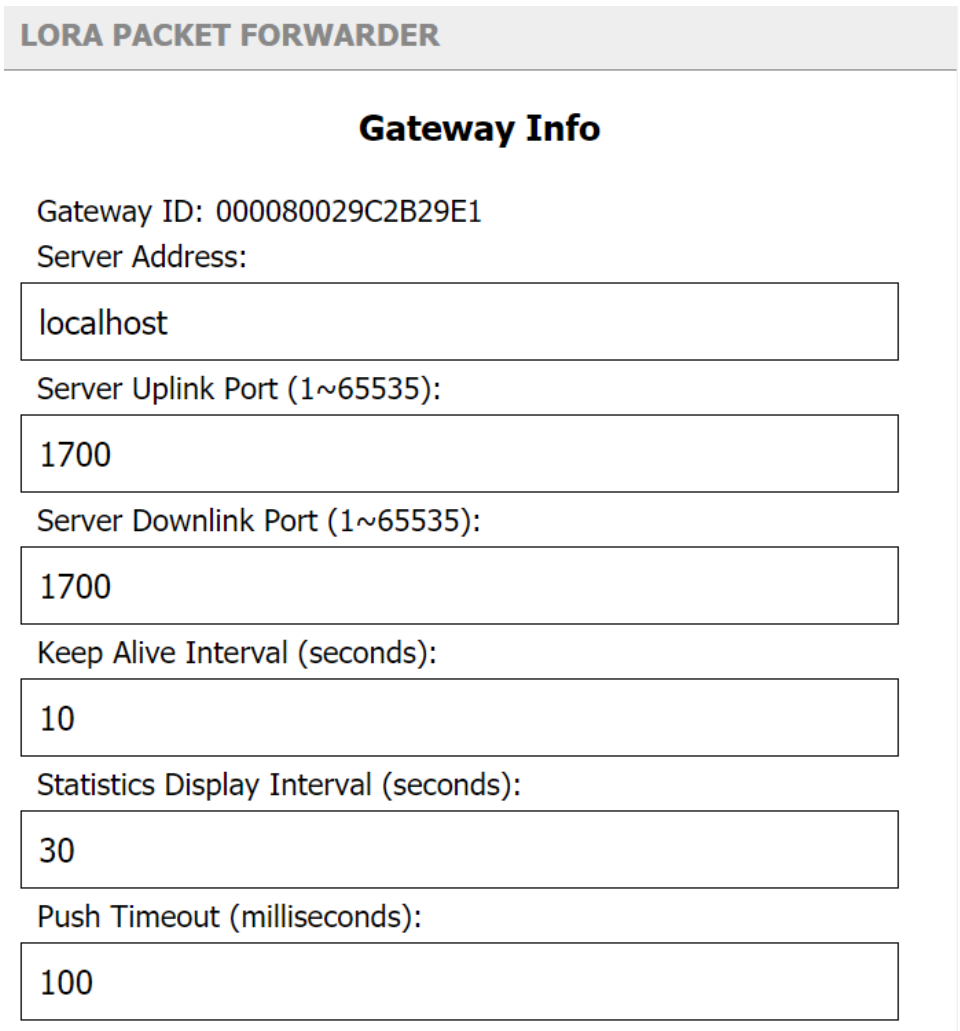


Figure 17 – Gateway settings

Radio Settings – configure the central frequency in Hz.

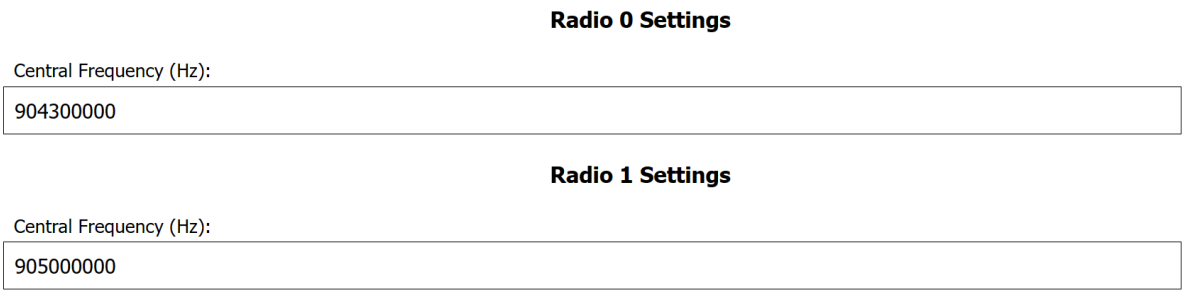


Figure 18 – Radio settings

Channel Assignment – configure the center frequency offset of each channel.

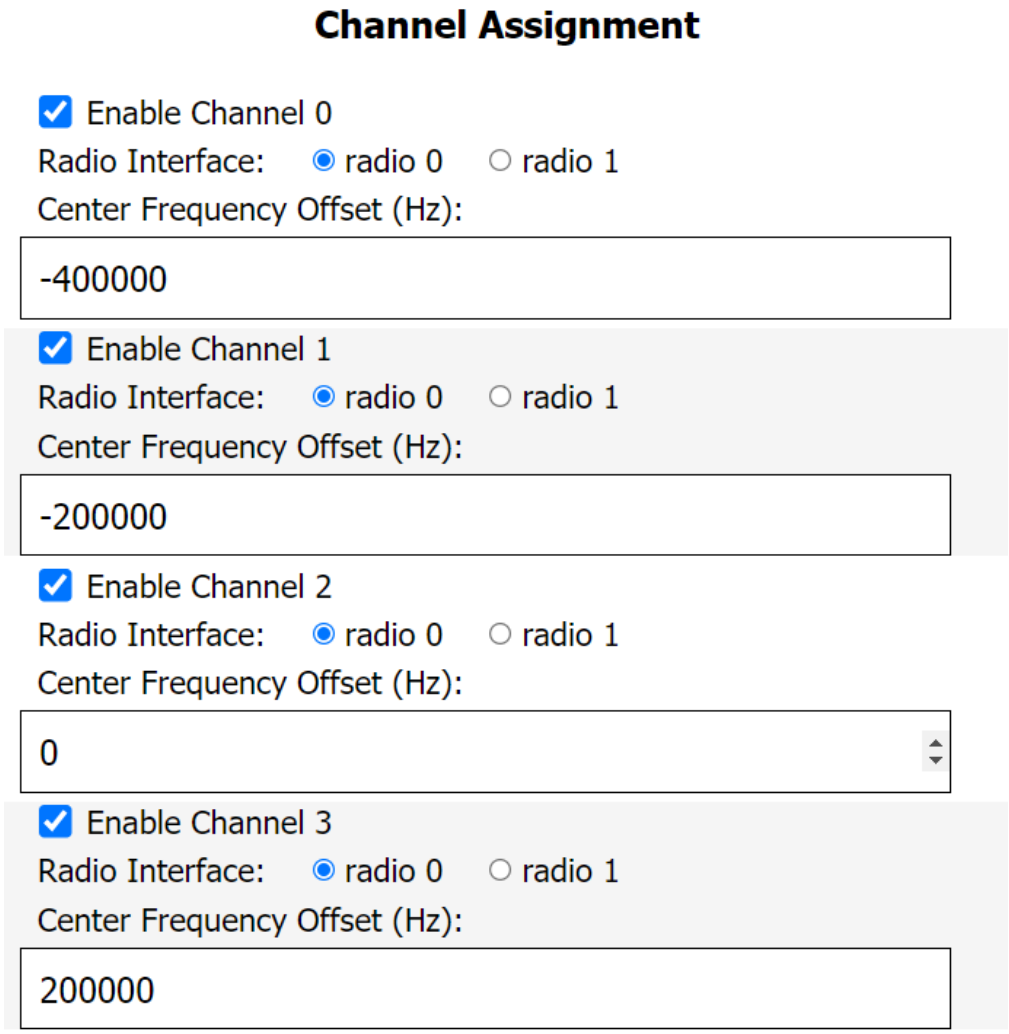


Figure 19 – Channel Assignment-1

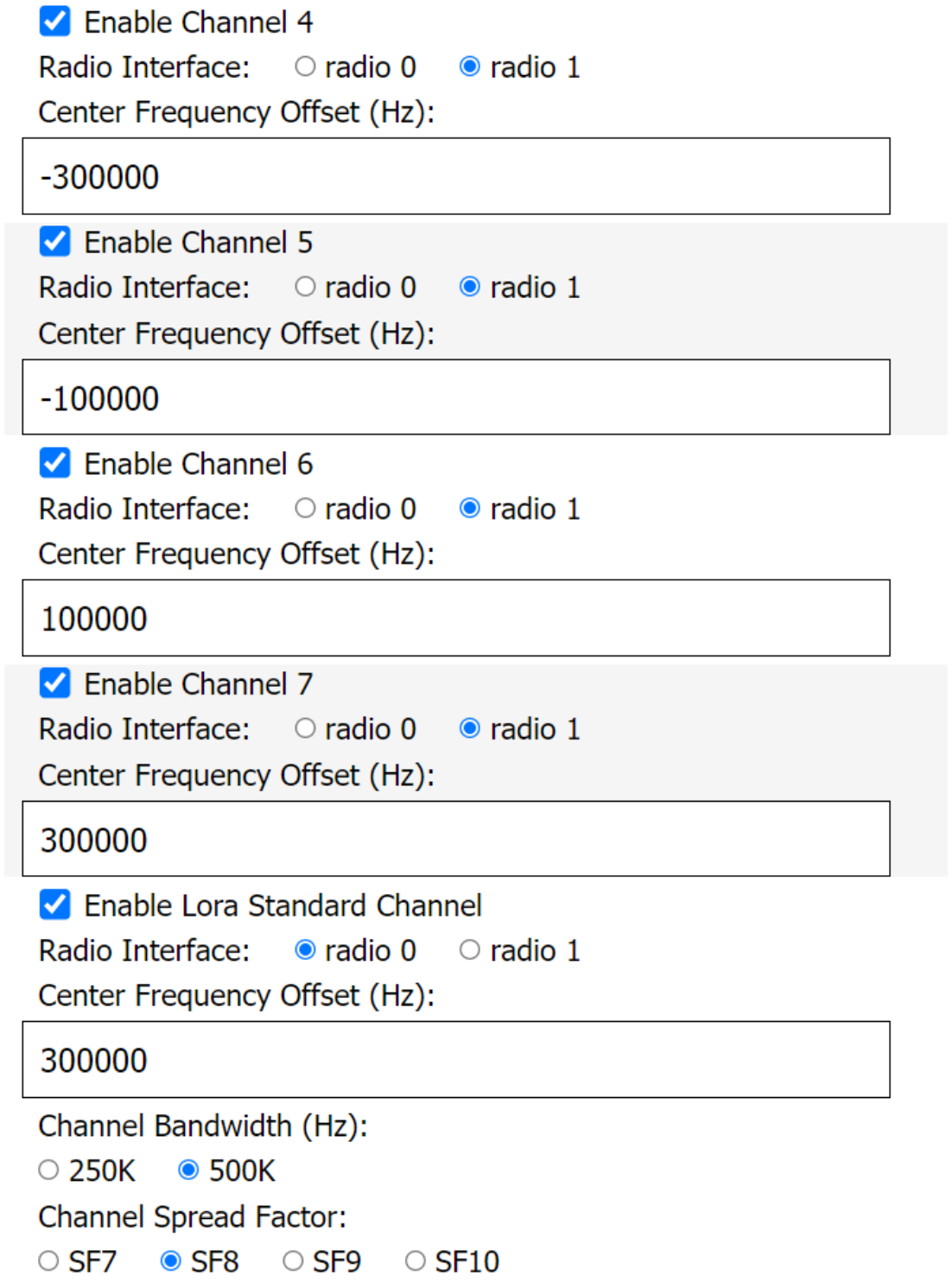


Figure 20 – Channel Assignment-2

STEP 3 : SET WAN

The gateway supports either “Ethernet” or “Wi-Fi” or “Dual WAN” connection as the internet backhaul.

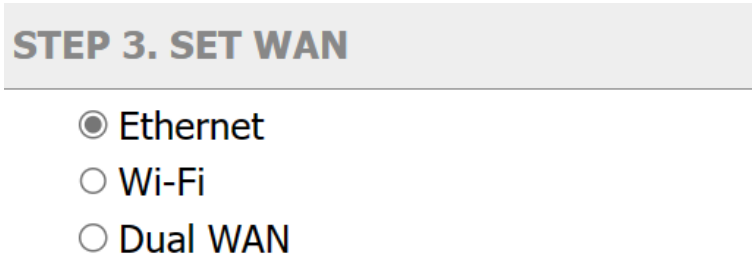


Figure 21 – WAN connection

STEP 3.1 Connection Check Address Setting

Schedule the WAN monitor to periodically check if this address can be pinged, in order to confirm the connectivity. If connecting to the local network, you can fill in "**localhost**". For an external connection, you can use "**8.8.8.8**" or another IP address.

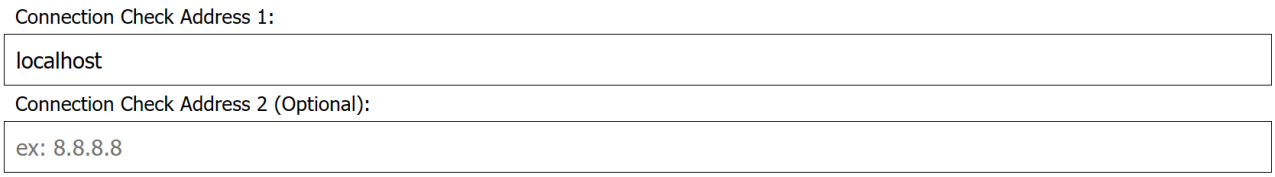


Figure 22 – Connection Check Address

STEP 3.2 Ethernet Setting

Configure the IP address of WAN.[Static IP/DHCP client]

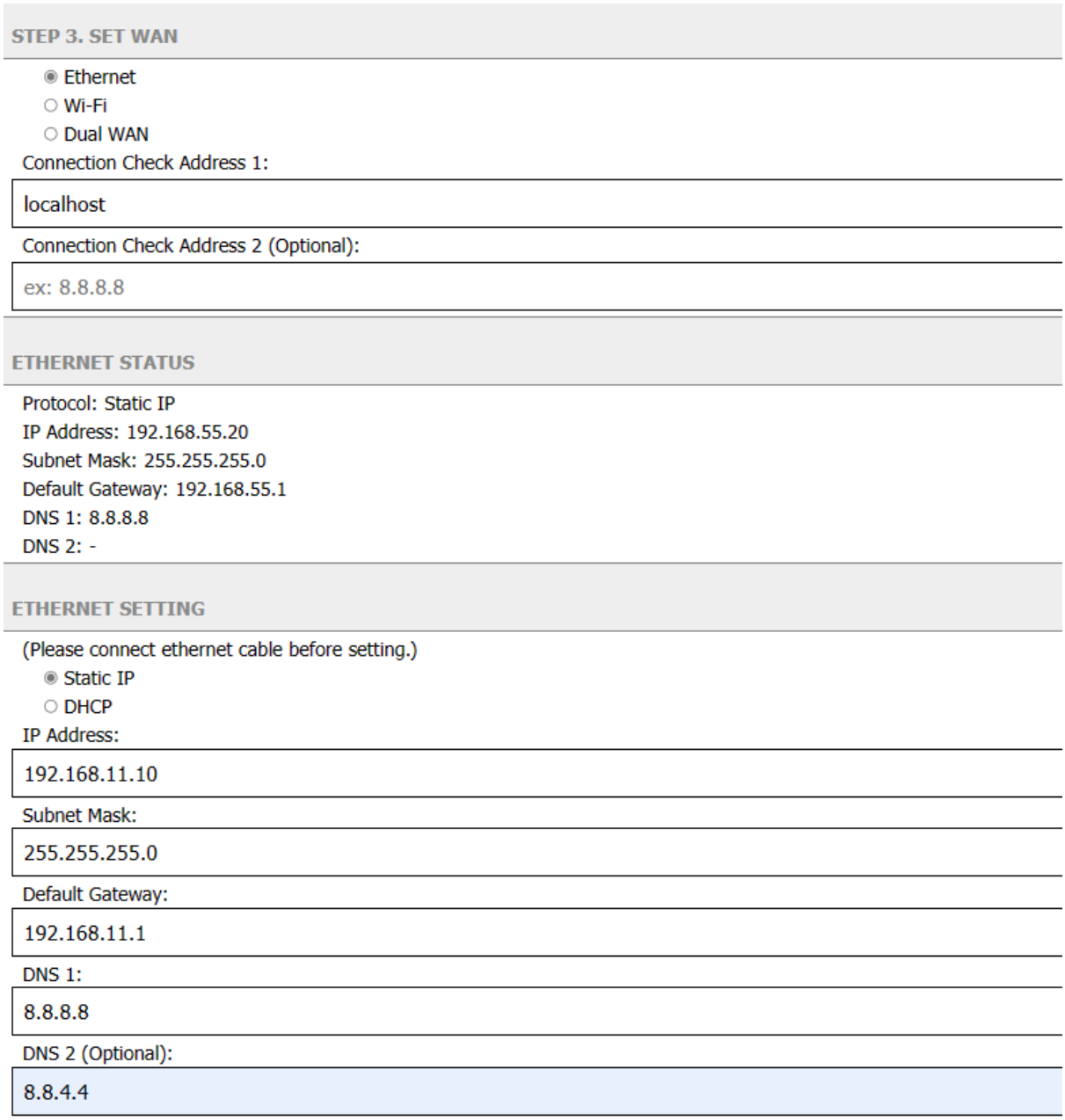


Figure 23 – Static IP connection

ETHERNET STATUS – The information of IP address/Subnet Mask/Gateway/DNS.

ETHERNET SETTING - Configure the IP address of WAN.[Static IP/DHCP client]

Static IP – Setup the IP address/Subnet Mask/Default Gateway/DNS of the static IP.

i	Contact the network administrator for the static IP address information.

DHCP – The IP address/Subnet Mask/Default Gateway/DNS will be assigned by the DHCP server.

After selecting "**Static IP**" or "**DHCP**", click “**Apply**” to connect network.

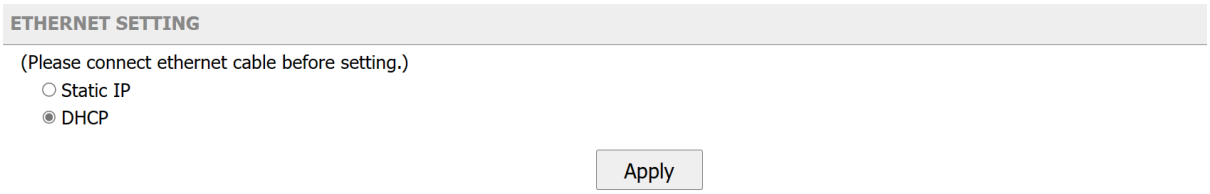


Figure 24 – DHCP client connection

STEP 3.3 Wi-Fi

Select “Wi-Fi” to be the internet backhaul connection.

	The gateway WiFi interface is the Access Point by default which SSID is “MerryIoTHub-XXXX” printed on the back label. The administrator can only access the WEB UI through the Access Point mode to configure the gateway. The gateway will be the WiFi client and will not be able to access the WEB UI after enabling the WiFi interface as the internet backhaul connection.

Figure 25 – Wi-Fi connection

MANUAL CONNECT – Specify the remote AP SSID and enter the password if necessary.

Click **“Join”** to accept or **“Cancel”** to abort.

Figure 26 – Wi-Fi manual connection

The gateway will scan the nearby access point automatically. Just click the SSID for the WiFi connection.

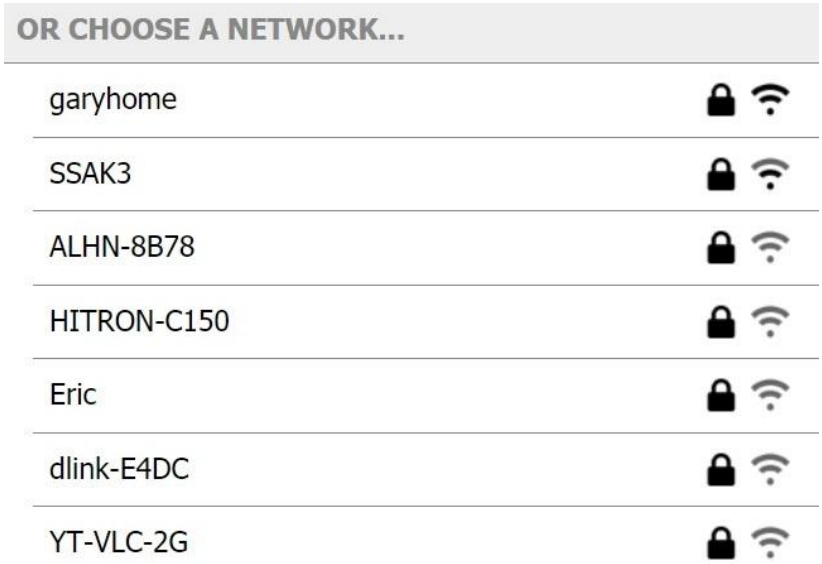


Figure 27 – Wi-Fi manual connection

Enter a WiFi password if it is necessary for the connection.

Figure 28 – Wi-Fi password

Click **“Join”** to accept or **“Cancel”** to abort.

STEP 3.4 Dual WAN

DUAL WAN CONFIGURATION consists of three steps in total. The first step will display the network setting priority, please select “**Ethernet First**” or “**Wi-Fi First**”. After selecting, click “**Next**”.

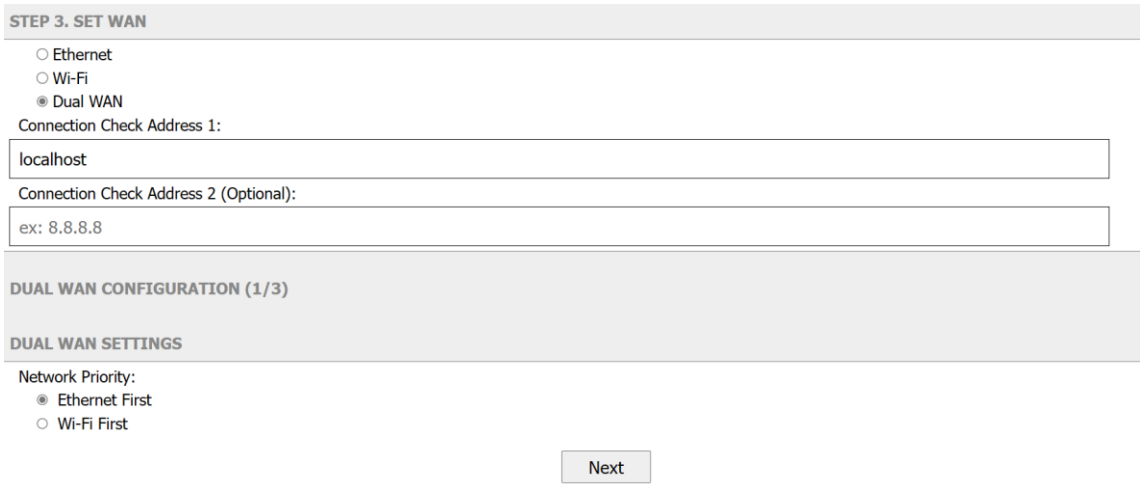


Figure 29 – Dual WAN Settings

In the second step, please select whether to use “**Static IP**” or “**DHCP**”. After selecting, click “**Next**”.

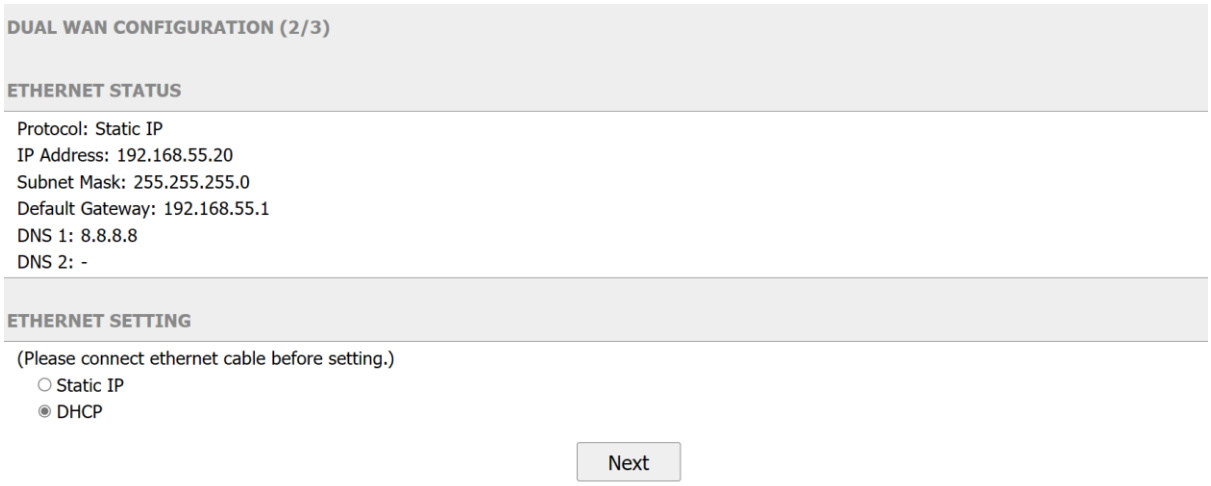


Figure 30 – Dual WAN Settings

In the third step, please select the Wi-Fi SSID you want.

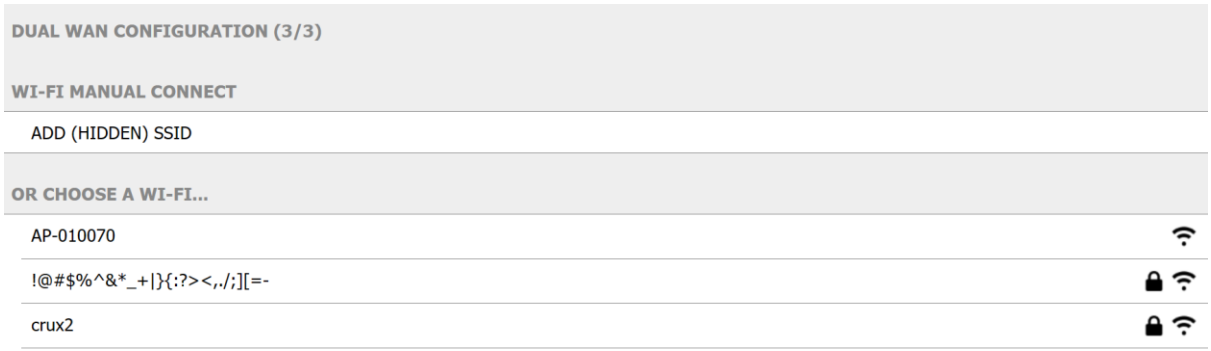


Figure 31 – Dual WAN Settings

Enter your Wi-Fi password and click "**Join**" to connect network or "**Cancel**" to abort.

Figure 32 – Dual WAN Settings

The final screen that the GUI will display.

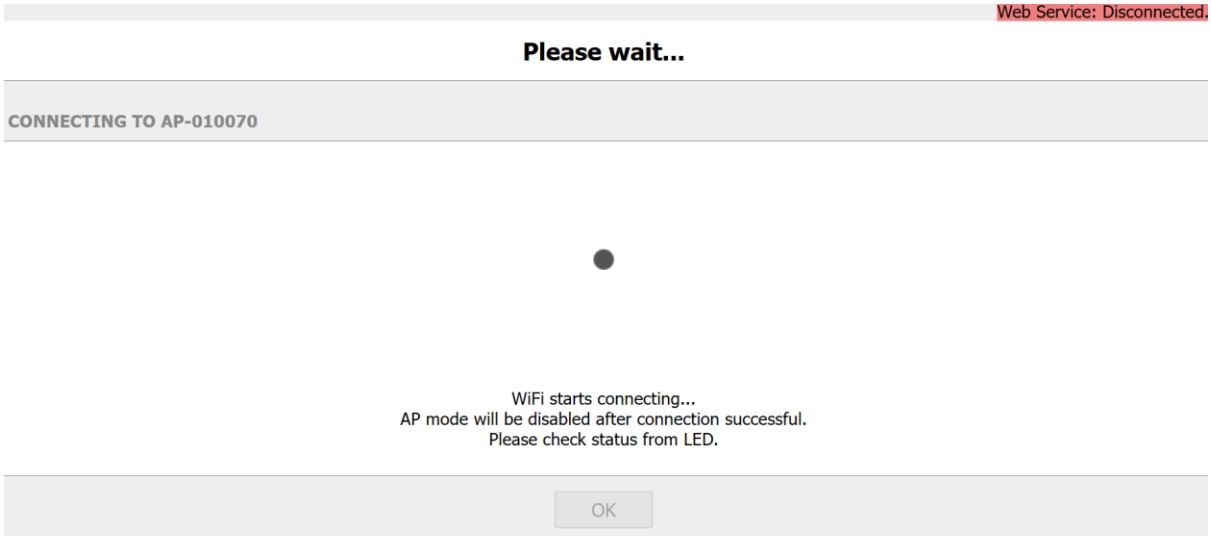


Figure 33 – Final screen

To get into the **Config mode** (not restore), you could press and hold the Reset button longer than 2 sec and shorter than 10 sec (with LED indicator **slow** blink), and release it. You could connect to the device's WIFI AP and configure LoRa/Network/OTA again in this mode.

If you want to reset and enter the initial GUI screen, you can press the Reset button for 10 seconds (with LED indicator **fast** blink) or command "**restore_default**" and then "**restart**", so that the AP MODE can be displayed again to enter the GUI.

Figure 34 – Wi-Fi broadcast AP MODE

After clicking AP MODE to connect, you can fill in "**192.168.4.1**" on the web page and enter the initial GUI screen.

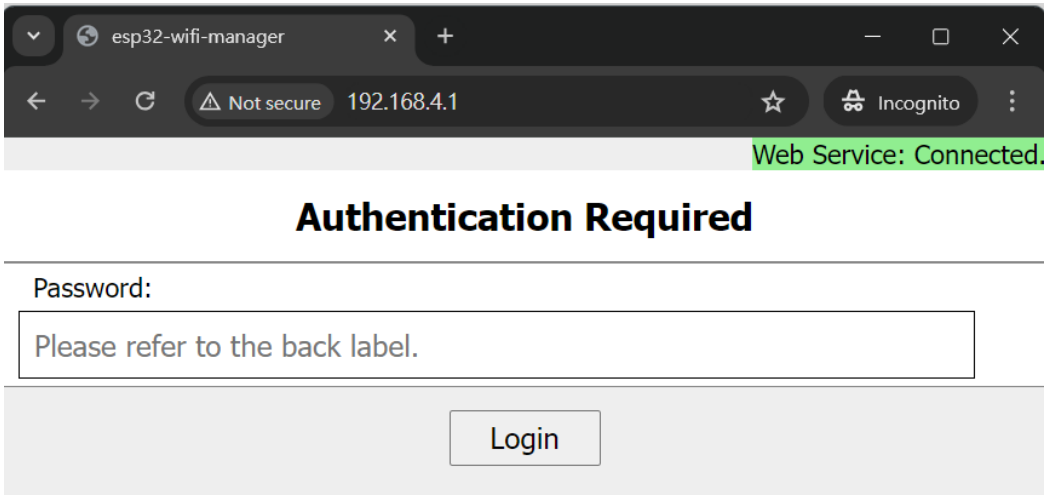


Figure 35 – Login Page

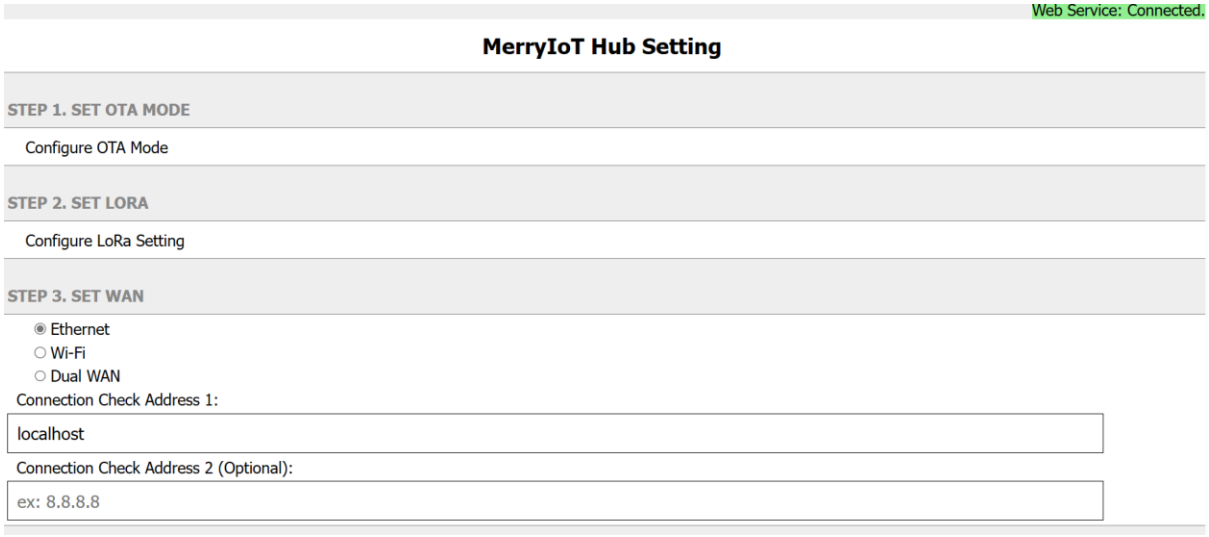


Figure 36 – The Setting screen

Federal Communication Commission Interference 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 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.

IMPORTANT NOTE:
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 transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

Operation of this device is restricted to indoor use only

Industry Canada statement:

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.

Radiation Exposure Statement:
This equipment complies with Canada 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.

Déclaration d'exposition aux radiations:
Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.