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# **MerryIoT Hub**

## **WLRRTES – 106V2**

### **User Manual**



## Revision History

Revision	Date	Description	Author
.Draft	Nov. 08, 2023	<ul style="list-style-type: none"><li>• New naming</li></ul>	Vincent
.001	Jan. 17, 2024	<ul style="list-style-type: none"><li>• Add Dualwan</li></ul>	Bill Lu



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## Chapter 1 – Introduction

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### Purpose and Scope

The purpose of this document is to describe the main functions, supported features, and system architecture of the WLRRTES-106V2 MerryIoT Hub based on the latest LoRaWAN<sup>®</sup> specification.

### Product Design

The purpose of this document is to describe the main functions, supported features, and system architecture of the WLRRTES-106V2 MerryIoT Hub based on the latest LoRaWAN<sup>®</sup> specification.





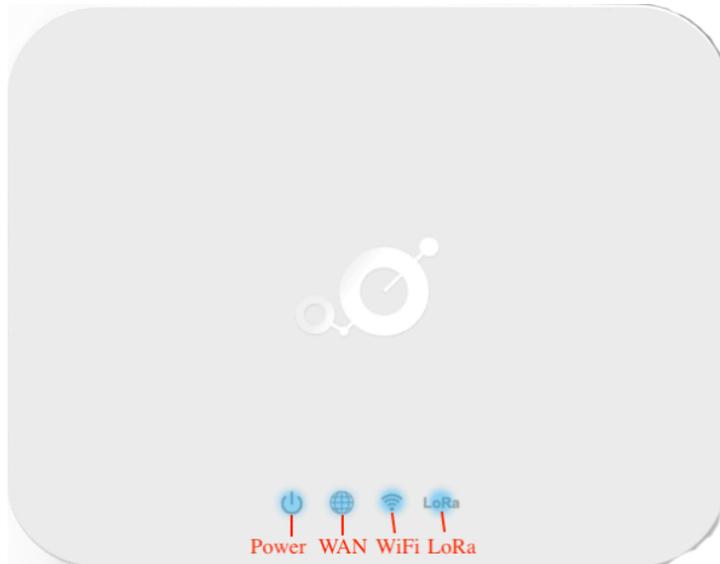
## Definitions, Acronyms, and Abbreviations

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 (ignore bootloader)	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)

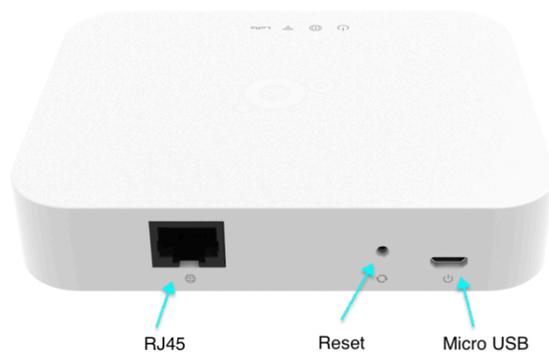
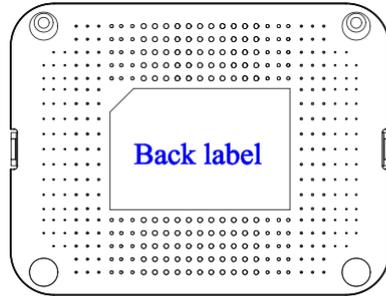


Figure 1 – IO Ports

## Back Label

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



### Back label

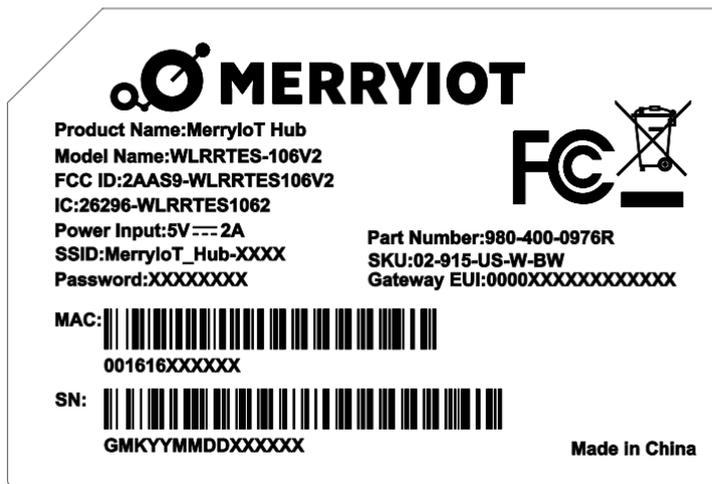


Figure 2 – Back Label

## 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



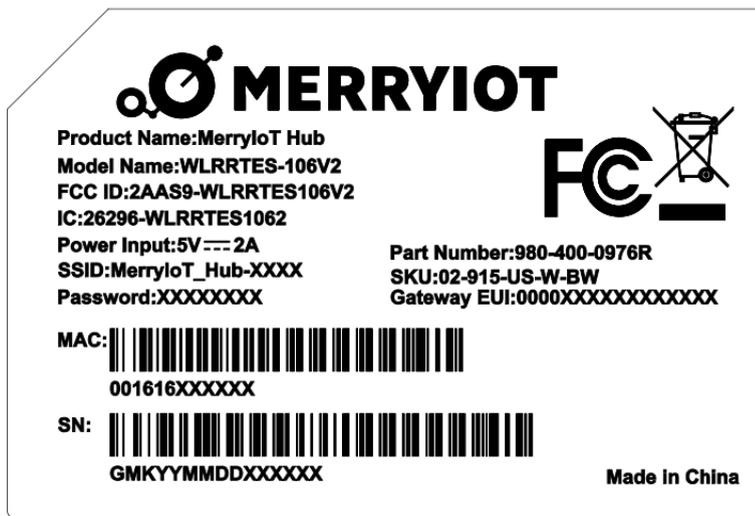
## Chapter 3 – User Manual

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### 3.1 Connect MerryIoT Hub

You can connect to the gateway via a Wi-Fi interface, in which the SSID and password are printed on the back label by default.

Figure 3 – Back Label



The rule of gateway SSID is MerryIoT\_Hub-XXXX where the last digits are the last 4 digits of the MAC address

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

### 3.2 MerryIoT Hub Setting

Open the web browser(ex: Chrome) after connecting to the gateway via IP address "192.168.4.1"



## MerryIoT Hub Setting

### STEP 1. SET OTA MODE

Configure OTA Mode

### STEP 2. SET LORA

Configure LoRa Setting

### STEP 3. SET WAN

- Ethernet
- Wi-Fi
- Dual WAN

Connection Check Address 1:

localhost

Connection Check Address 2 (Optional):

ex: 8.8.8.8

Figure 4 – WEB UI-1

### ETHERNET STATUS

Protocol: Static IP  
IP Address: 192.168.55.20  
Subnet Mask: 255.255.255.0  
Default Gateway: 192.168.55.1  
DNS 1: 8.8.8.8  
DNS 2: -

Figure 5 – WEB UI-2

### ETHERNET SETTING

(Please connect ethernet cable before setting.)

- Static IP
- DHCP

IP Address:

192.168.55.20

Subnet Mask:

255.255.255.0

Default Gateway:

192.168.55.1

DNS 1:

8.8.8.8

DNS 2 (Optional):

Apply

Figure 6 – WEB UI-3

Now you can configure the gateway through the WEB GUI.

## STEP 1 : Firmware Upgrade

The gateway support firmware upgrade through the OTA method.



## STEP 1. SET OTA MODE

Configure OTA Mode

Figure 7 – Configure OTA Mode

Click the “Configure OTA Mode”.

<b>CURRENT FIRMWARE VERSION</b>
v1.0.14
<b>OTA SERVER DAILY CHECK</b>
<input checked="" type="radio"/> Disable <input type="radio"/> Enable
<input type="button" value="Cancel"/> <input type="button" value="Save"/>

Figure 8 – 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” function.

<b>OTA SERVER DAILY CHECK</b>
<input type="radio"/> Disable <input checked="" type="radio"/> Enable
<input type="button" value="Cancel"/> <input type="button" value="Save"/>

Figure 9 – Enable OTA

## STEP 2 : SET LORA

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

## STEP 2. SET LORA

### Configure LoRa Setting

Figure 10 – Configure LoRa Setting

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

#### MODE

- LoRa Basics™ Station
- LoRa Packet Forwarder

Figure 11 – 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.

**MODE**

- LoRa Basics™ Station
- LoRa Packet Forwarder

**LORA BASICS™ STATION**

Gateway EUI: 80029CFFFE2B29E1

Enable CUPS

**CUPS**

Type:  Boot  Regular

CUPS URI:

https://s2.sm.tc:7007

- Install CUPS Trust [installed]  
 No file chosen
- Install CUPS CRT [installed]  
 No file chosen
- Install CUPS Key [installed]  
 No file chosen

Figure 12 –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]

 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.

Type:  Boot  Regular  
 CUPS URI:  
  
 Install CUPS Trust [installed]  
 No file chosen  
 Install CUPS CRT [installed]  
 No file chosen  
 Install CUPS Key [installed]  
 No file chosen

Figure 13 – 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.

## LNS

LNS URI:  
  
 Install LNS Trust [non-install]  
 Ins.trust  
 Install LNS CRT [non-install]  
 9864a869-7b2a-4...a7da8f6.cert.pem  
 Install LNS Key [non-install]  
 9864a869-7b2a-4...da8f6.private.key

Figure 14 – 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.

### MODE

- LoRa Basics™ Station  
 LoRa Packet Forwarder

Figure 15 – LoRa Packet Forwarder mode

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

### LORA PACKET FORWARDER

#### Gateway Info

Gateway ID: 000080029C2B29E1

Server Address:

localhost

Server Uplink Port (1~65535):

1700

Server Downlink Port (1~65535):

1700

Keep Alive Interval (seconds):

10

Statistics Display Interval (seconds):

30

Push Timeout (milliseconds):

100

Figure 16 – Gateway settings

**Radio Settings** – configure the central frequency in Hz.

**Radio 0 Settings**

Central Frequency (Hz):

904300000

**Radio 1 Settings**

Central Frequency (Hz):

905000000

Figure 17 – Radio settings

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

**Channel Assignment**

Enable Channel 0

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

-400000

Enable Channel 1

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

-200000

Enable Channel 2

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

0

Enable Channel 3

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

200000

Figure 18 – Channel Assignment-1



# BROWAN

Enable Channel 4

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

-300000

Enable Channel 5

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

-100000

Enable Channel 6

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

100000

Enable Channel 7

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

300000

Enable Lora Standard Channel

Radio Interface:  radio 0  radio 1

Center Frequency Offset (Hz):

300000

Channel Bandwidth (Hz):

250K  500K

Channel Spread Factor:

SF7  SF8  SF9  SF10

Figure 19 – Channel Assignment-2

### STEP 3 : SET WAN

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

#### STEP 3. SET WAN

- Ethernet
- Wi-Fi
- Dual WAN

Figure 20 – 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.

Connection Check Address 1:

localhost

Connection Check Address 2 (Optional):

ex: 8.8.8.8

Figure 21 – Connection Check Address

### STEP 3.2 Ethernet Setting

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



### STEP 3. SET WAN

- Ethernet
- Wi-Fi
- Dual WAN

Connection Check Address 1:

localhost

Connection Check Address 2 (Optional):

ex: 8.8.8.8

### ETHERNET STATUS

Protocol: Static IP

IP Address: 192.168.55.20

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.55.1

DNS 1: 8.8.8.8

DNS 2: -

### ETHERNET SETTING

(Please connect ethernet cable before setting.)

- Static IP
- DHCP

IP Address:

192.168.11.10

Subnet Mask:

255.255.255.0

Default Gateway:

192.168.11.1

DNS 1:

8.8.8.8

DNS 2 (Optional):

8.8.4.4

Figure 22 – 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.



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.

**ETHERNET SETTING**

(Please connect ethernet cable before setting.)

Static IP  
 DHCP

Figure 23 – 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 "MerryloTHub-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.

**STEP 3. SET WAN**

Ethernet  
 Wi-Fi  
 Dual WAN

Connection Check Address 1:

Connection Check Address 2 (Optional):

**WI-FI MANUAL CONNECT**

ADD (HIDDEN) SSID

---

**OR CHOOSE A WI-FI...**

AP-010070	
!@#\$\$%^&*_{ }{:;><,./;][=-	
crux2	

Figure 24 – Wi-Fi connection

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

Click "Join" to accept or "Cancel" to abort.

**MANUAL CONNECTION**

LoRa gateway

●●●●●●●●|

Figure 25 – Wi-Fi manual connection

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

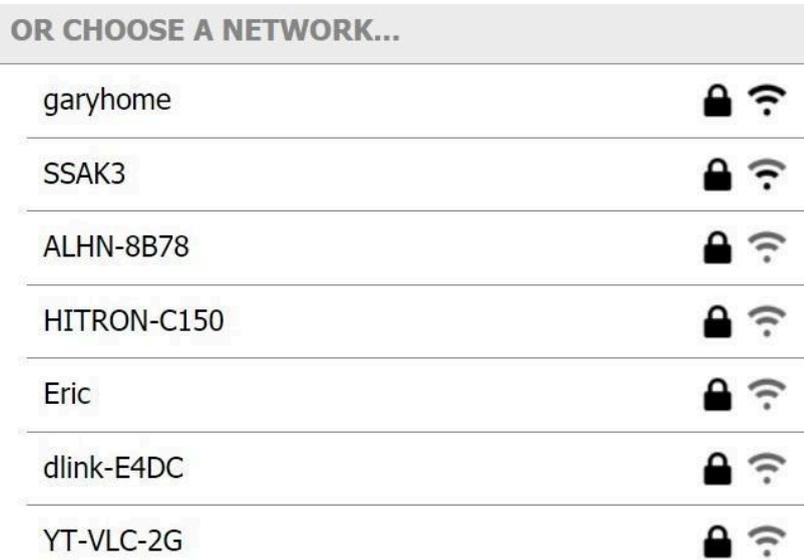


Figure 26 – Wi-Fi manual connection

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



Figure 27 – 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**”.

**STEP 3. SET WAN**

Ethernet  
 Wi-Fi  
 Dual WAN

Connection Check Address 1:

Connection Check Address 2 (Optional):

**DUAL WAN CONFIGURATION (1/3)**

**DUAL WAN SETTINGS**

Network Priority:  
 Ethernet First  
 Wi-Fi First

Figure 28 – Dual WAN Settings

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

**DUAL WAN CONFIGURATION (2/3)**

**ETHERNET STATUS**

Protocol: Static IP  
IP Address: 192.168.55.20  
Subnet Mask: 255.255.255.0  
Default Gateway: 192.168.55.1  
DNS 1: 8.8.8.8  
DNS 2: -

**ETHERNET SETTING**

(Please connect ethernet cable before setting.)  
 Static IP  
 DHCP

Figure 29 – Dual WAN Settings

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

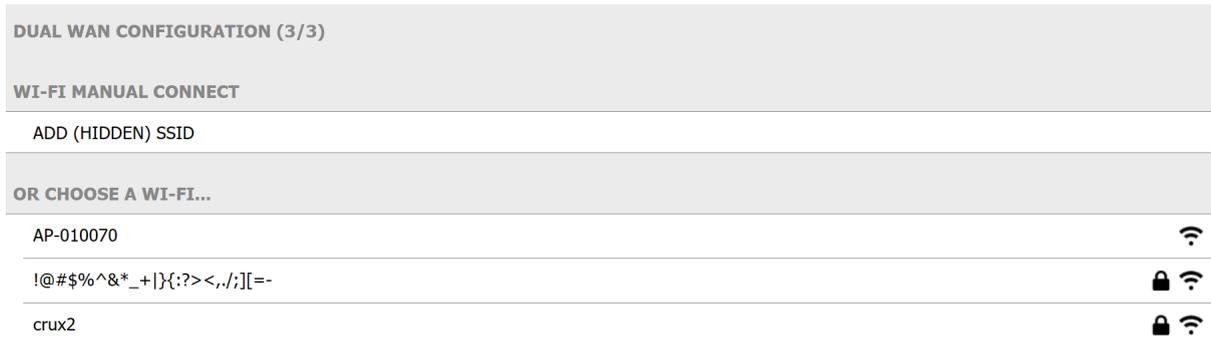


Figure 30 – Dual WAN Settings

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



Figure 31 – Dual WAN Settings

The final screen that the GUI will display.

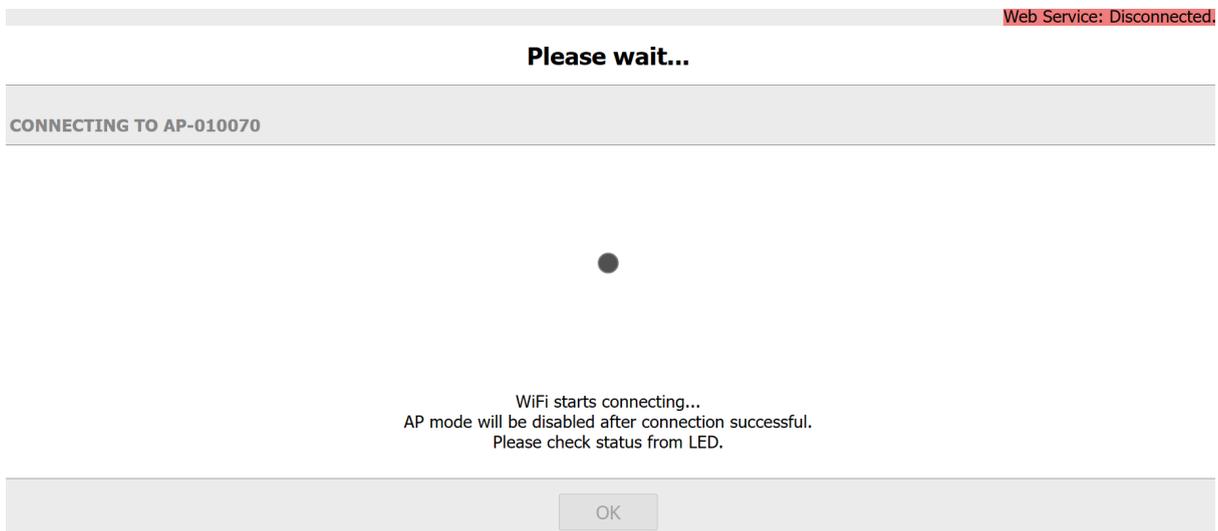


Figure 32 – Final screen

If you want to reset and enter the initial GUI screen, you can press the Reset button for 5 seconds or command “**restore\_default**” and then “**restart**”, so that the AP MODE can be displayed again to enter the GUI.



Figure 33 – 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.

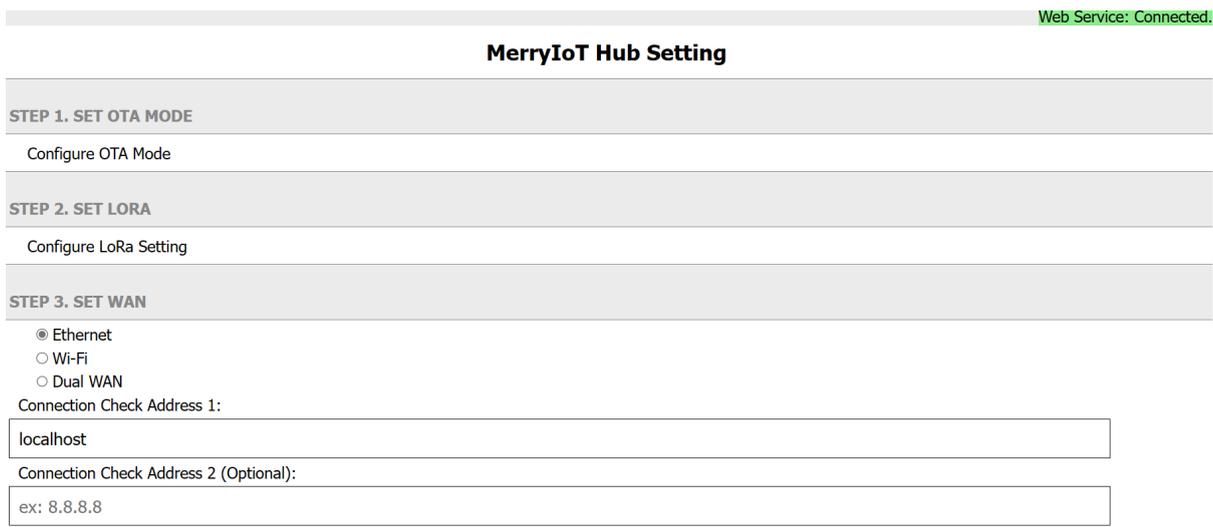


Figure 34 – The initial GUI screen