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MerryIoT Hotspot Miner V1
Model:L0001
User Manual

Revision History

Revision	Date	Description	Author
.001	Oct. 21, 2021	First release	Vincent

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Chapter 1 – Introduction

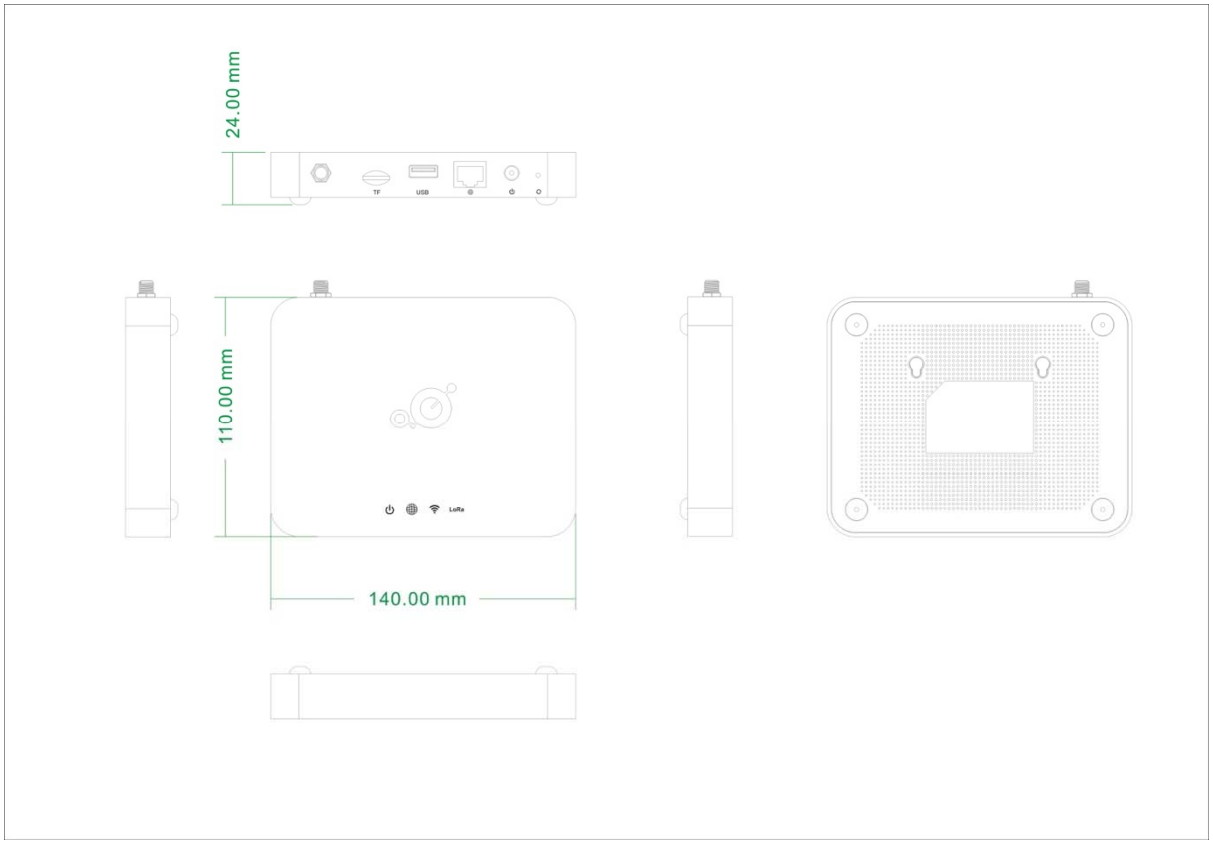
Purpose and Scope

MerryIoT Hotspot Miner V1 is designed for edge computing applications in IoT, Smart Manufacturing, Automation, Blockchain and etc, to support high performance, high reliability and high throughput for the heavy data processing demand.

MerryIoT Hotspot Miner V1 is targeting at AIoT applications with quad A55 cores, G52 GPU hardware, based on Linux distribution. IoT solution providers can easily integrate advanced and stable functions for their application-centric development on their own IoT projects.

Product Design

The dimension of L0001 Helium Hotspot Miner V1 is with the dimension of 140 x 110 x 24 mm, and with one LAN port, one USB port, One TF card and 12V1A power input, four LED indicators, and one reset button.

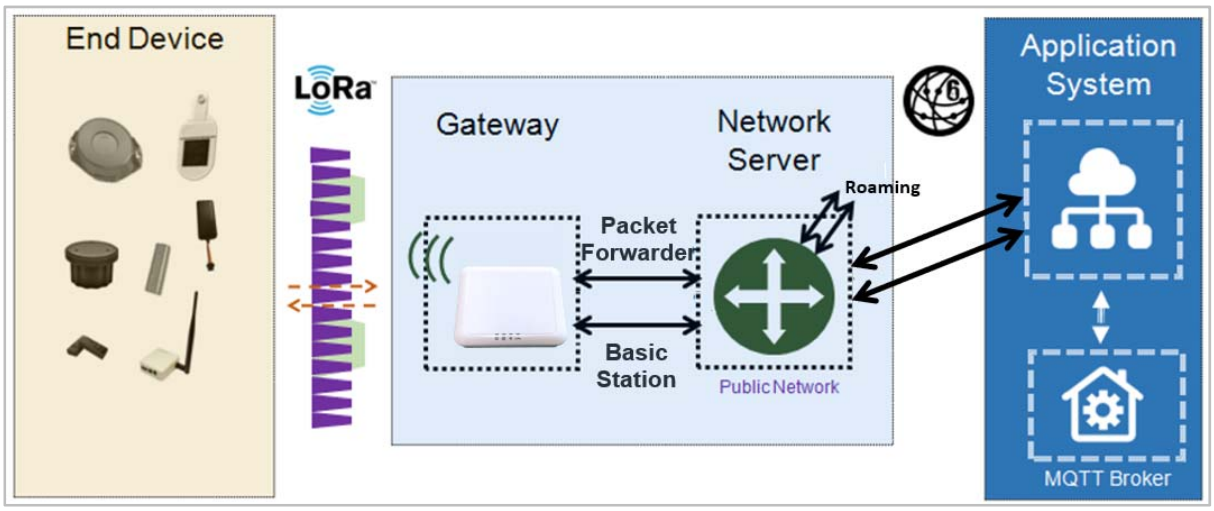


Product Features

- Up to 8 concurrent channels for LoRa transmission

- Built-in 2.4G 802.11b/g/n Wireless LAN, and Bluetooth 5.2
- Various Internet connection: Ethernet, WiFi
- Support LoRaWan 1.0.3 packet forwarder and Basic Station mode
- Ethernet/WiFi Configuration through APP
- Support BROWAN OTA
- Externalantennas for LoRa and internal antenna for WiFi connection

System Architecture



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
LoRaWAN Backend Interfaces Specification v1.0	LoRa Alliance

Chapter 2 – Hardware Details

LED Indicators

LED sequence: Power(System), Internet,WiFi, LoRa,BT.

Four Green, One White

Solid LED is for static status, blanking means system is upgrading or active devices linked to the corresponding port

	Solid On	Blinking	Off
Power System(Green)	Power ON	Booting/OTA	Power Off
Internet(Green)	Internet available	Check Internet	RFU
Wireless(Green)	Wireless connected to root AP	RFU	Wireless NOT connected to root AP
LoRa(Green)	LoRa is working	Initialing	LoRa is not working
BT(White)	BT Advertising	BT Button pressed	No BT Advertising

Table 1 LED Behaviors

Figure 1 – IO Ports

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)
USB	1	Power input via USB adaptor(5VDC/2A)
TF Card		

Figure 2 – IO Ports

Back Label

The marking information is located at the bottom of apparatus.

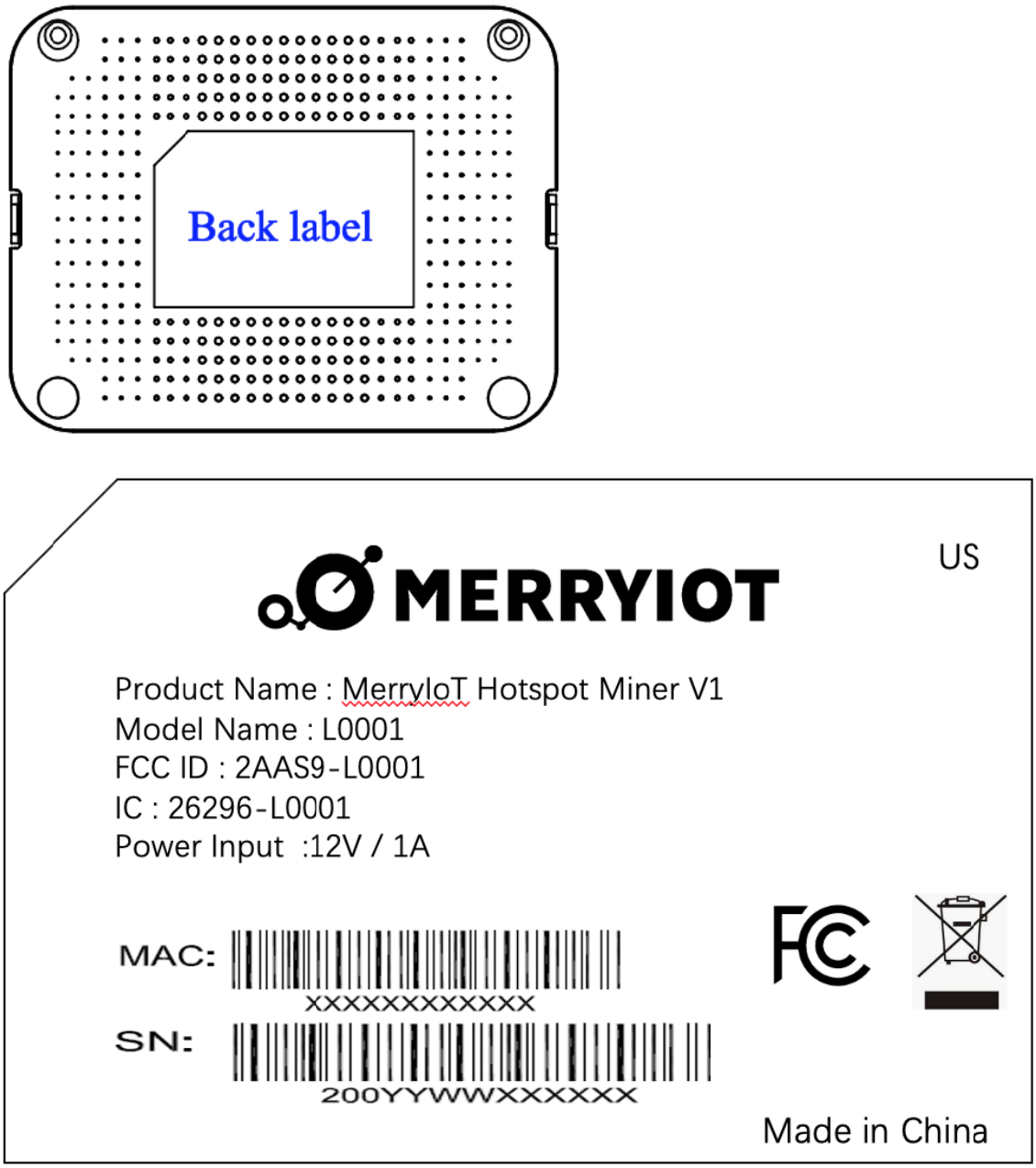


Figure 3 – Back Label

Package Label

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

Package Content

No.	Description	Quantity

1	MerryIoT Hotspot Miner V1	1
2	Power adapter (12V/1A)	1
3	LoRa Antenna and Base	1

Chapter 3 – System Specification

Hardware Specification

No.	Item	Description
1	CPU	- Rockchip RK3566 - Quad-core Cortex-A55 up to 1.8GHz
2	Memory	- DDR3/4 4GB
3	Storage	- eMMC 32GB
4	LoRa radio	- US 915 SKU - External SMA antenna
5	W-Fi radio	- 2.4GHz 1Tx/1Rx 802.11 b/g/n - Built-in antenna
6	BLE radio	- 2.4GHz BLE 5.2 - Built-in antenna
7	Crypto chip	- I2C control - Microchip ATECC608A/B in SOIC-8 and UDFN-8
8	LAN interface	- RJ45 1Gbps x 1
9	TF	- External TF card slot - Supports SDXC or higher speed
10	USB	- External USB-A 2.0 connector - Reserved for future use
11	LEDs	- Logo - Single colored LED indicator (green) x 4 ■ Power ■ Status ■ System ■ Wi-Fi
12	Button	- Push button (GPIO)
13	Console	- Debug UART console
14	Environment	- Temp. operating -10°C ~ +40°C ambient - Storage -20°C ~ +70°C ambient - Humidity operating 5%RH ~ 95%RH (non-condensed relative humidity) - Altitude operating 0 ~ 3000 Meters
15	IP ratings	- IP42 (plastic enclosure)
16	Size	- 140x110x20 mm
17	Power	- DC jack - DC12V 1~1.5A
Note		

LoRa Specification

No.	Item	Description
1	Channels	125K: 922.0MHz~924.6MHz 250K: 921.8MHz~924.5MHz FSK:921.8MHz~924.8MHz
2	Chipset	SX1302+SX1250 (x2)
3	Bandwidth	125KHz/ 250KHz
4	Power	5VDC, 500mA (typical)
5	Antenna	1 ipex connector on board for external antenna
6	Interface	SPI for data communication
7	GPIOs	To control SX1262 (chip select)
8	Form Factor	- Mini-PCIe - 40 x 50 (w/golden pins) x 3 mm
9	Channel Plan -US923	- Uplink Frequency (MHZ) Frequency (MHZ) Spreading Factor n 923.2 - SF7BW125 to SF12BW125 n 923.4 - SF7BW125 to SF12BW125 n 922.2 - SF7BW125 to SF12BW125 n 922.4 - SF7BW125 to SF12BW125 n 922.6 - SF7BW125 to SF12BW125 n 922.8 - SF7BW125 to SF12BW125 n 923.0 - SF7BW125 to SF12BW125 n 922.0 - SF7BW125 to SF12BW125 n 922.1 - SF7BW250 n 921.8 - FSK - -Downstream Frequency (MHZ) Spreading Factor n Uplink channels 1-10 (RX1) n 923.2 - SF10BW125 (RX2) Downlink Frequency (MHZ) - Upstream Frequency (MHZ) Spreading Factor n 923.2 - SF7BW125 to SF12BW125 n 923.4 - SF7BW125 to SF12BW125 n 923.6 - SF7BW125 to SF12BW125 n 923.8 - SF7BW125 to SF12BW125 n 924.0 - SF7BW125 to SF12BW125 n 924.2 - SF7BW125 to SF12BW125 n 924.4 - SF7BW125 to SF12BW125 n 924.6 - SF7BW125 to SF12BW125 n 924.5 - SF7BW250 n 924.8 - FSK - - Downstream Frequency (MHZ) Spreading Factor n Uplink channels 1-10 (RX1) n 923.2 - SF10BW125 (RX2)
Note: LoRa frequency is user defined.		

Software Specification

3.1 Configuration/Performance/Capability

Req. #	Features	Description	comment
PR-0001	Network Configuration	• WiFi or Ethernet switch Configuration	
PR-0002	BLE Name	MerryIoT Hotspot V1_xxxxxx where the last hex are the last 6 uppercase hex of the MAC address.	

PR-0003	OTA	• OTA daily check • Browan OTA • ALi OTA • 同時更新 loading 的問題?	
PR-0003	SSH Password	Account : root Password: Create by MerryIot sign key based on MAC • 8 characters • English uppercase and lowercase, 2~9 numbers (default Skip: 0,O,1,I,l, o)	
PR-0004	Gateway Config	• Network setting WiFi o App 不能 skip WiFi • 設定 Helium on boarding	

3.2 Basic Features

Req. #	Features	Description	comment
PR-1001	BLE Button	• Over 6 seconds then trigger BLE provision	

PR-1002	LED	• 5 LEDS
		  o Power LED
		  o Internet LED
		  o WiFi LED
		  o LoRa LED
		  o BT LED
		• Refer to Table 1 LED Behavior.	

PR-1003	Ethernet	• Ethernet connection	
PR-1004	WiFi Station	• WiFi Station Mode	
PR-1005	BLE	• Configuration through BLE	
PR-1006	Debug port	• UART for debug	
PR-1007	OTA	• OTA agent	
PR-1008	SW Monitor	• Monitor packet forwarder • Monitor Helium Miner • Monitor Gateway Config	
PR-1009	HW Watchdog	• Monitor system	

3.3 LoRaWAN features

Req. #	Features	Description	comment
PR-2001	Packet Forwarder	• Compatible with Semtech LoRa Packet Forwarder	
PR-2002	Miner Application	• Miner Application	
PR-2003	gateway_mfr	• Swarm key provision	
PR-2004	Gateway config	• WiFi Setting • Helium on boarding	

Regulatory Specification

No.	Item	Standard
1	FCC/IC	TBD
2	NCC	TBD
3	CE	EN 300 328 V2.2.2(included EN 62311/EN 50665/EN 50385) EN 300 220-2 V3.1.1 EN 301 489-1 V2.2.3 EN 301 489-3 V2.1.1 EN 301 489-17 V3.2.4 EN 55032 / EN 55024 EN 62368-1 LVD
4	RCM	TBD

Reliability Specification

No.	Item	Specification
1	MTBF	300,000 @ 40 ℃

Chapter 4 – User Manual

4.1 Connect MerryIoT Hotspot

You can connect to the gateway via WiFi interface which the SSID and password printed on the back label by default.

The rule of gateway SSID is MerryIoT-xxxxxx where the last digits are the last 6 digits of the MAC address

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

4.2 Hotspot Setting

Open the web browser(ex:Chrome) after connect to the gateway via IP address “192.168.4.1”

Now you can configure the gateway through the WEB UI.

STEP 1 : SET WAN

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

Figure 4 –WANconnection

STEP 1.1Ethernet Setting

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

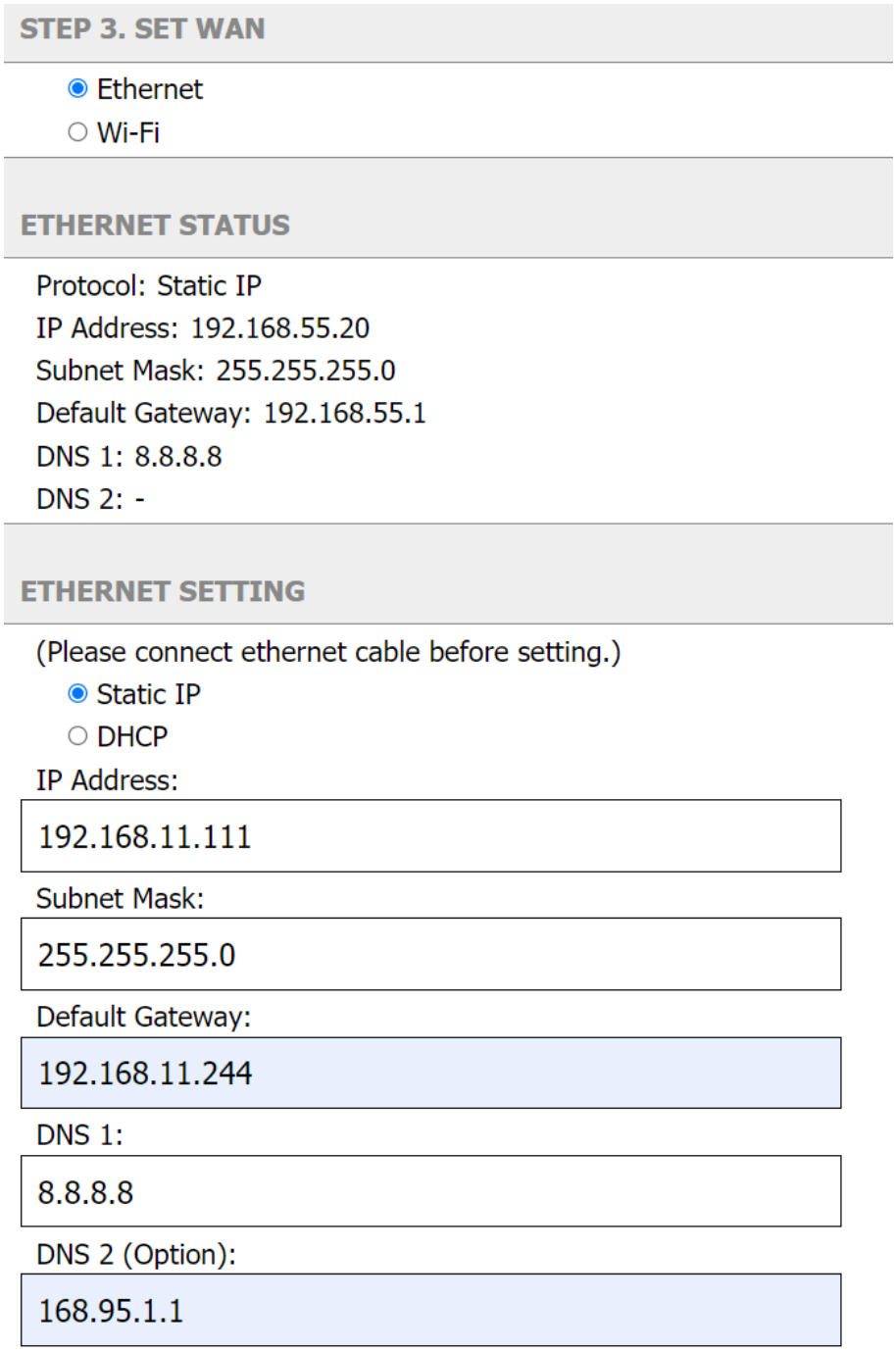


Figure 5 – WAN connection

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 to 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.

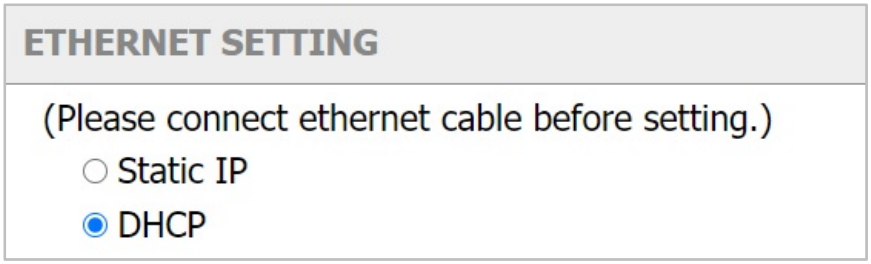


Figure 6 –DHCP client

STEP 1.2Wi-Fi

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

i	The gateway WiFi interface is the Access Point by default which SSID is “Femto_Lite-XXXXXX” printed on the back label. Administrator can only access to the WEB UI through the Access Point mode to configure the gateway. The gateway will be the WiFi client and won’t access to the WEB UI after enable WiFi interface as the internet backhaul connection.

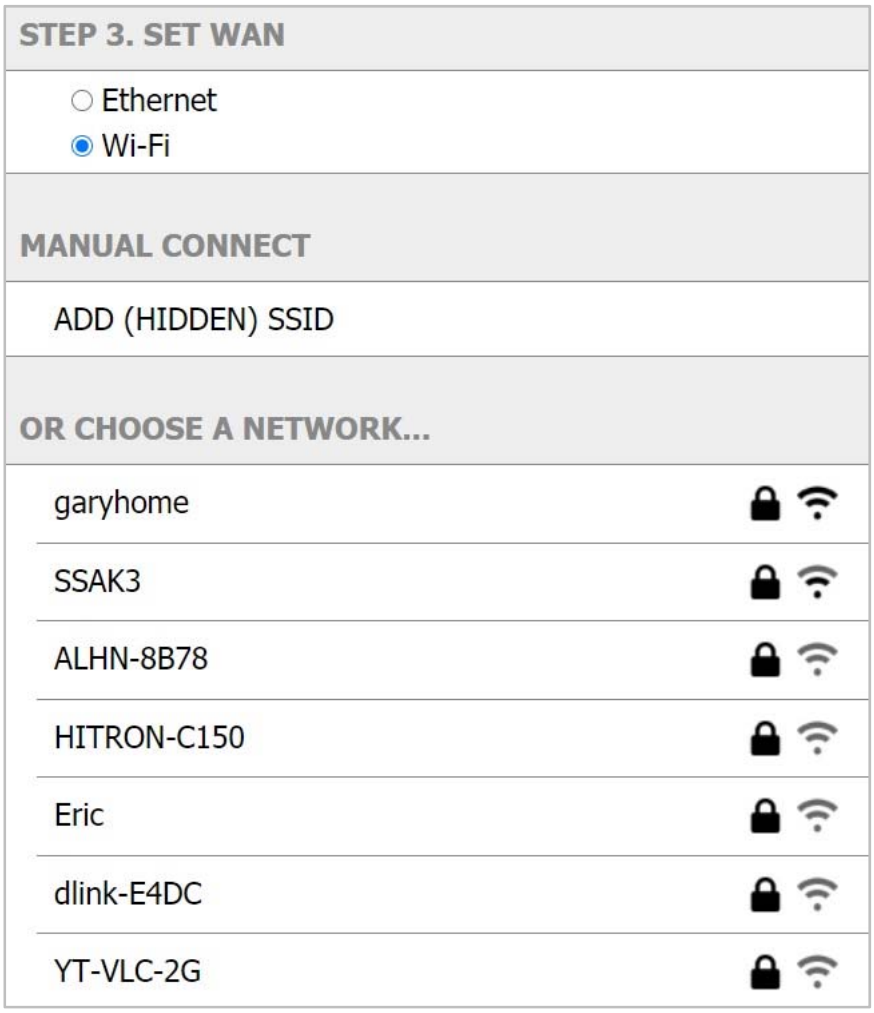


Figure 7 – Wi-Fi connection

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

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

Figure 8 – Wi-Fi manual connection

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

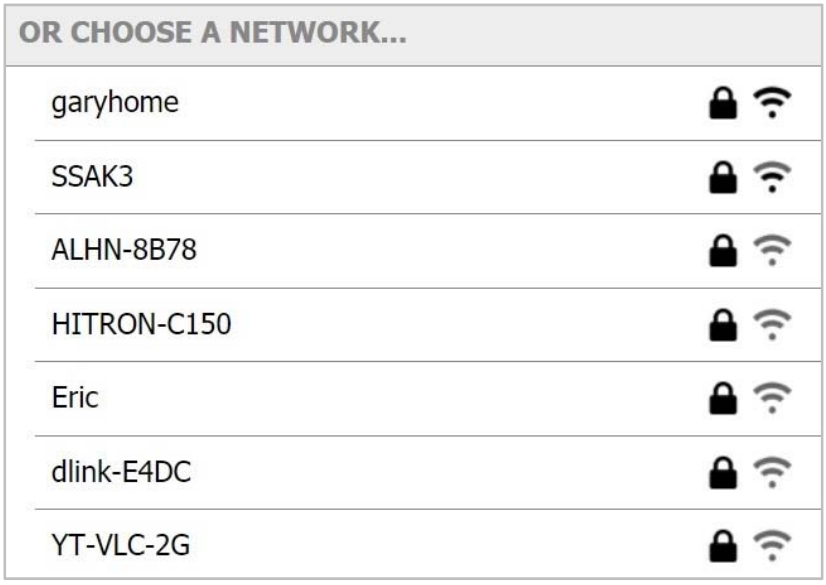


Figure 9 – Wi-Fi manual connection

Enter WiFi password if it is necessary for the connection.

Figure 10 – Wi-Fi password

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

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 thatto 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 ExposureStatement:

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 devicecontains licence-exempt transmitter(s)/receiver(s) thatcomplywith Innovation, Science and EconomicDevelopmentCanada's licence-exempt RSS(s). Operationissubject to the followingtwoconditions:

(1) This devicemay not cause interference
(2) This device must acceptanyinterference, includinginterferencethatmay cause undesiredoperation 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 ExposureStatement:
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 conformeCanadalimites d'exposition auxradiations dansun environnement non contrôlé. Cet équipement doit êtreinstallé et utilisé àdistance minimum de 20cmentre le radiateur etvotre corps.