UG87-Out LoRaWAN Gateway

Quick Start Guide

Welcome

Thank you for choosing Ursalink UG87 LoRaWAN Gateway.

This guide teaches you how to install the UG87 (Outdoor) and how to log in the web GUI to configure the device. Once you complete the installation, refer to the Ursalink UG87 User Guide for instructions on how to perform configurations on the device.

Related Documents

This Quick Start Guide only explains the installation of Ursalink UG87 LoRaWAN Gateway. For more functionality and advanced settings, please refer to the relevant documents as below.

Document	Description
Ursalink UG87 Datasheet	Datasheet for the Ursalink UG87 LoRaWAN Gateway.
Ursalink UG87 User Guide	Users can refer to the guide for instruction on how to log in the web GUI, and how to configure all the settings.

The related documents are available on Ursalink website: http://www.ursalink.com.

Declaration of Conformity

UG87 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.
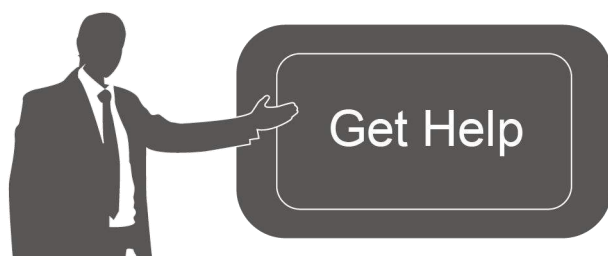
For assistance, please contact
Ursalink technical support:
Email: support@ursalink.com
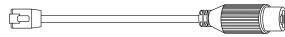Tel: 86-592-5023060
Fax: 86-592-5023065

1. Packing List

Before you begin to install the UG87 LoRaWAN Gateway, please check the package contents to verify that you have received the items below.
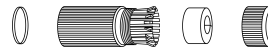
1.1 Package Contents

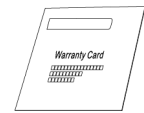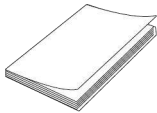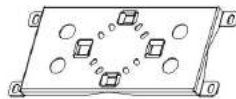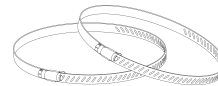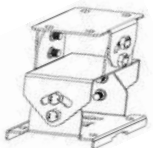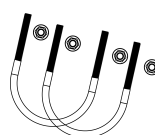|			
1 × UG87	1 × Ethernet Extension Cord	1 × Water-proof Connector	1 × Power Supply Cable
2 × Cellular Antennas	1 × LoRa Antenna	1 × GPS Antenna	1 × Warranty Card
1 × Quick Start Guide	1 × Wall Mounting Kit	2 × Pole Mounting Kit	Screws

Optional Accessories
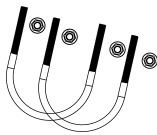
1 × Pole Mount A + 2 × U-Bolt	1 × Pole Mount B + 2 × U-Bolt	Screws
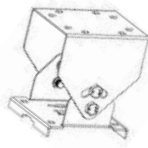
Required Additional Equipment

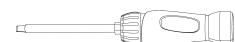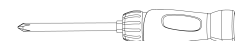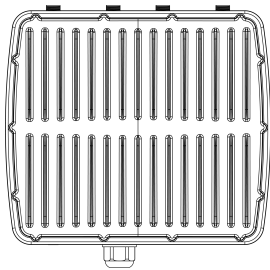|			
1 × Personal Computer	1 × Ethernet Cable	1 × Wrench M6	2 × Screwdrivers
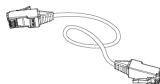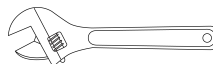
(Phillips-head and Flathead)

⚠ **If any of the above items is missing or damaged, please contact your Ursalink sales representative.**

2. Hardware Introduction

2.1 Overview
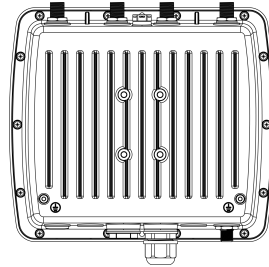
Top View   **Bottom View**   **Front & Rear View**

Core plug—seal up these unneeded interfaces.

Ethernet Interface

Power Interface

Vent plug—applied to balance different pressure, protect UG87 from dust and water, and ventilate the enclosure.

Antenna Interface

2.2 Dimensions (mm)

90.5
25
256
35
255
226
58

2.3 LED Indicators

⚠️ **LED indicators are on the front panel of device.**

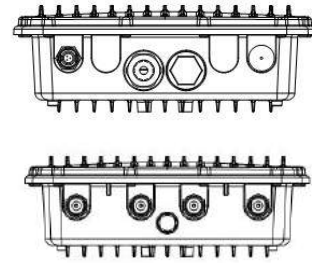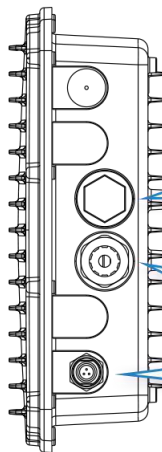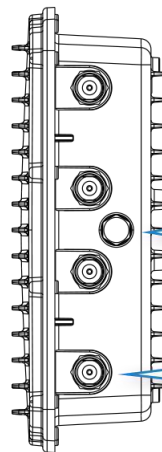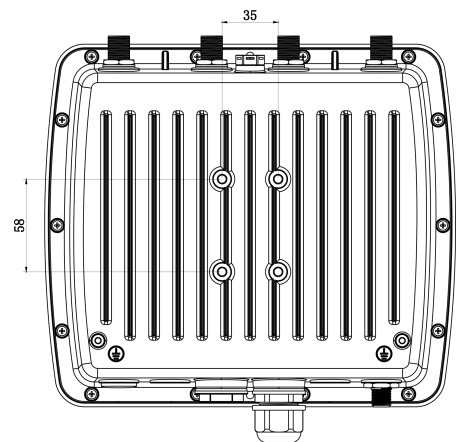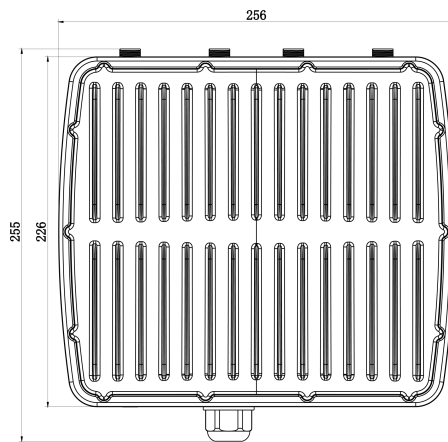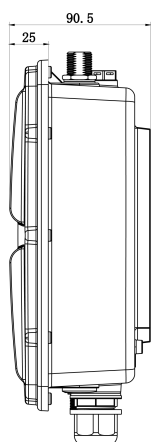| LED	Indication	Status	Description
POWER	Power Status	On	The power is switched on
		Off	The power is switched off
STATUS	System Status	Green Light	Static: Start-up
			Blinking slowly: the system is running properly
		Off	The system goes wrong
LoRa	LoRa Status	Green Light	Packet Forwarder mode is running well.
		Off	Packet Forwarder mode is running off.
VPN	VPN Status	Green Light	VPN is connected
		Off	VPN is disconnected
SIM1/SIM2	SIM Card Status	Off	SIM1 or SIM2 is registering or fails to register (or there are no SIM cards inserted)
		Green Light	Blinking slowly: SIM1 or SIM2 has been registered and is ready for dial-up
			Blinking rapidly: SIM1 or SIM2 has been registered and is dialing up now
			Static: SIM1 or SIM2 has been registered and dialed up successfully
Signal Strength	Signal 1/2/3	Off	No signal
		Green Light	Static/Off/Off: weak signals with 1-10 ASU (please check if the antenna is installed correctly, or move the antenna to a suitable location to get better signal)
			Static/Static/Off: normal signals with 11-20 ASU (average signal strength)
			Static/Static/Static: strong signals with 21-31 ASU (signal is good)

2.5 Reset Button

⚠️ **Reset button is on the front panel of device.**

Function	Description	
	STATUS LED	**Action**
Reboot	Blinking	Press and hold the reset button for about 5-15 seconds.
	Static Green	Release the button and wait for system to reboot.
Reset	Blinking	Press and hold the reset button for more than 15 seconds.
	Static Green → Rapidly Blinking	Release the button and wait.
	Off → Blinking	The gateway is now reset to factory default.

2.6 Ethernet Port Indicator

⚠ **Ethernet port indicators are on the front panel of device.**

Indicator	Status	Description
Link Indicator (Orange)	On	Connected
	Blinking	Transmitting data
	Off	Disconnected
Rate Indicator (Green)	On	1000 Mbps mode
	Off	100 Mbps mode

3. Hardware Installation

Environmental Requirements

- Power Input: 100-240VAC (Option: 9-48 VDC)
- Power Consumption: Typical 3.3W (Max 6.4 W)
- Ingress Protection: IP67
- Operating Temperature: -40°C to 70°C (-40°F -158°F)
- Relative Humidity: 0% to 95% (non-condensing) at 25°C/77°F

3.1 SIM Card Installation

3.1.1 Remove the detachable cover

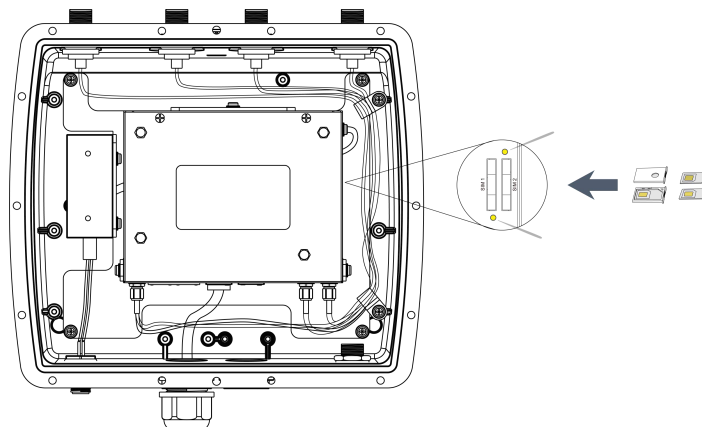Remove the detachable cover of the housing with a screwdriver (M4).
Note: Your device has been installed into the enclosure before delivery.
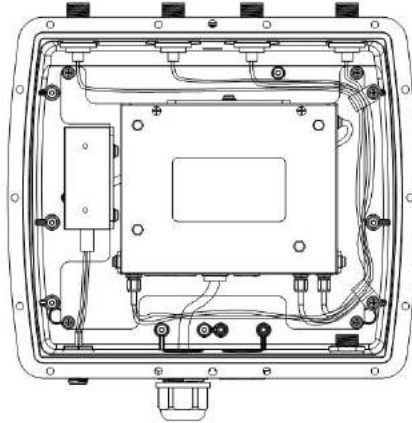
3.1.2 SIM Card Installation

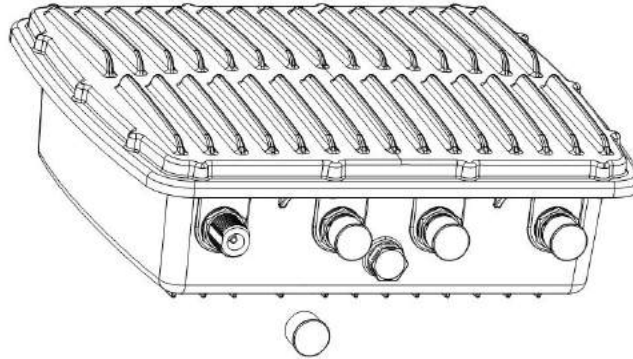A. Push the yellow button on the left panel of the slot, and then you will see the SIM card slot popping out directly.

B. Put SIM card onto the slot then insert the back into the hole.

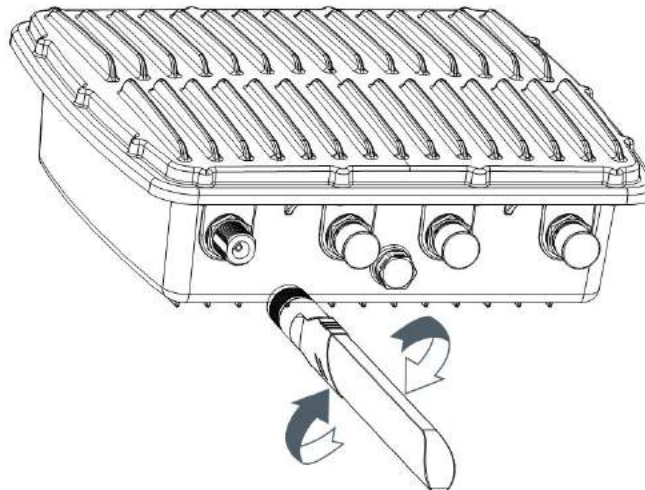## 3.2 Antenna Installation

3.2.1 Remove the protective caps

Remove the protective caps from the antenna connectors. Take cellular connector as an example.

3.2.2 Connect the antenna

Connect the antenna to the corresponding antenna connector by holding on the metal part of the antenna and rotating it clockwise.
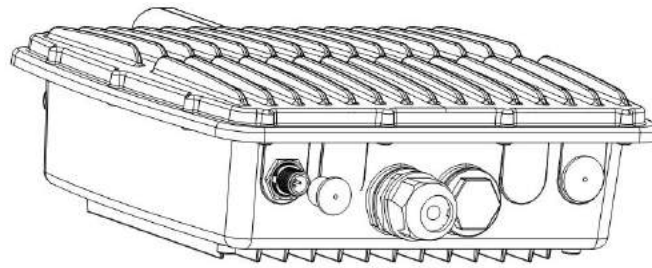Note: Each antenna is labeled as 3G, 4G or LoRa.
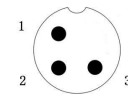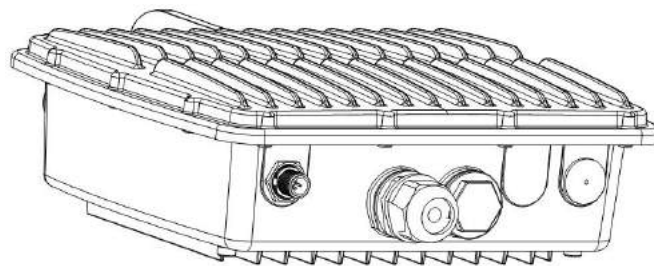
3.3 Power Connection

3.3.1 Remove the protective caps

Locate the power port marked POWER on the left side of the enclosure and remove the protective cap to find the connection pins.
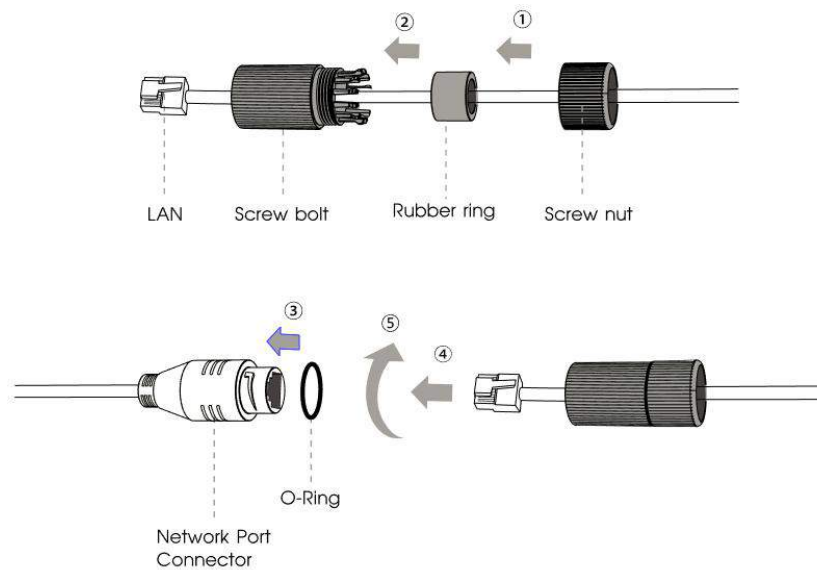
3.3.2 Connect the power cable

Connect a power supply cable to the power port, and rotate it clockwise.

PIN	Color	Description
1	Brown	L (VIN+)
2	Black	GND
3	Blue	N (VIN-)

3.4 Ethernet Connection

1. Get the network cable through the screw nut, rubber ring and the screw bolt;
2. Insert the rubber ring into the screw bolt;
3. Connect the screw nut to the screw bolt;
4. Place the O-Ring on the network port connector;
5. Connect the RJ45 to the Network port connector, and tighten the screw bolt and the connector.

## 3.5 Connect UG87 to a Computer
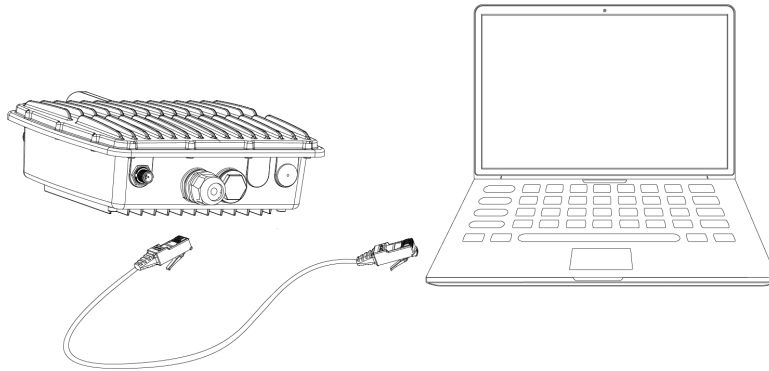
3.6 Mount Gateway

The gateway can be mounted to a wall or a pole.

3.6.1 Wall Mounting

Make sure you have mounting bracket, bracket mounting screws, wall plugs, wall mounting screws and other required tools.

1. Before you start, make sure that your SIM card has been inserted, your antennas have been attached and that all cables have been disconnected from your enclosure.

2. Mount the enclosure to the mounting bracket with the bracket mounting screws.
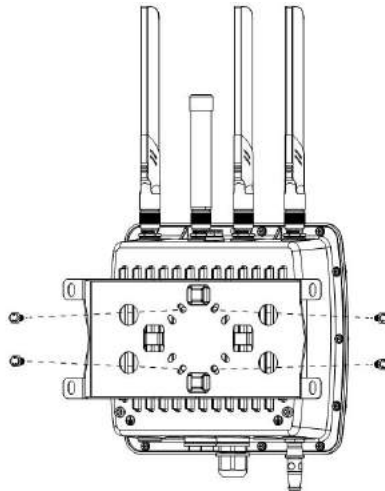

3. Align the mounting bracket horizontally to the desired position on the wall, use a marker pen to mark four mounting holes on the wall, and then remove the mounting bracket from the wall.

Note: The connecting lines of adjacent points are at right angles.

4. Drill the four holes with a depth of 32 mm by using your drill with a 6 mm drill bit on the positions you marked previously on the wall.

5. Insert four wall plugs into the holes respectively.

6. Mount the mounting bracket horizontally to the wall by fixing the wall mounting screws into the wall plugs.

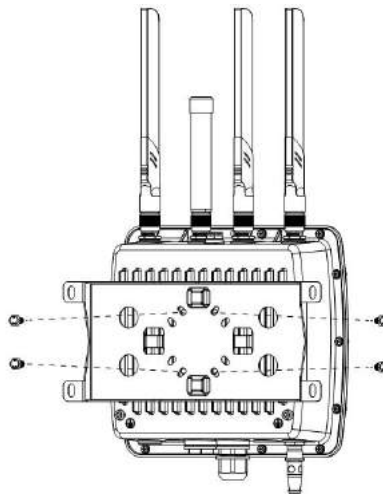**Note:** Place the power port on the button when installing.
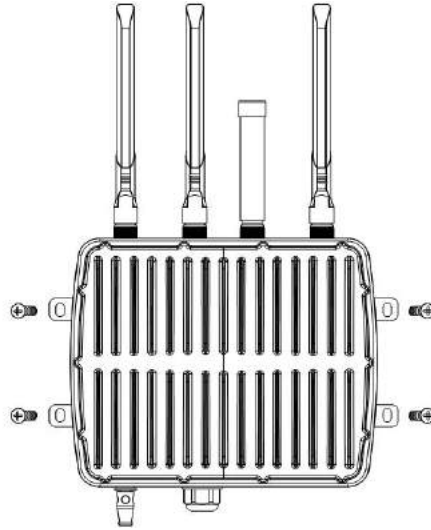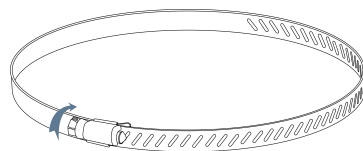
7. Reconnect the cables.

3.6.2 Pole Mounting (Hose clamp)

Make sure you have mounting bracket, bracket mounting screws, hose clamp and other required tools.
1. Before you start, make sure that your SIM card has been inserted, your antennas have been attached and that all cables have been disconnected from your enclosure.
2. Mount the enclosure to the mounting bracket with the bracket mounting screws.
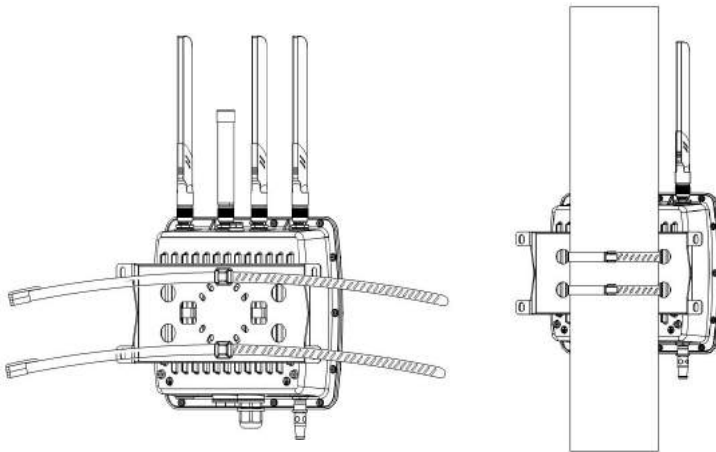

3. Loosen the hose clamp by turning the locking mechanism counter-clockwise.

4. Straighten out the hose clamp and slide it through the rectangular holes in the mounting bracket, wrap the hose clamp around the pole.

5. Use a screwdriver to tighten the locking mechanism by turning it clockwise.

6. Reconnect the cables.

## 3.6.3 Pole Mounting (U-bolt)

Note: Pole mounting (U-bolt) is optional.

Make sure you have mounting bracket, bracket mounting screws, hose clamp and other required tools.

1. Before you start, make sure your SIM card has been inserted, your antennas have been attached and that all cables have been disconnected from your enclosure.

2. Mount the enclosure to the mounting bracket with the bracket mounting screws.
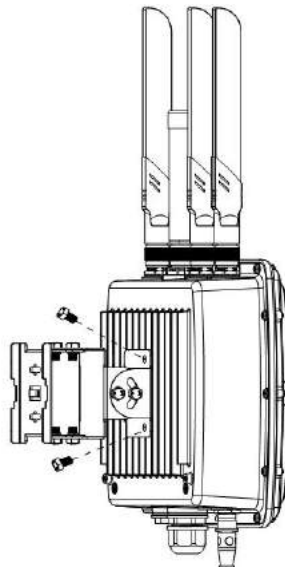
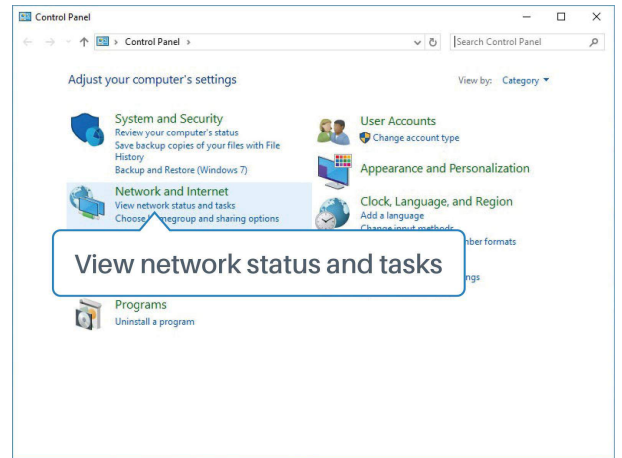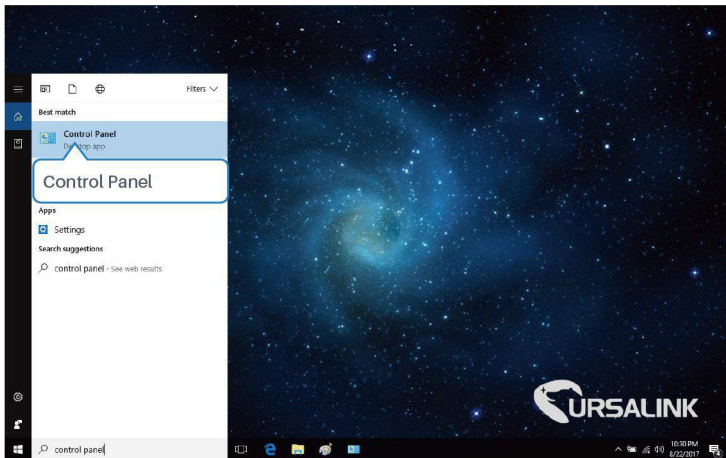3. Wrap the U-bolt around the pole and mount the bracket with the mounting screws.
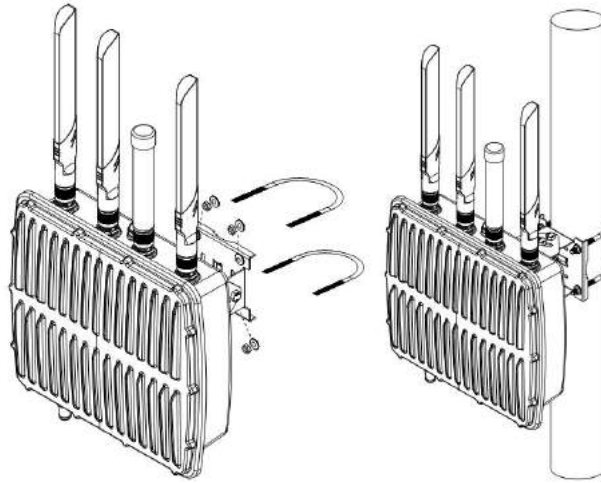
4. Reconnect the cables.

Getting Started

4. PC Configuration for UG87 Web GUI

Please connect PC to GE port of UG87 directly. PC can obtain an IP address, or you can configure a static IP address manually. The following steps are based on Windows 10 operating system for your reference.
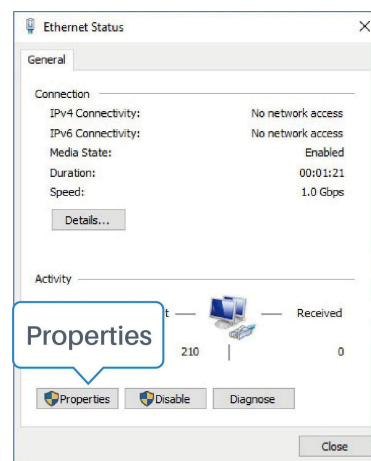

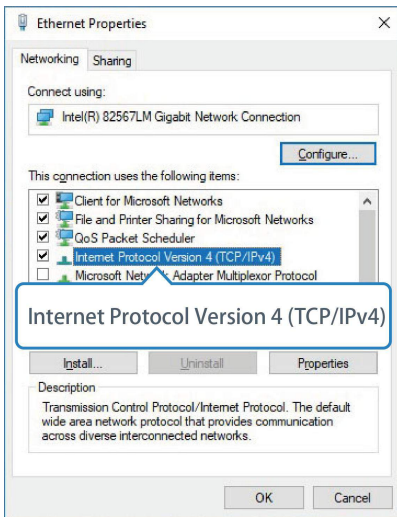① Click "Search Box" to search "Control Panel" on the Windows 10 taskbar.

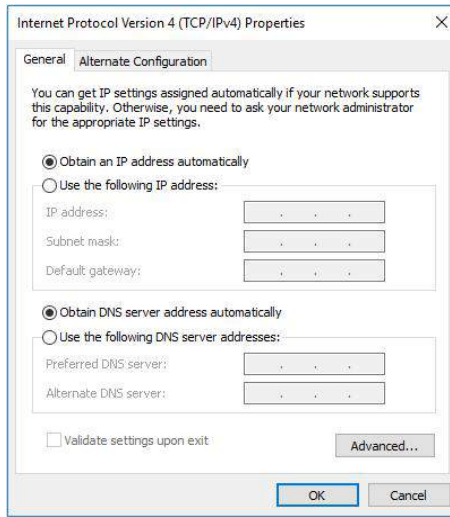② Click "Control Panel" to open it, and then click "View network status and tasks".
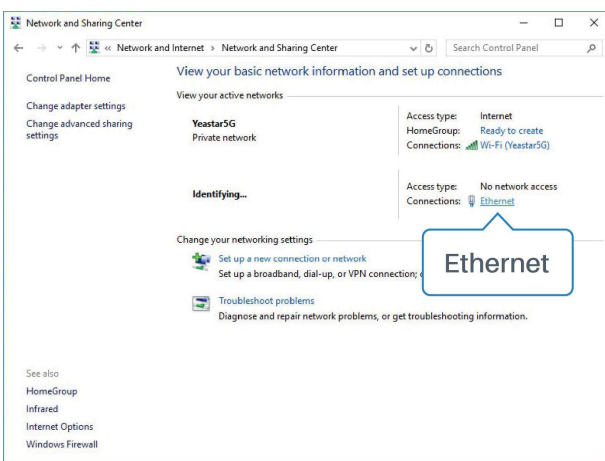
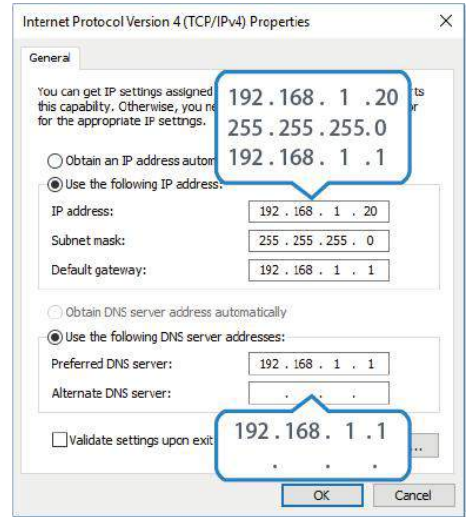③ Click "Ethernet" (May have different names).

④ Click "Properties".

⑤ Double Click "Internet Protocol Version 4 (TCP/IPv4)" to configure IP address and DNS server.

(Note: Remember to click "OK" to finish configuration.)

⑥ Method 1: click "Obtain an IP address automatically";

Method 2: click "Use the following IP address" to assign a static IP manually within the same subnet of the gateway.

5. Access to UG87 Web GUI for Cellular Connection

This chapter explains how to log in UG87 Web GUI, and connect the gateway to cellular network.

Ursalink UG87 provides web-based configuration interface for management. If this is the first time you configure the gateway, please use the default settings below:
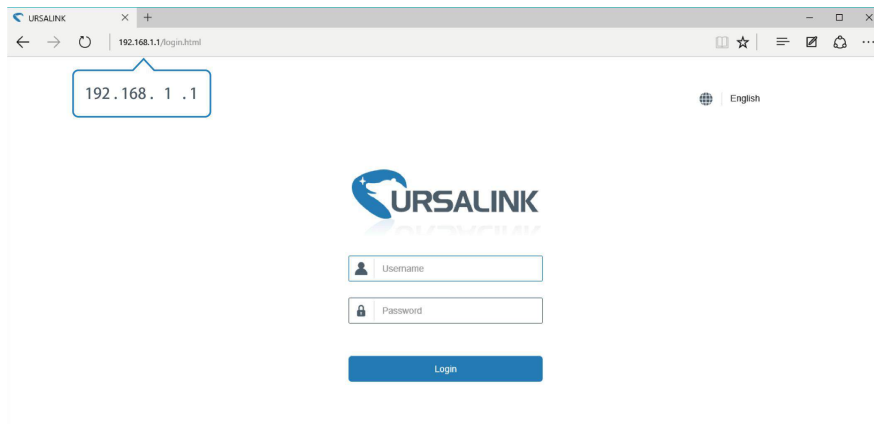
IP Address: **192.168.1.1**
Username: **admin**
Password: **password**

5.1 Log in the Gateway

⚠ **Make sure your PC is connected to the same network as shown in Section 4.**

A. Start a Web browser on your PC (Chrome and IE are recommended), type in the IP address, and press Enter on your keyboard.
B. Enter the username and password, click "Login".


⚠ **If you enter the username or password incorrectly more than 5 times, the login page will be locked for 10 minutes.**

C. When you log in with the default username and password, you will be asked to modify the password. It's suggested that you change the password for the sake of security. Click "Cancel" button if you want to modify it later.
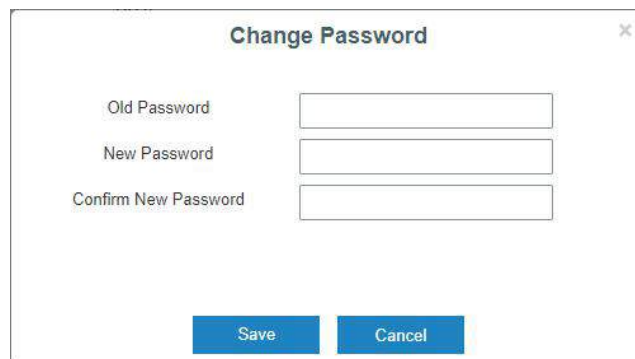
D. After you log in the Web GUI, you can view system information and perform configuration on the gateway.
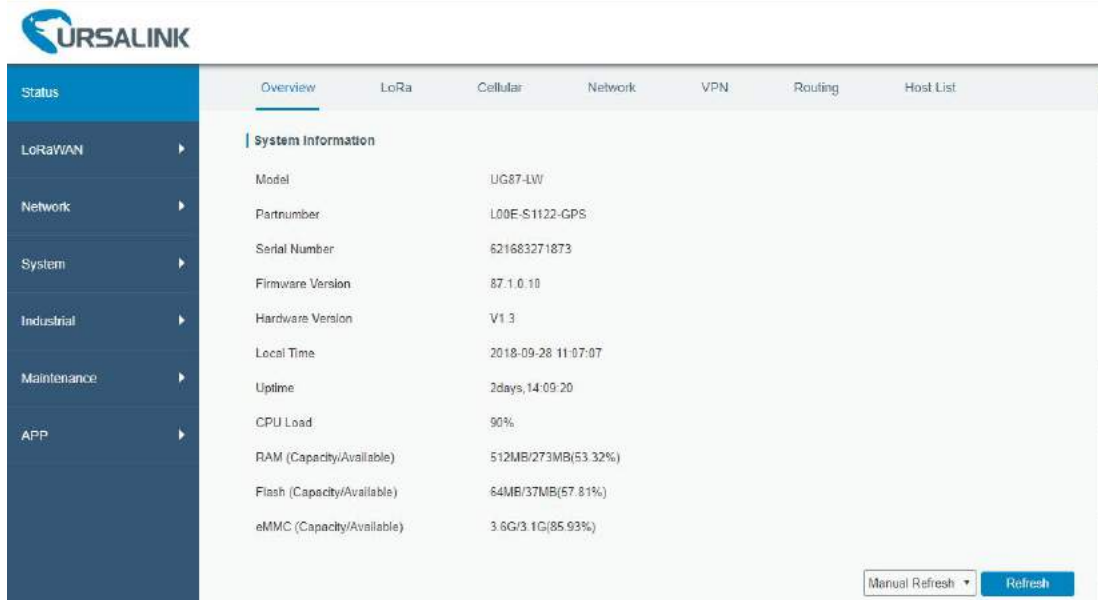
5.2 Configure the Cellular Connection

Take inserting SIM card into SIM1 slot as an example; please refer to the following detailed operations.

A. Click "Network" → "Interface" → "Cellular" → "Cellular Setting" to configure the cellular info.
B. Enable SIM1.
C. Choose relevant network type. "Auto", "4G First", "4G Only", "3G First", "3G Only", "2G First" and "2G Only" are optional.
D. Click "Save" and "Apply" for configuration to take effect.
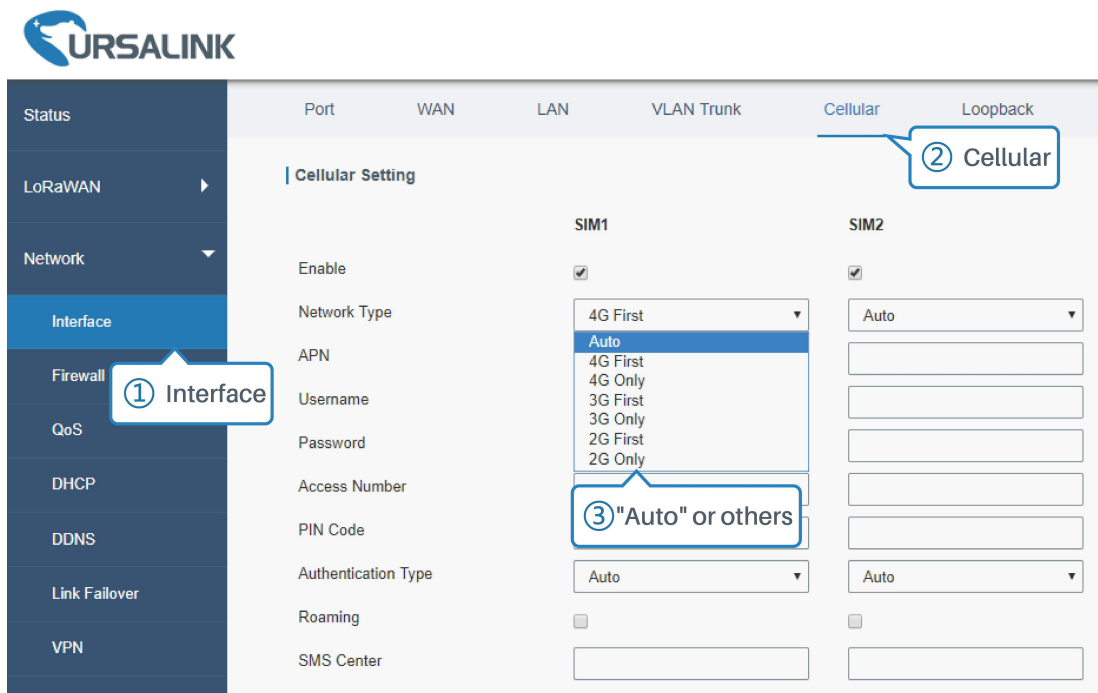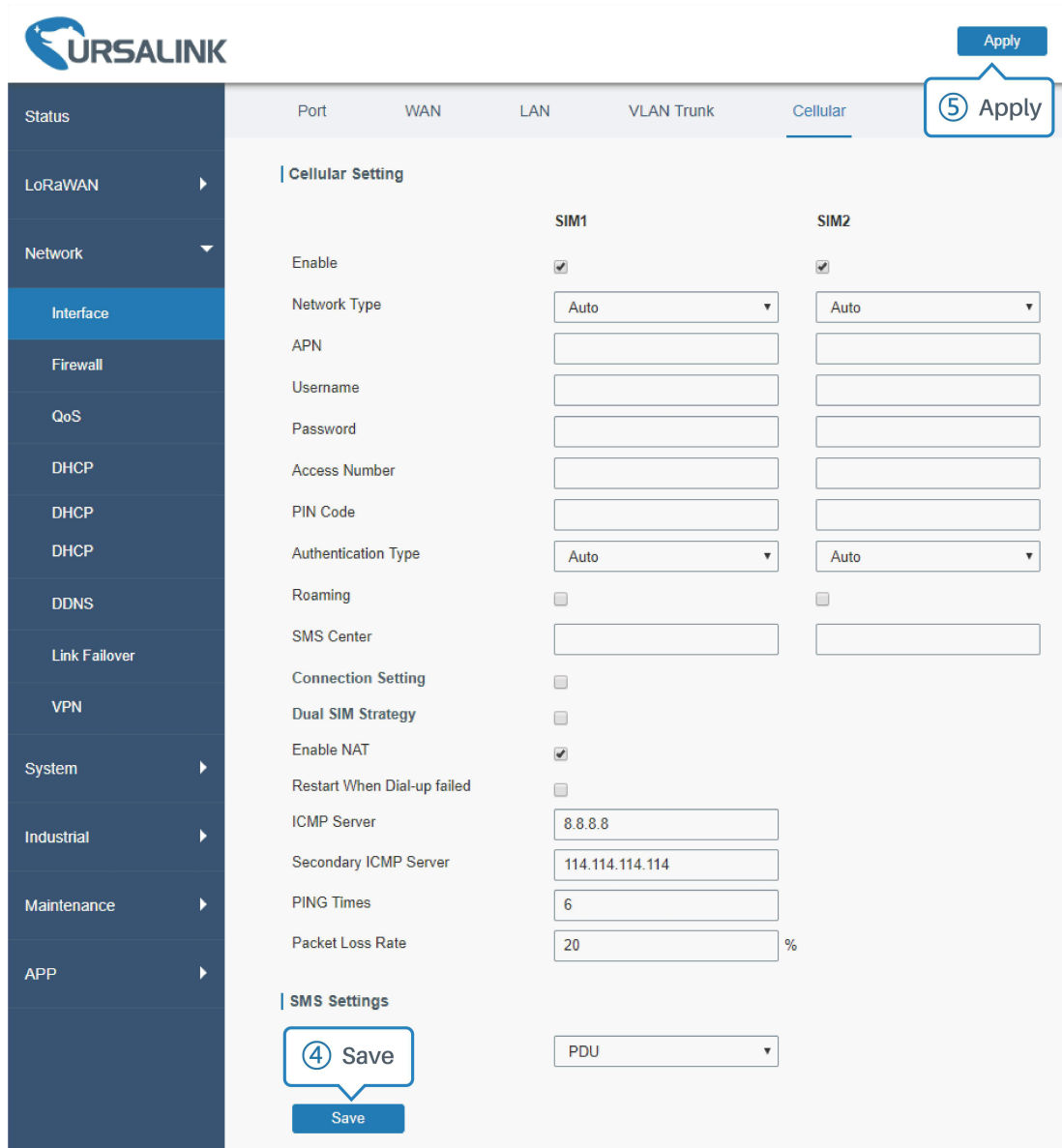
If you select "Auto", the gateway will obtain ISP information from SIM card to set APN, Username, and Password automatically. This option will take effect when the SIM card is issued from a well-known ISP.

If you select "4G First" or "4G Only", you can click "Save" to complete the configuration directly.

If you select "3G First", "3G Only", "2G First" or "2G Only", you should manually configure APN, Username, Password, and Access Number.
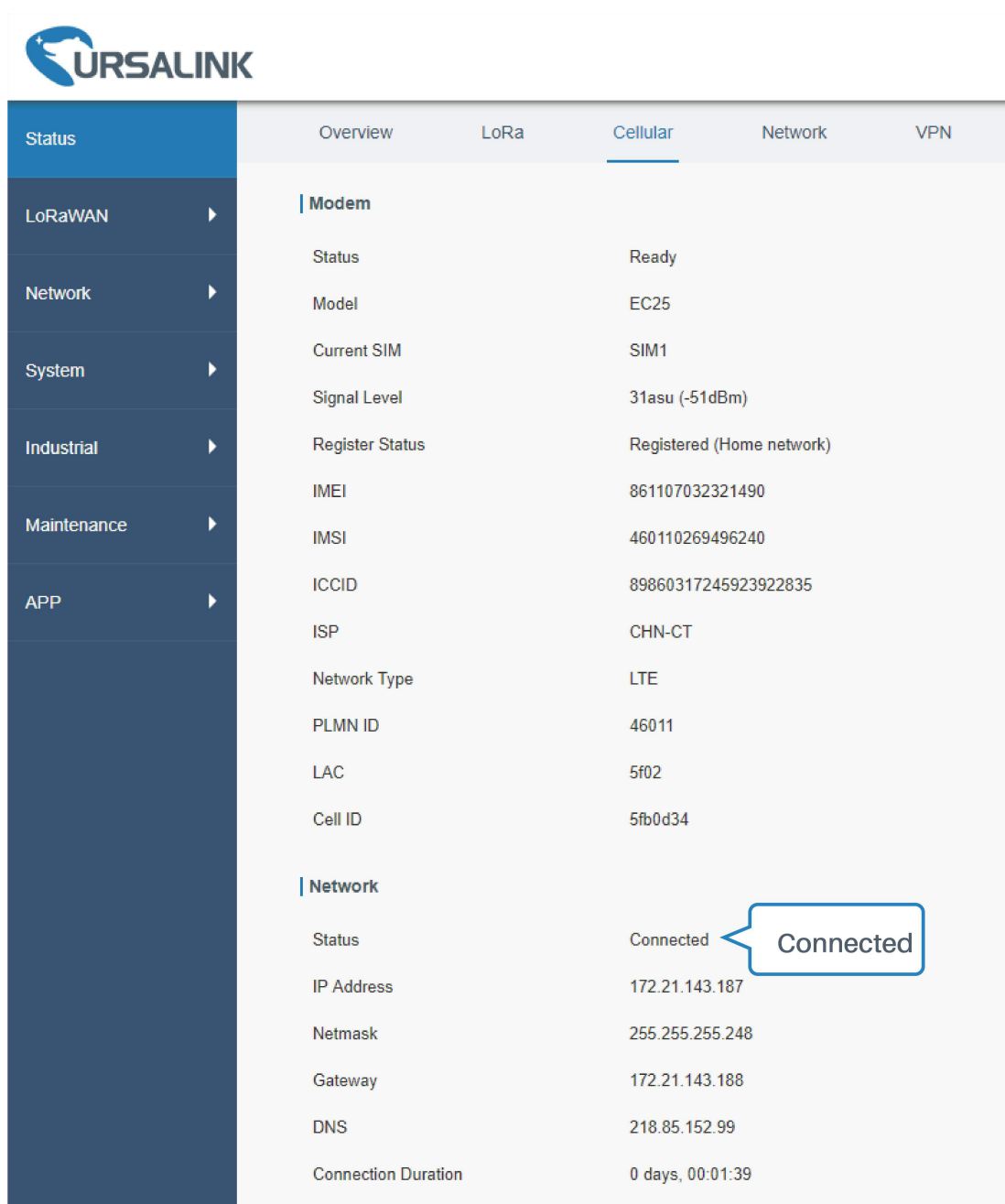
UG87 have two cellular interfaces, named SIM1 & SIM2. Only one cellular interface is active at one time. If both cellular interfaces are enabled, SIM1 interface takes precedence by default.

5.3 Check the Cellular Connection Status

5.3.1 Check the Cellular Connection Status by Web GUI of Gateway

Click "Status" → "Cellular" to view the status of the cellular connection. If it shows "Connected", it means

SIM1 has dialed up successfully.

5.3.2 Check the Cellular Connection Status by Hardware

On the other hand, you can check the status of SIM1 indicator. If it keeps on green light statically, it means SIM1 has dialed up successfully.

5.4 Check if Network Works Properly by Browser on PC

Open your preferred browser on PC, then type any available web address into address bar and see if it is able to visit Internet via UG87.

6. Packet Forwarder Testing

6.1 Node Parameters

Channel Plan	AS923
Frequency	923.4MHZ, 923.2MHZ
Join Type	OTAA
Device EUI	60C5A8FFFE0003F9
Application EUI	70B3D57ED0007AC2
App Key	328F2A3F5BA8D0B236459CF06D0512B5

6.2 Configure The Things Network

A. Gateway Configuration

Gateway EUI	24E124FFFEF0132E
Frequency Plan	Asia 920-923MHZ
Server ID	Switch-router (ttn.opennetworkinfrastructure.org)

B. Applications Configuration
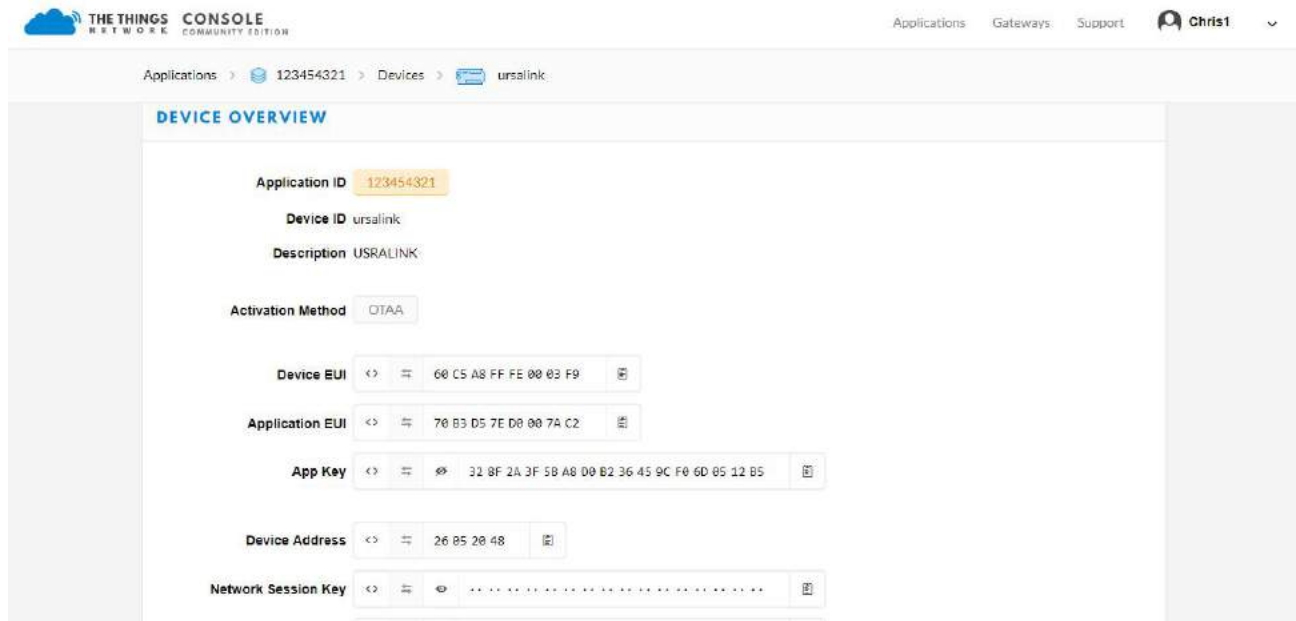
6.3 Packet Forwarder Configuration

A. Click "LoRaWAN" → "Packet Forwarder" → "General" to configure the general setting.
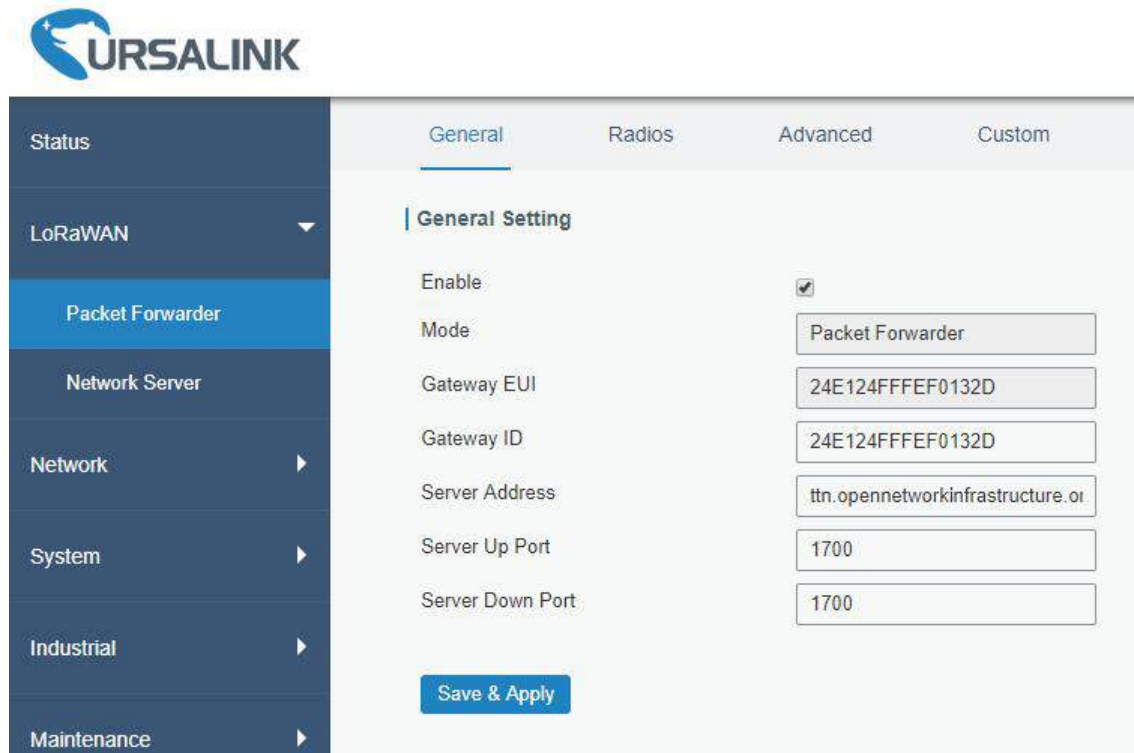
B. Click "Radios" to configure the center frequency and channels.

General	Radios	Advanced	Custom	Traffic

| Radio Channel Setting

Supported Frequency   AS923 ▼

Name	Center Frequency/MHz
Radio 0	923.6
Radio 1	922.6

| Multi Channels Setting

Enable	Index	Radio	Frequency/MHz
☑	0	Radio 0 ▼	923.2
☑	1	Radio 0 ▼	923.4
☑	2	Radio 0 ▼	923.6
☑	3	Radio 1 ▼	922.2
☑	4	Radio 1 ▼	922.4
☑	5	Radio 1 ▼	922.6
☑	6	Radio 1 ▼	922.8
☑	7	Radio 1 ▼	923.0

C. Click "Traffic" to view the data communication of UG87

General	Radios	Advanced	Custom	Traffic

| Traffic Setting

[Stop]   [Clear]

Rfch	Direction	Time	Ticks	Frequency	Datarate	Coderate	RSSI	SNR
1	up	-	2422567628	922.6	SF7BW125	4/7	-86	-11.5
1	up	-	2027425380	923.0	SF7BW125	4/6	-87	-10.8
1	up	-	1906152459	922.2	SF7BW125	OFF	-89	-11.8
0	up	-	1896642603	923.6	SF7BW125	4/6	-89	-12.0
0	up	-	1833066556	923.8	SF7BW250	4/5	-86	-12.0
0	up	-	1793222443	923.4	SF7BW125	4/8	-85	-11.2
0	up	-	1768923067	923.2	SF7BW125	4/5	-89	-11.8
1	up	-	1736475188	922.8	SF8BW125	4/8	-86	-14.0
1	up	-	1504937860	923.0	SF7BW125	4/5	-87	-11.5

6.4 Check Data Transmission on The Things Network

A. Click "Gateways", you can check the Gateways status.

B. Click "Applications"and select the Applications, then go to "Data", you can find the data from the Node.
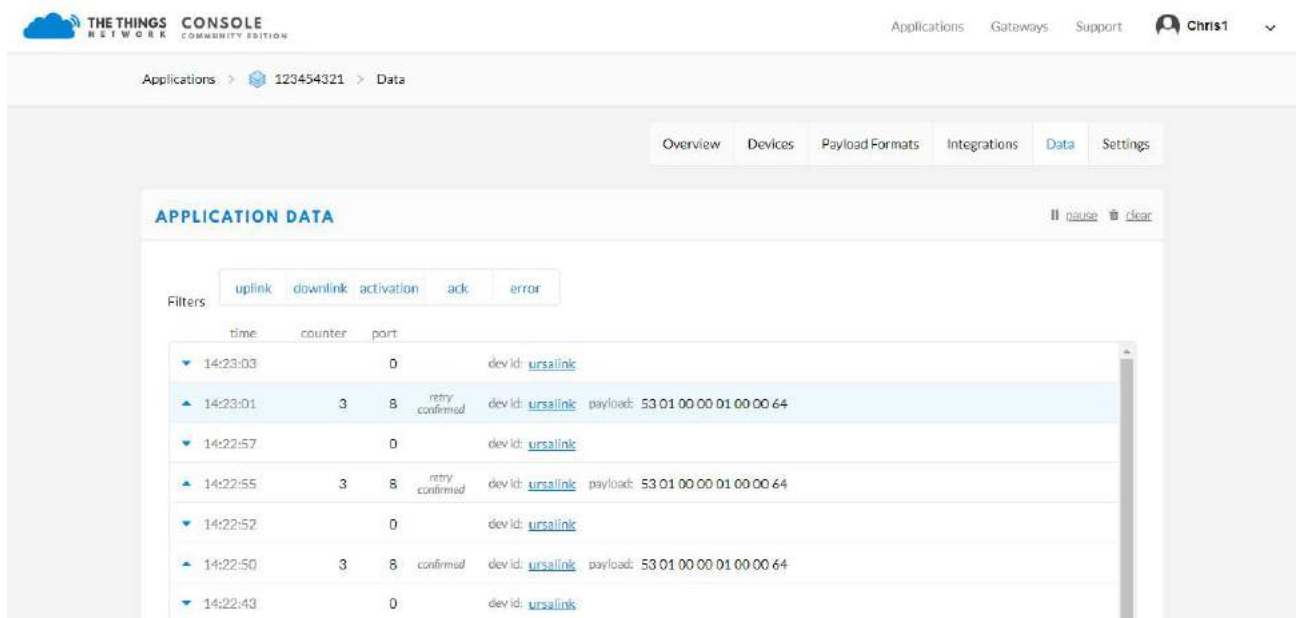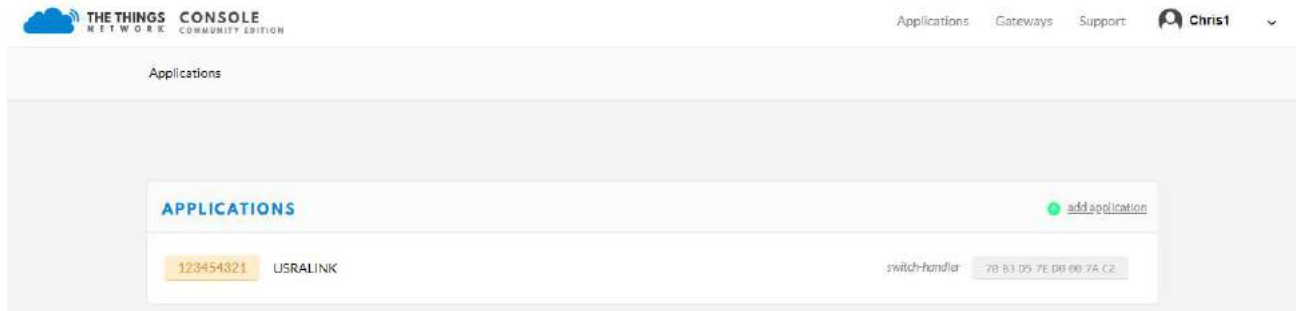
7. Network Server Testing

Note that only gateway with activated built-in Network Server supports this function.

7.1 Node Parameters

Channel Plan	AS923
Frequency	923.4MHZ, 923.2MHZ
Join Type	OTAA
Device EUI	60C5A8FFFE0003F9
Application EUI	70B3D57ED0007AC2
App Key	1A98A25536993A882154B81551F18A76

7.2 Network Server Configuration

A. Click "LoRaWAN" → "Network Server" → "General" to configure the general setting.
Note that the channel plan of the nodes and network server need to be the same.

B. Add a new Application

General   Applications   Profiles   Device   Packets

| Applications

Name   Smoke-Sensor-APP

Description   Smoke Sensor

Payload Codec   None   ▼

[Save]   [Cancel]

General   Applications   Profiles   Device   Packets

| Applications

ID	Name	Description	Payload Codec	Operation
8	Smoke-Sensor-APP	Smoke Sensor	None	✎ ✕
				➕

C. Add Profiles for the device

General   Applications   Profiles   Device   Packets

| Device Profiles

Name	Max TXPower	Join Type	Class Type	Operation
				➕

General   Applications   Profiles   Device   Packets

| Device Profiles

Name   Smoke-Sensor

Max TXPower   0

Join Type   OTAA   ▼

Class Type   Class A   ▼

Advanced   ☐

[Save]   [Cancel]

Device Profiles				
Name	Max TXPower	Join Type	Class Type	Operation
Smoke-Sensor	0	OTAA	Class A	✏ ✕
				➕

D. Add device

Device

General

Device Name	Somke-Sensor
Description	Somke Sensor
Device EUI	60C5A8FFFE0003F9
Device-Profile	Smoke-Sensor ▼
Application	▼
Frame-counter Validation	☑

Activate Device(OTAA)

Application Key	1A98A25536993A882154B815!
Device Address	
Network Session Key	
Application Session Key	
Uplink Frame-counter	0
Downlink Frame-counter	0

Save **Cancel**

Device

Device Name	Device EUI	Device-Profile	Application	Last Seen	Actived	Operation
Somke-Sensor	60c5a8fffe0003f9	Smoke-Sensor	Smoke-Sensor-APP	-	---	✏ ✕
						➕

7.3 Package Forwarder Configuration

Click "LoRaWAN" → "Packet Forwarder" → "Radios" to configure the center frequency and channels
Note that node frequency needs to be included in the channels frequency.

7.4 Check the Packets

Click "LoRaWAN" → "Network Server" → "Packets" to check the packets from the node on network server.

[END]