



UG87 LoRaWAN Gateway

Quick Start Guide



Welcome

Thank you for choosing Ursalink UG87 LoRaWAN Gateway.

This guide teaches you how to install the UG87 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

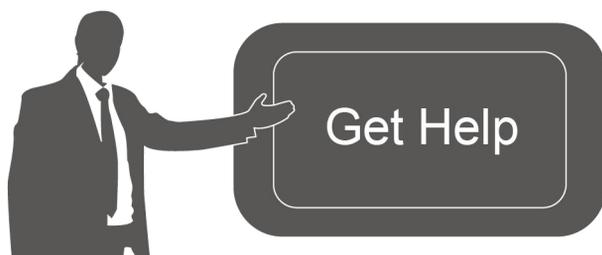
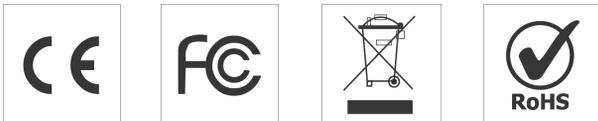
This Quick Start Guide only explains the installation of Ursalink UG87 LoRaWAN Gateway. For more functionality and advanced settings, please refer to the relevant documents as below.

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.



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Tel: 86-592-5023060
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Revision History

Date	Doc Version	Description
Sept. 9, 2019	V1.1	Initial version
Oct. 18, 2019	V1.2	<ol style="list-style-type: none">1. Add 16 channels description;2. Change antenna location.
Nov. 29, 2019	V1.3	Delete AC/DC power supply, add PoE injector
Apr. 4, 2020	V1.4	<ol style="list-style-type: none">1. Reset button definition change;2. Add back AC/DC power supply;3. Default IP change from 192.168.1.1 to 192.168.23.150;4. Web GUI interface change (based on 80.0.0.62);5. Add bulk import LoRaWAN devices.

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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 × UG87



1 × Cellular Antenna



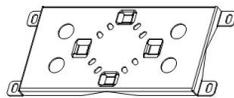
1 × LoRa Antenna
(2 × LoRa Antennas for
16-channel model)



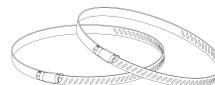
1 × GPS Antenna



1 × WiFi Antenna
(WiFi Version Only)



1 × Wall Mounting Kit



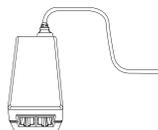
2 × Pole Mounting Kit



Screws



1 × Warranty Card



1 × PoE Injector

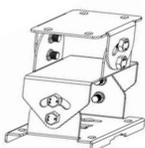


1 × Power cable
(AC/ DC Version Only)

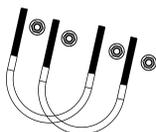


1 × Ethernet Cable
(Optional)

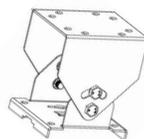
Optional Installation Accessories



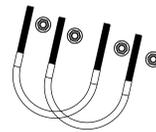
+



1 × Pole Mount A + 2 × U-Bolt



+



1 × Pole Mount B + 2 × U-Bolt



Screws

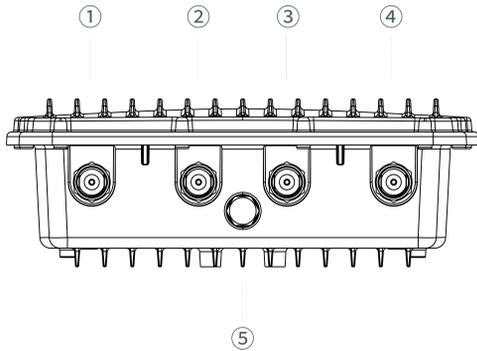


If any of the above items is missing or damaged, please contact your Ursalink sales representative.

2. Hardware Introduction

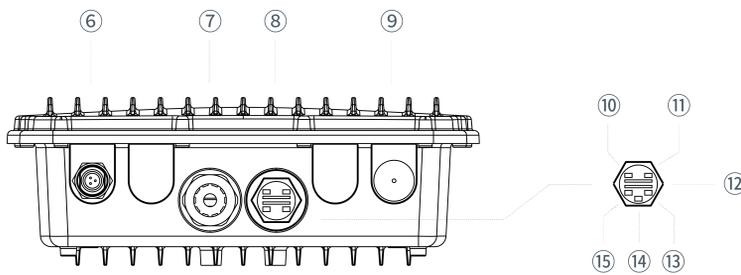
2.1 Overview

A. Front Panel



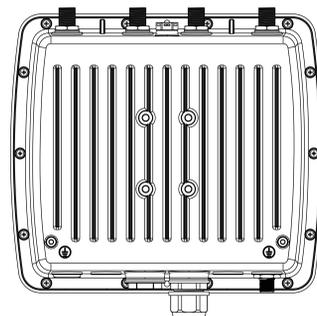
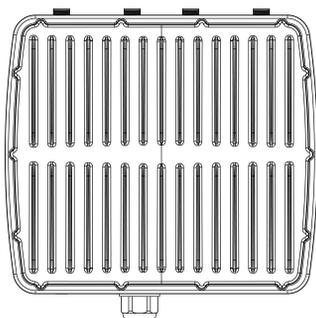
- ① LoRa2 Antenna (only for 16-channel model)
- ② GPS Antenna
- ③ LTE Antenna
- ④ LoRa1 Antenna
- ⑤ Vent Plug

B. Rear Panel

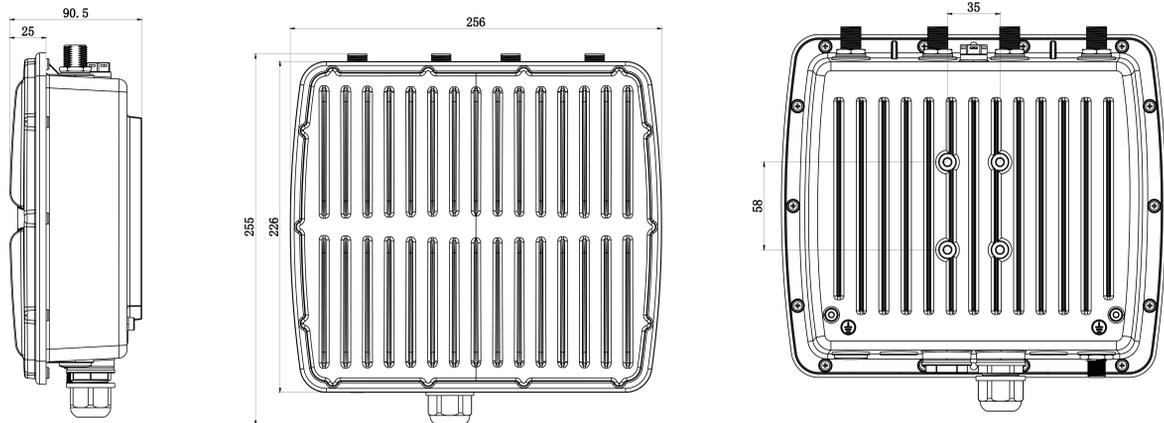


- ⑥ Power Connector
- ⑦ Ethernet Port (PoE)
- ⑧ LED&SIM Area
- ⑨ Wi-Fi Antenna
- LED&SIM Area
- ⑩ PWR: Power Indicator
- ⑪ SYS: System Indicator
- ⑫ SIM Card Slot
- ⑬ L2: Cellular Indicator
- ⑭ RST: Reset Button
- ⑮ L1: LoRa Indicator

C. Top & Bottom View



2.2 Dimensions (mm)



2.3 LED Indicators

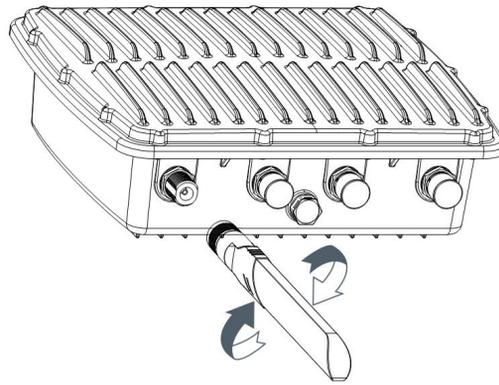
LED	Indication	Status	Description
PWR	Power Status	On	The power is switched on
		Off	The power is switched off
SYS	System Status	Green Light	Static: Start-up Blinking slowly: the system is running properly
		Off	The system goes wrong
L1	LoRa Status	Green Light	Package Forwarder mode is running well.
		Off	Package Forwarder mode is running off.
L2	SIM Card Status	Off	SIM1 or SIM2 is registering or fails to register (or there are no SIM cards inserted)
		Green Light	Blink Slowly: SIM1 has been registered and is ready for dial-up
			Blink Rapidly: SIM1 has been registered and is dialing up now
			Static: SIM1 or SIM2 has been registered and dialed up successfully
		Orange Light	Blink Slowly: SIM2 has been registered and is ready for dial-up
			Blink Rapidly: SIM2 has been registered and is dialing up now
Static: SIM2 has been registered and dialed up successfully			

2.4 Reset Button

Function	Description	
	SYS LED	Action
Reset	Blinking	Press and hold the reset button for more than 5 seconds.
	Static Green → Rapidly Blinking	Release the button and wait.
	Off → Blinking	The gateway resets to factory default.

2.5 Ethernet Port Indicator

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



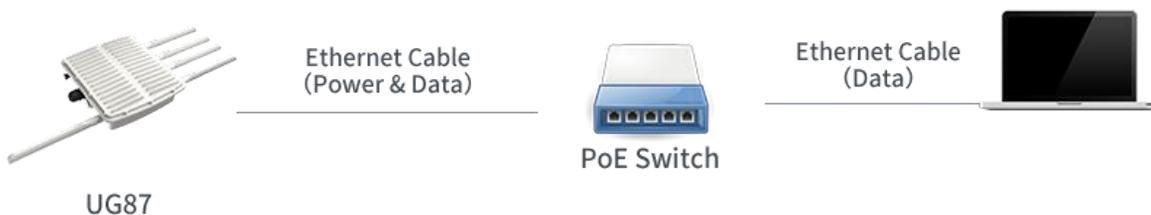
3.3 Power Supply

3.3.1 PoE Power Supply

Ethernet cable of UG87 device side should be installed first, or PoE devices or gateway may be damaged.

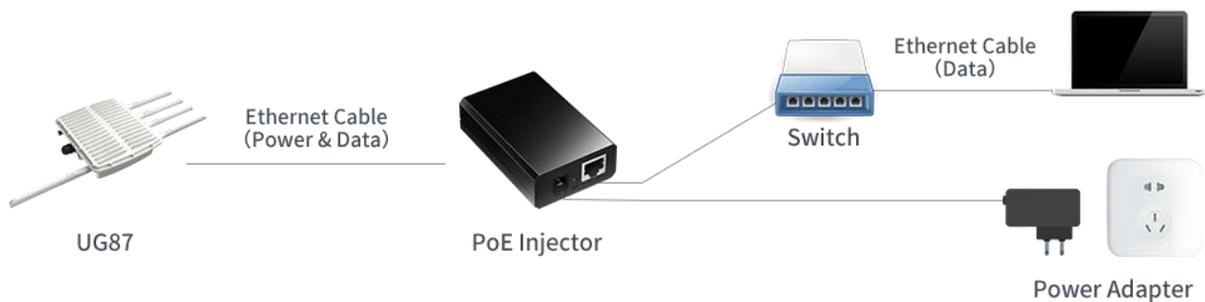
3.3.1.1 Connect UG87 to PoE Switch

Connect UG87 Ethernet port to a PoE switch via Ethernet cable. PoE switch must meet IEEE 802.3 af standard.



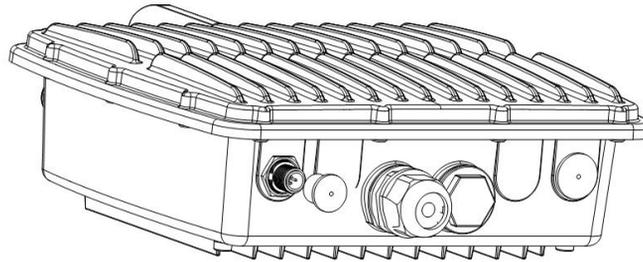
3.3.1.2 Connect UG87 to PoE Injector

Connect UG87 Ethernet port to a PoE injector via Ethernet cable. PoE injector must meet IEEE 802.3 af standard.

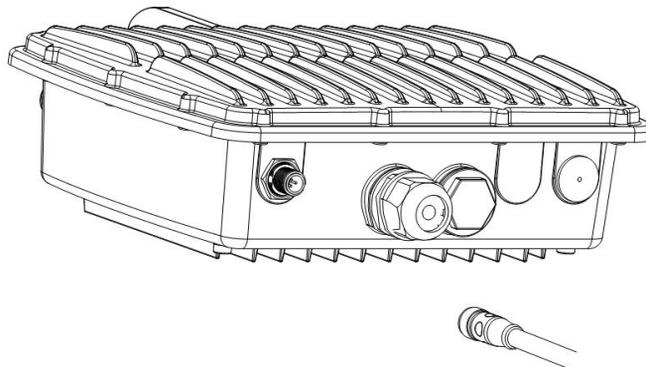


3.3.2 AC/DC Power Supply (Optional)

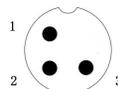
A. Locate the power port marked POWER on the left side of the enclosure and remove the protective cap to find the connection pins.



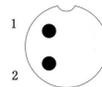
B. Connect a power supply cable to the power port, and rotate it clockwise.



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



Type	PIN	Color	Description
VDC	1	Brown	V+
	2	Black	GND



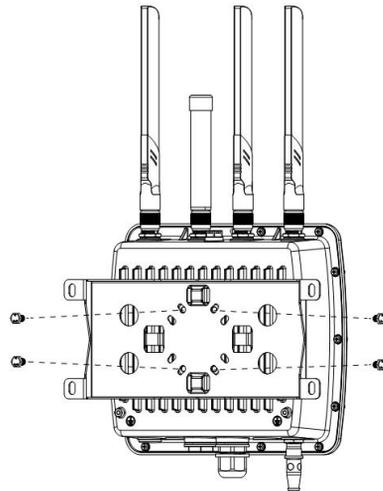
3.4 Mount Gateway

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

3.4.1 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.



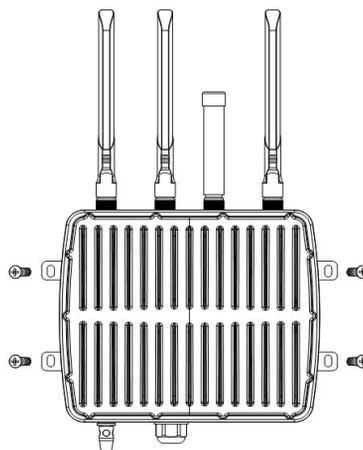
3. Align the mounting bracket horizontally to the desired position on the wall, use a marker pen to mark four mounting holes on the wall, and then remove the mounting bracket from the wall.

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

4. Drill 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.

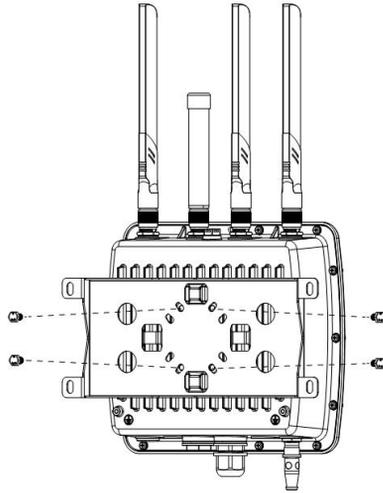
7. Reconnect the cables.



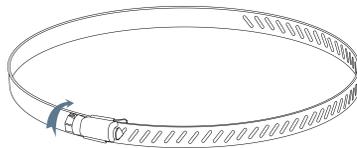
3.4.2 Pole Mounting (Hose clamp)

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

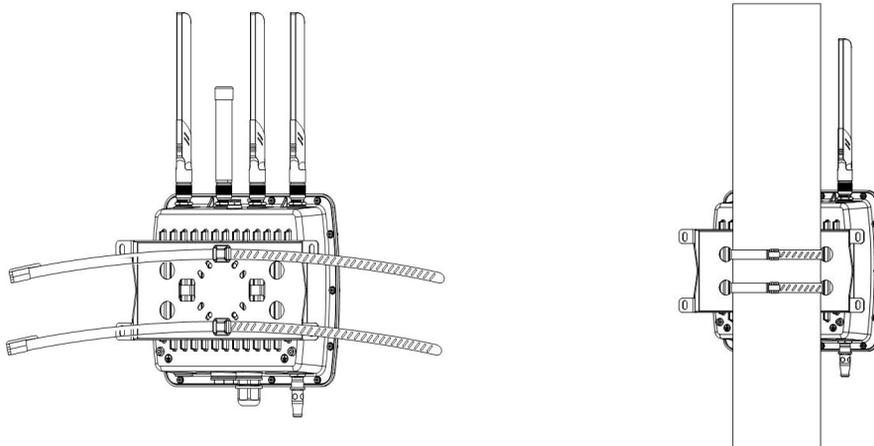
1. Before you start, make sure that your SIM card has been inserted, your antennas have been attached and that all cables have been disconnected from your enclosure.
2. Mount the enclosure to the mounting bracket with the bracket mounting screws.



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.

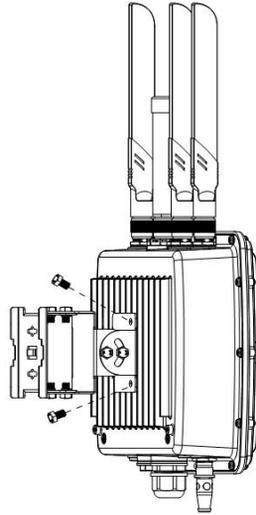


3.4.3 Pole Mounting (U-bolt)

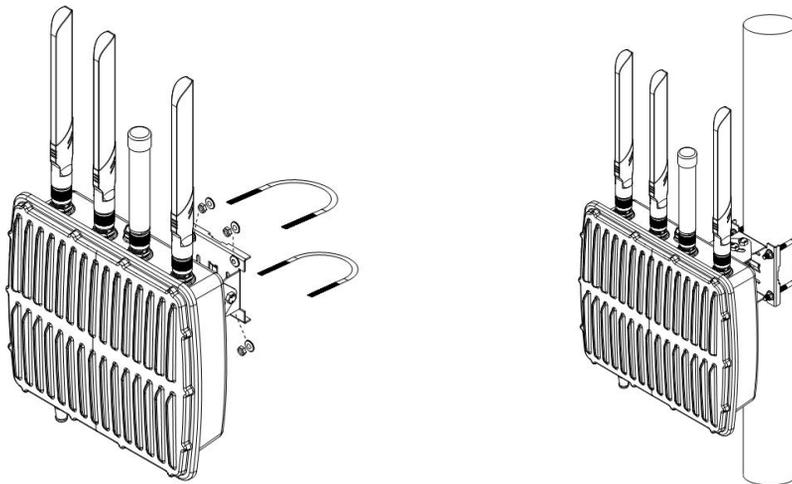
Note: Pole mounting (U-bolt) is optional.

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.



4. Access the Web GUI of UG87

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:

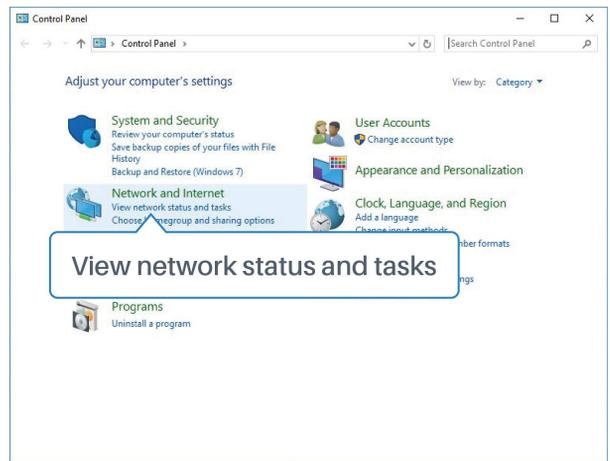
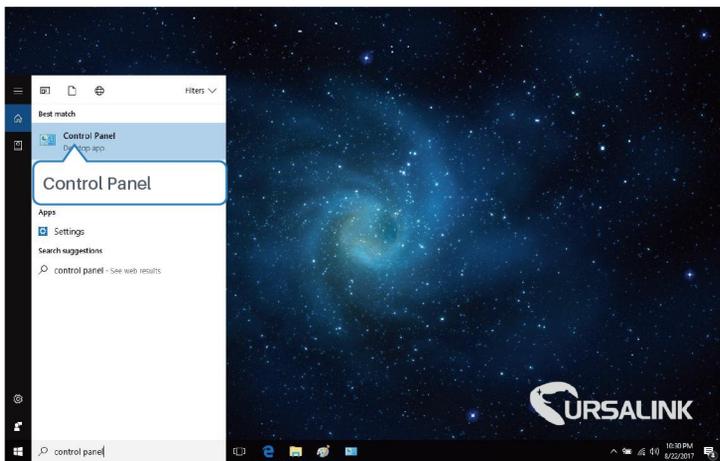
IP Address: **192.168.23.150**

Username: **admin**

Password: **password**

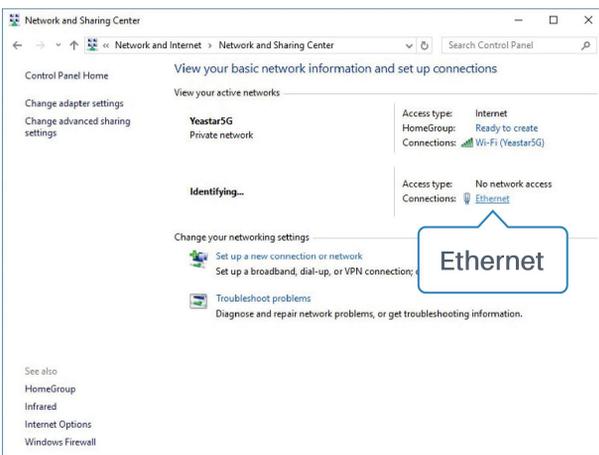
4.1 PC Configuration

Please connect PC to Ethernet port of UG87 directly and configure a static IP address manually. The following steps are based on Windows 10 operating system for your reference.

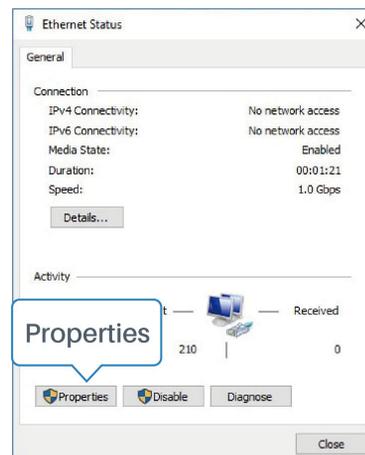


① Click “Search Box” to search “Control Panel” on the Windows 10 taskbar.

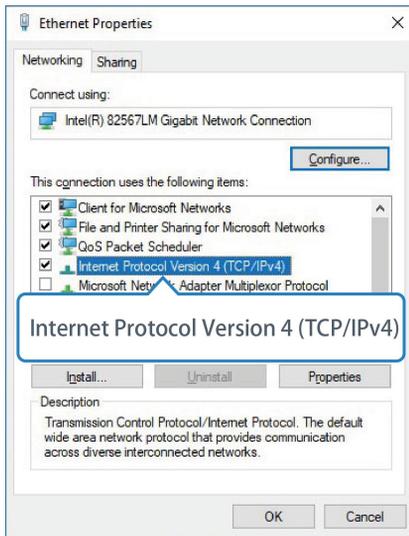
② Click “Control Panel” to open it, and then click “View network status and tasks”.



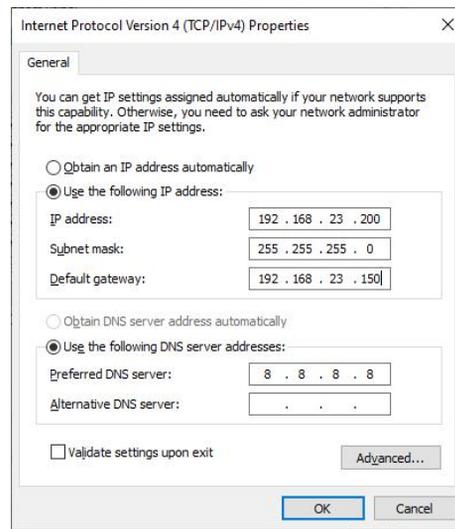
③ Click “Ethernet” (May have different names).



④ Click “Properties”.



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



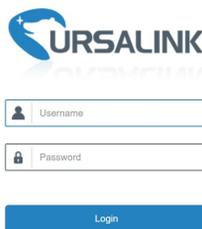
⑥ Click “Use the following IP address” to assign a static IP manually within the same subnet of the gateway.

(Note: Remember to click “OK” to finish configuration.)

4.2 Log in the Web GUI of UG87

A. Open 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 change password. It’s suggested that you change the password for the sake of security. Click “Cancel” button if you want to modify it later.

Change Password ✕

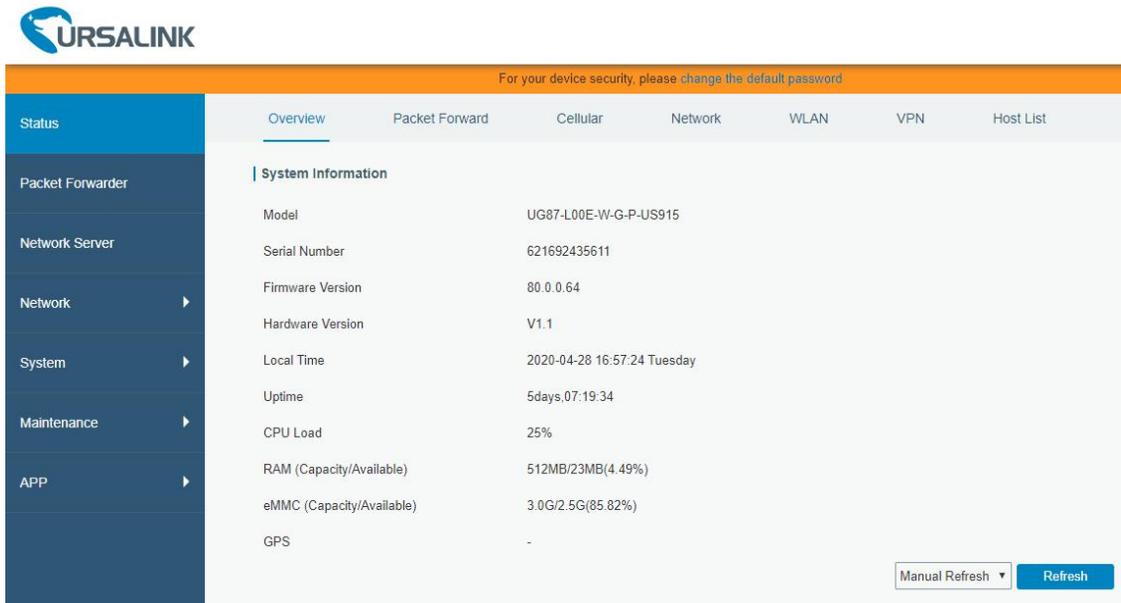
Old Password

New Password

Confirm New Password

Save
Cancel

D. After you log in the Web GUI, you can view system information and perform configuration of the gateway.



The screenshot shows the Ursalink Web GUI interface. At the top, there is a navigation bar with the Ursalink logo and a warning message: "For your device security, please change the default password". Below the navigation bar, there are several tabs: Overview, Packet Forward, Cellular, Network, WLAN, VPN, and Host List. The "Overview" tab is selected, and the "System Information" section is displayed. The system information is presented in a table format with the following data:

System Information	
Model	UG87-L00E-W-G-P-US915
Serial Number	621692435611
Firmware Version	80.0.0.64
Hardware Version	V1.1
Local Time	2020-04-28 16:57:24 Tuesday
Uptime	5days,07:19:34
CPU Load	25%
RAM (Capacity/Available)	512MB/23MB(4.49%)
eMMC (Capacity/Available)	3.0G/2.5G(85.82%)
GPS	-

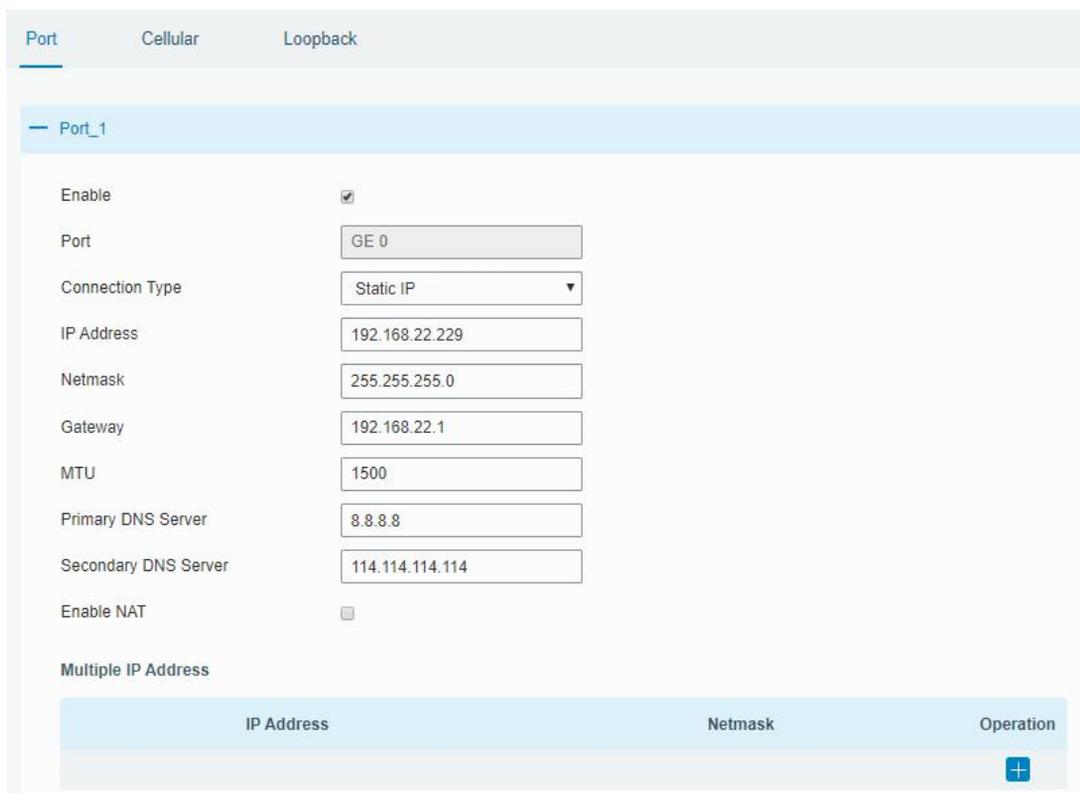
At the bottom right of the system information section, there are two buttons: "Manual Refresh" (with a dropdown arrow) and "Refresh".

5. Connect UG87 to the Network

This chapter explains how to connect the gateway to network via WAN connection, cellular or Wi-Fi.

5.1 Configure the WAN Connection

- A. Go to “Network”→ “Interface” → “Port” page to select the connection type and configure WAN information.
- B. Click “Save&Apply” for configuration to take effect.



- C. Connect Ethernet port of gateway to network devices like router or modem.
- D. Log in the web GUI via the newly assigned IP address and go to “Status”→ “Network” to check Ethernet port status.



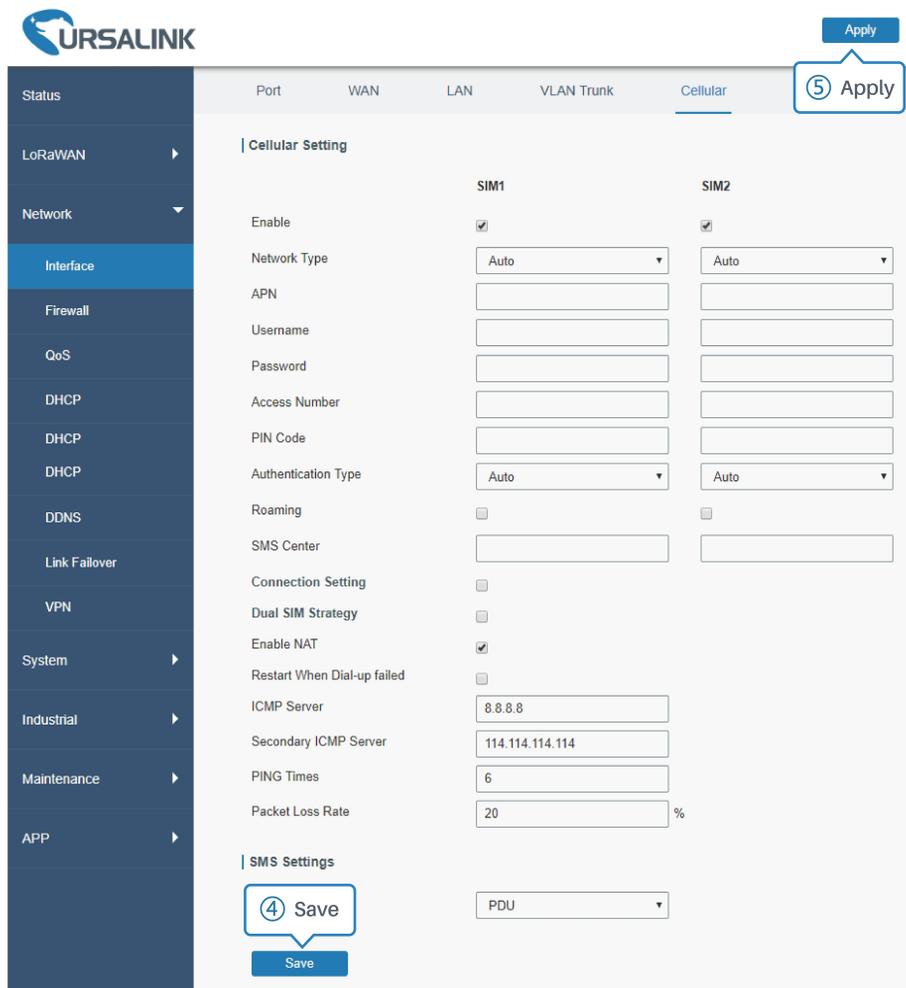
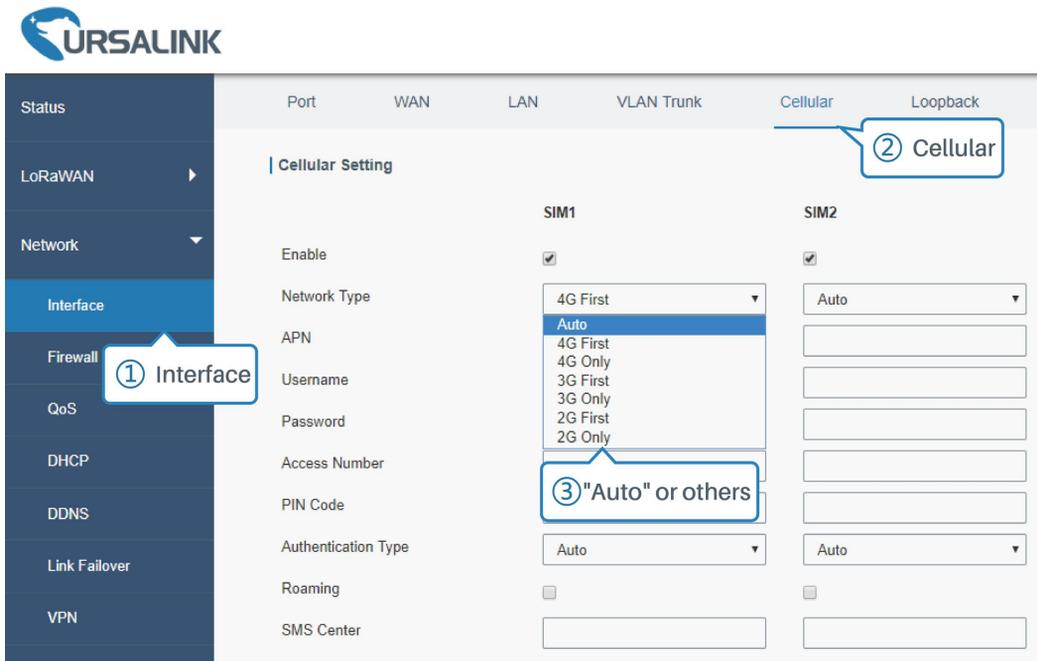
Port	Status	Type	IP Address	Netmask	Gateway	DNS	Duration
GE 0	up	Static	192.168.22.229	255.255.255.0	192.168.22.1	8.8.8.8	03h 01m 21s

5.2 Configure the Cellular Connection

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

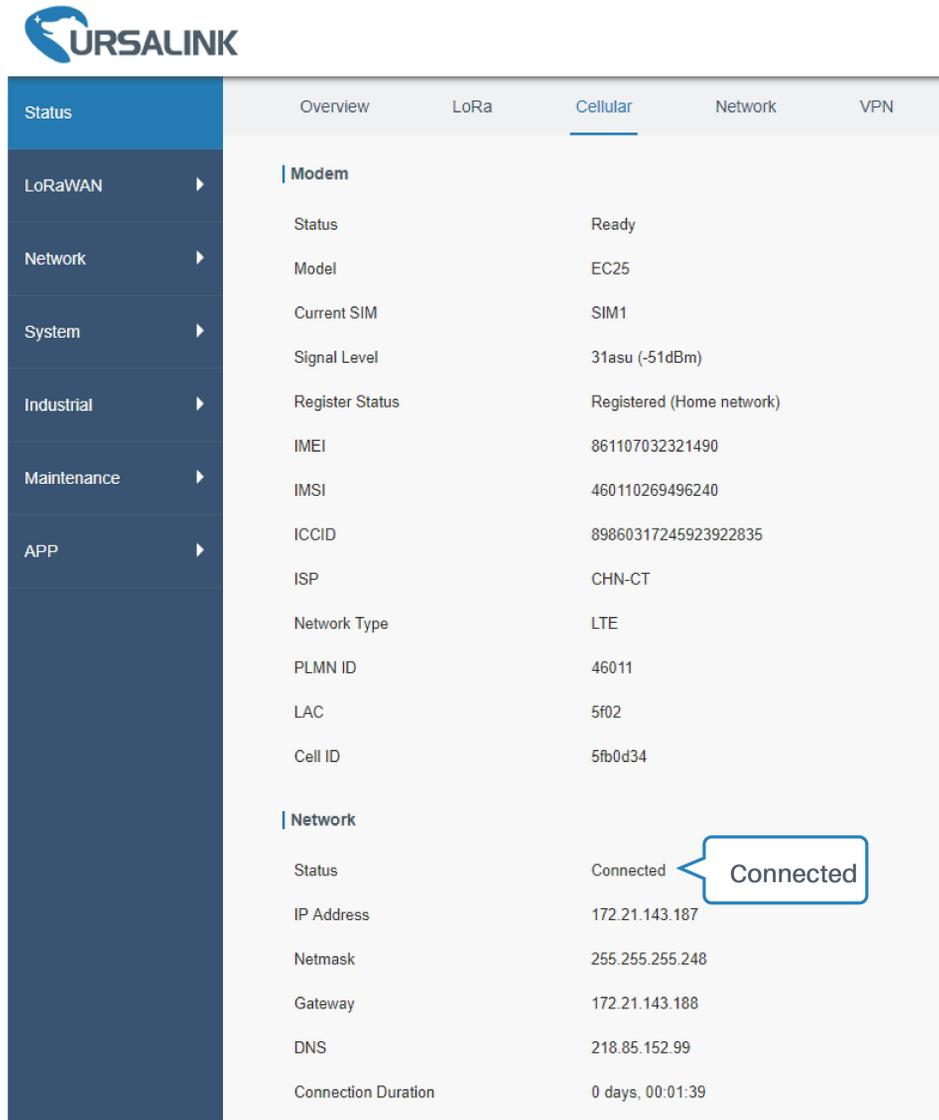
- A. Go to “Network” → “Interface” → “Cellular” → “Cellular Setting” page to configure the cellular info.

- B. Enable SIM1.
- C. Choose relevant network type. "Auto", "4G Only", "3G Only" and "2G Only" are optional.
- D. Click "Save" and "Apply" for configuration to take effect.



UG87 has 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.

E. Go to “Status” → “Cellular” page to view the status of the cellular connection. If it shows “Connected”, it means SIM1 has dialed up successfully. On the other hand, you can check the status of L2 indicator. If it keeps on green light statically, it means SIM has dialed up successfully.



Status	Overview	LoRa	Cellular	Network	VPN
LoRaWAN	Modem				
Network	Status		Ready		
System	Model		EC25		
Industrial	Current SIM		SIM1		
Maintenance	Signal Level		31asu (-51dBm)		
APP	Register Status		Registered (Home network)		
	IMEI		861107032321490		
	IMSI		460110269496240		
	ICCID		89860317245923922835		
	ISP		CHN-CT		
	Network Type		LTE		
	PLMN ID		46011		
	LAC		5f02		
	Cell ID		5fb0d34		
	Network				
	Status		Connected		
	IP Address		172.21.143.187		
	Netmask		255.255.255.248		
	Gateway		172.21.143.188		
	DNS		218.85.152.99		
	Connection Duration		0 days, 00:01:39		

5.3 Configure the Wi-Fi Connection

- A. Go to “Network” → “Interface” → “WLAN” and select “Client” mode.
- B. Click “Scan” to search for Wi-Fi access point. Select the available one and click “Join Network”.

Port	WLAN	Cellular	Loopback				
< GoBack							
SSID	Channel	Signal	Cipher	BSSID	Security	Frequency	
Ursalink_F08A9B	Auto	-76dBm	Auto	24:e1:24:f0:8a:9b	No Encryption	2412MHz	Join Network
Ursalink_F03D6D	Auto	-75dBm	Auto	24:e1:24:f0:3d:6d	No Encryption	2412MHz	Join Network
Ursalink_EEFF89	Auto	-73dBm	Auto	24:cc:dd:ee:ff:89	No Encryption	2412MHz	Join Network
+4413133	Auto	-77dBm	AES	24:e1:24:f0:32:1b	WPA-PSK/WPA2-PSK	2412MHz	Join Network
AABB	Auto	-75dBm	AES	24:e1:24:f0:32:1b	WPA-PSK/WPA2-PSK	2412MHz	Join Network
Redmi	Auto	-75dBm	AES	2a:56:e4:fe:2b:b2	WPA2-PSK	2412MHz	Join Network
Ursalink_Tec	Auto	-73dBm	AES	24:e1:24:f0:2c:4b	WPA-PSK/WPA2-PSK	2452MHz	Join Network

C. Type the correct key of Wi-Fi.

Port	WLAN	Cellular	Loopback
WLAN			
Enable	<input checked="" type="checkbox"/>		
Work Mode	Client		Scan
SSID	Ursalink_TechnologyCenter		
BSSID	24:e1:24:f0:01:1a		
Encryption Mode	WPA-PSK/WPA2-PSK		
Cipher	AES		
Key		
IP Setting			
Protocol	DHCP Client		

D. Go to “Status”→”WLAN” to check Wi-Fi status. If it shows “Connected”, it means gateway connects to Wi-Fi successfully.

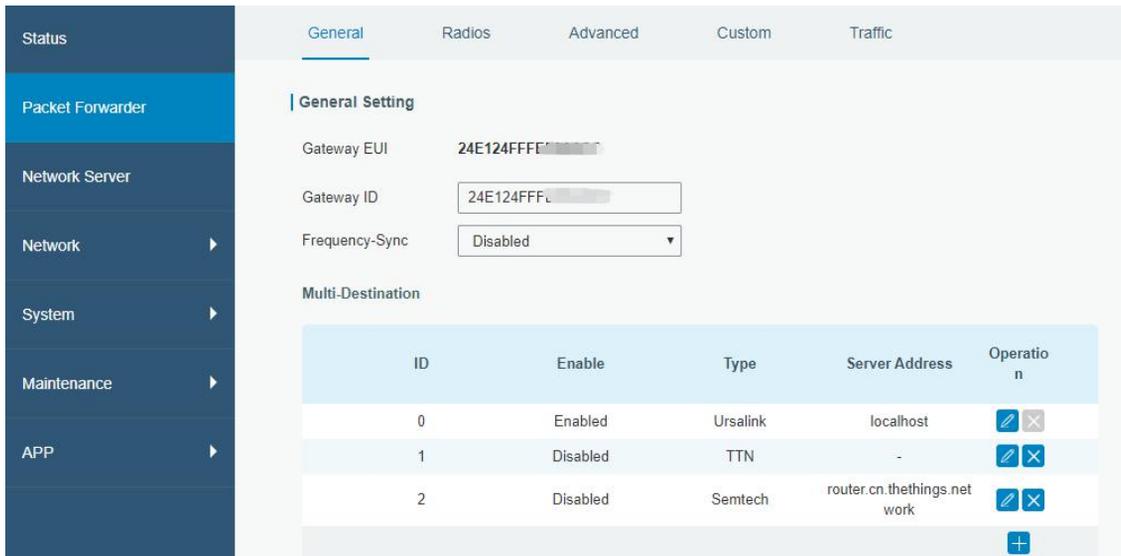
Overview	Packet Forward	Cellular	Network	<u>WLAN</u>
 WLAN Status				
Wireless Status	Enabled			
MAC Address	24:e1:24:f0:27:d6			
Interface Type	Client			
SSID	Ursalink_TechnologyCenter			
Channel	Auto			
Encryption Type	WPA-PSK/WPA2-PSK			
Cipher	AES			
Status	Connected			
IP Address	0.0.0.0			
Netmask	0.0.0.0			
Connection Duration	0 days, 00:00:01			

6. Packet Forwarder Configuration

UG87 has embedded multiple packet forwarders like TTN, Loriot and ChirpStack. This chapter explains how to connect the gateway to third-party network servers.

 **Make sure the gateway connects to the network as shown in [Chapter 5](#).**

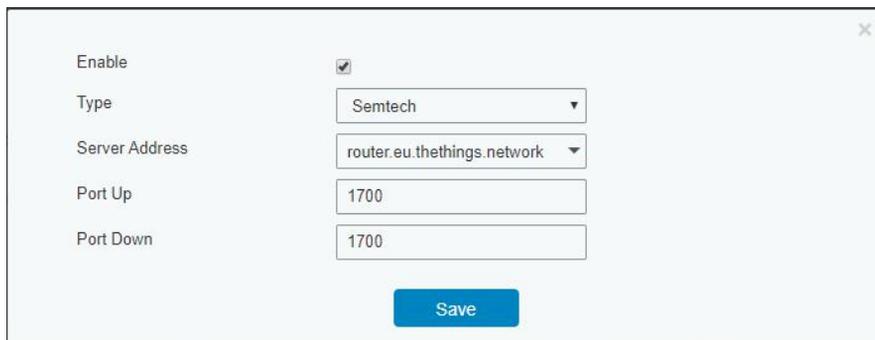
A. Go to “Packet Forwarder” → “General” page and click  to add a network server.



ID	Enable	Type	Server Address	Operation
0	Enabled	Ursalink	localhost	 
1	Disabled	TTN	-	 
2	Disabled	Semtech	router.cn.thethings.net work	 

B. Fill in the server information and enable this server.

Note: When you select one of TTN, Loriot or ChirpStack, other servers are not allow to enable.



Enable

Type

Server Address

Port Up

Port Down

C. Go to “Radios” page to configure the center frequency and channels.

Note: the channel plan of the gateway and network server need to be the same.

General **Radios** Advanced Custom Traffic

Radio Channel Setting

Supported Frequency: AU915

Name	Center Frequency/MHz
Radio 0	917.0
Radio 1	917.8

Multi Channels Setting

Enable	Index	Radio	Frequency/MHz
<input checked="" type="checkbox"/>	0	Radio 0	916.8
<input checked="" type="checkbox"/>	1	Radio 0	917.0
<input checked="" type="checkbox"/>	2	Radio 0	917.2
<input checked="" type="checkbox"/>	3	Radio 0	917.4
<input checked="" type="checkbox"/>	4	Radio 1	917.6
<input checked="" type="checkbox"/>	5	Radio 1	917.8
<input checked="" type="checkbox"/>	6	Radio 1	918.0
<input checked="" type="checkbox"/>	7	Radio 1	918.2

D. Add the gateway in network server page. Take TTN for example, type and save the gateway EUI and other information when you connect via Semtech packet forwarder. After you add the gateway, TTN will show connection status.

Gateways > Register

REGISTER GATEWAY

Gateway EUI
The EUI of the gateway as read from the LoRa module

24 E1 24 FF FE [] [] [] [] 8 bytes

I'm using the legacy packet forwarder
Select this if you are using the legacy [Semtech packet forwarder](#).

Description
A human-readable description of the gateway

Frequency Plan
The [frequency plan](#) this gateway will use

Australia 915MHz

E. Go to "Traffic" page to view the data communication of UG87.

admin

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

7. Network Server Configuration

UG87 can work as network server and transmit data to Ursalink Cloud or other platform via MQTT/HTTP/HTTPS.

! Make sure the gateway connects to the network as shown in [Chapter 5](#).

7.1 Connect UG87 to Ursalink Cloud

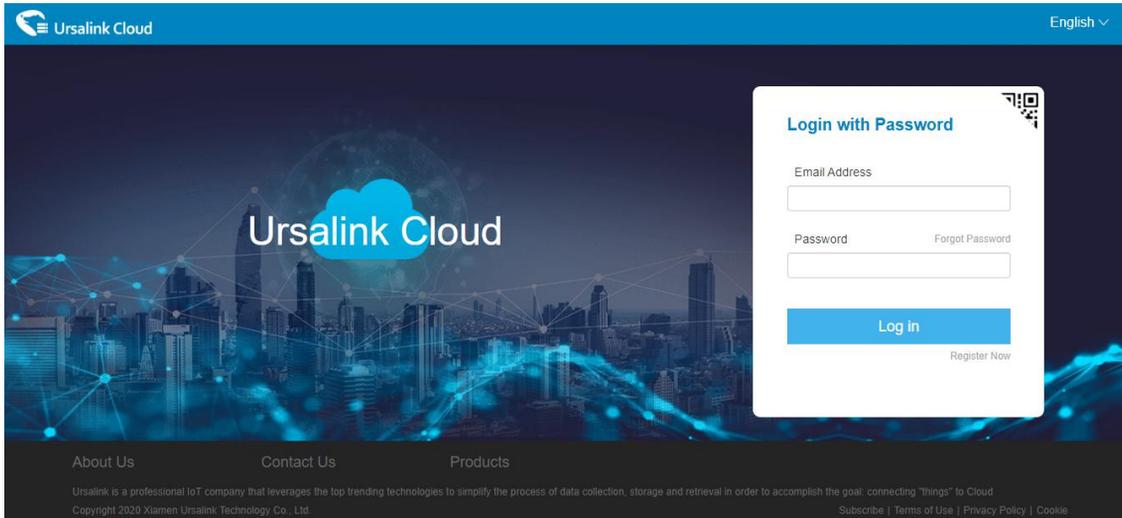
A. Go to “Packet Forwarder” → “General” page to enable the “Ursalink” type server.

ID	Enable	Type	Server Address	Operation
0	<input checked="" type="checkbox"/>	Ursalink	localhost	✎ ✕

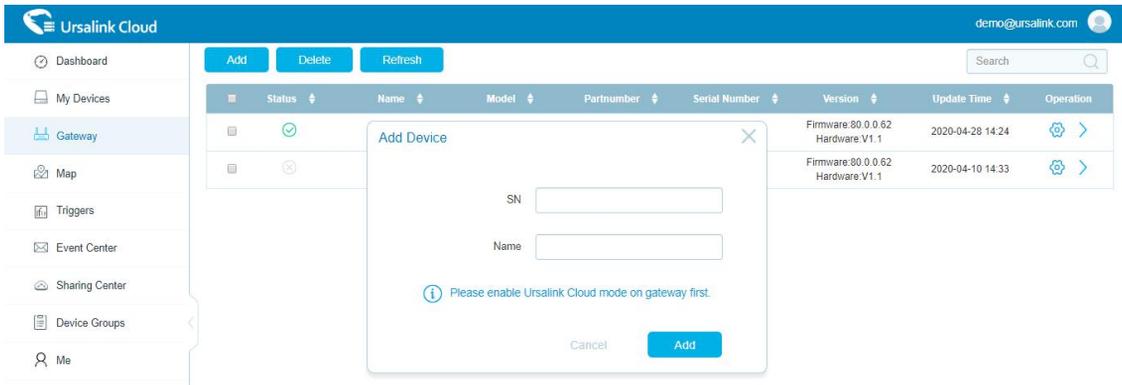
Note: the channel plan of the gateway and network server need to be the same.

B. Go to “Network Server” → “General” page to enable the network server and Ursalink Cloud mode.

C. Register and log in the Ursalink Cloud (cloud.ursalink.com).



D. Go to “Gateway” page and click “Add” to add a gateway.



E. The gateway is online on Ursalink Cloud.



7.2 Connect UG87 to Other Platform

A. Go to “Packet Forwarder” → “General” page to enable the “Ursalink” type server.

The screenshot shows the 'General Setting' page with the following details:

- Gateway EUI: 24E124FFFF00000000
- Gateway ID: 24E124FFFF00000000
- Frequency-Sync: Disabled
- Multi-Destination table:

ID	Enable	Type	Server Address	Operation
0	Enabled	Ursalink	localhost	[Edit] [Close]
+				

Save & Apply

B. Go to “Radios” page to configure the center frequency and channels.

Note: the channel plan of the nodes and gateway need to be the same.

The screenshot shows the 'Radio Channel Setting' page with the following details:

- Supported Frequency: AU915
- Radio Channel Setting table:

Name	Center Frequency/MHz
Radio 0	917.0
Radio 1	917.8

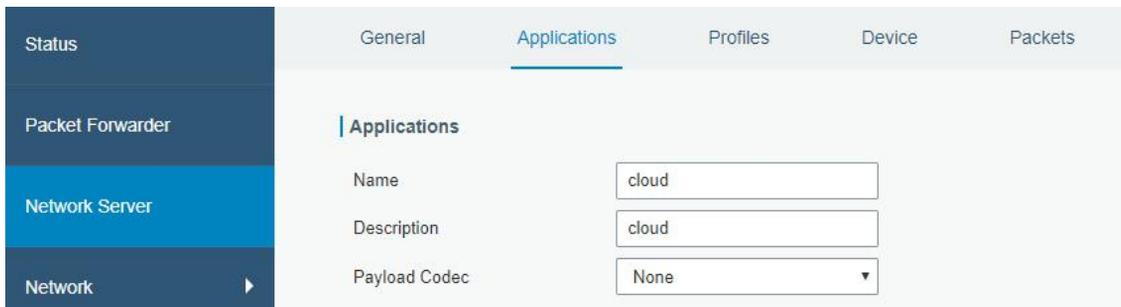
Multi Channels Setting table:

Enable	Index	Radio	Frequency/MHz
<input checked="" type="checkbox"/>	0	Radio 0	916.8
<input checked="" type="checkbox"/>	1	Radio 0	917.0
<input checked="" type="checkbox"/>	2	Radio 0	917.2
<input checked="" type="checkbox"/>	3	Radio 0	917.4
<input checked="" type="checkbox"/>	4	Radio 1	917.6
<input checked="" type="checkbox"/>	5	Radio 1	917.8
<input checked="" type="checkbox"/>	6	Radio 1	918.0
<input checked="" type="checkbox"/>	7	Radio 1	918.2

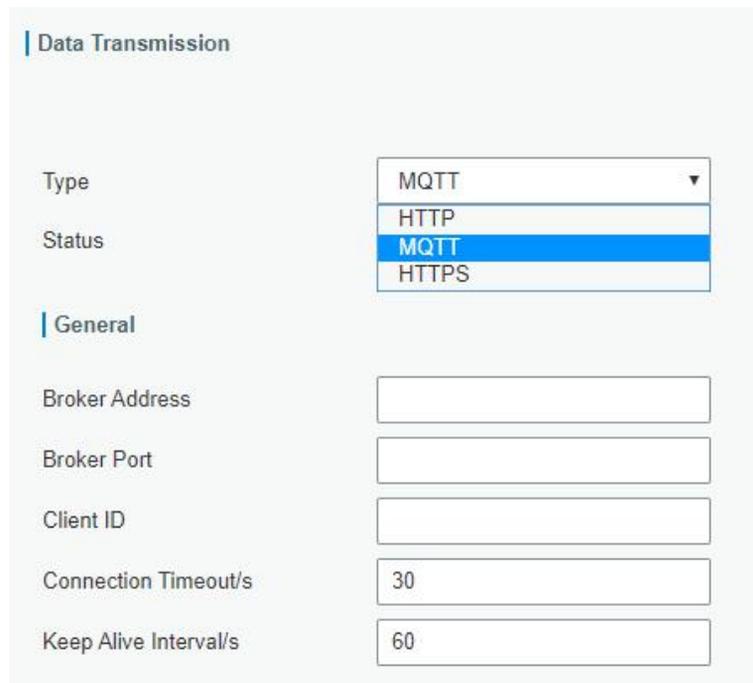
C. Go to “Network Server” → “General” page to enable the network server mode.



D. Go to “Network Server”→“Application” to add a new application.



After saving the application, select HTTP, HTTPS or MQTT protocol and fill in correspond server information to send data to another server.



E. Go to “Profiles” page to add a new profile for the device.

The screenshot shows the 'Profiles' page in the Ursalink interface. It has tabs for 'General', 'Applications', 'Profiles', 'Device', and 'Packets'. The 'Profiles' tab is active. Below the tabs is a 'Device Profiles' section with a form to create a new profile. The form fields are: Name (ClassA-OTAA), Max TXPower (0), Join Type (OTAA), Class Type (Class A), and an 'Advanced' checkbox. There are 'Save' and 'Cancel' buttons. Below the form is a table of existing profiles:

Name	Max TXPower	Join Type	Class Type	Operation
ClassA-OTAA	0	OTAA	Class A	[Edit] [Delete]
ClassC-OTAA	0	OTAA	Class C	[Edit] [Delete]

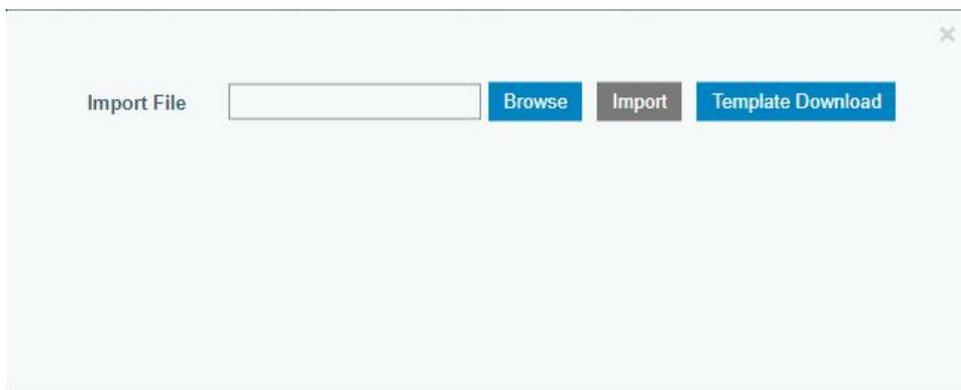
There is a '+' button at the bottom right of the table to add a new profile.

F. Go to “Device” page and click “Add” to add LoRaWAN node devices.

The screenshot shows the 'Device' page in the Ursalink interface. It has tabs for 'General', 'Applications', 'Profiles', 'Device', and 'Packets'. The 'Device' tab is active. Below the tabs is a 'Device' section with three buttons: 'Add', 'Bulk Import', and 'Delete All'. The 'Add' button is highlighted with a red box. There is also a search bar. Below the buttons is a table with columns: Device Name, Device EUI, Device-Profile, Application, Last Seen, Activated, and Operation. The table is currently empty with the message 'No matching records found'.

The screenshot shows a modal form for adding a new device. The fields are: Device Name (uc11), Description (a short description of your node), Device EUI (0000000000000000), Device-Profile (ClassA-OTAA), Application (cloud), Frame-counter Validation (checkbox), Application Key, Device Address, Network Session Key, Application Session Key, Uplink Frame-counter (0), and Downlink Frame-counter (0). There is a 'Save & Apply' button at the bottom.

You can also click “Bulk Import” if many LoRaWAN nodes need to add.

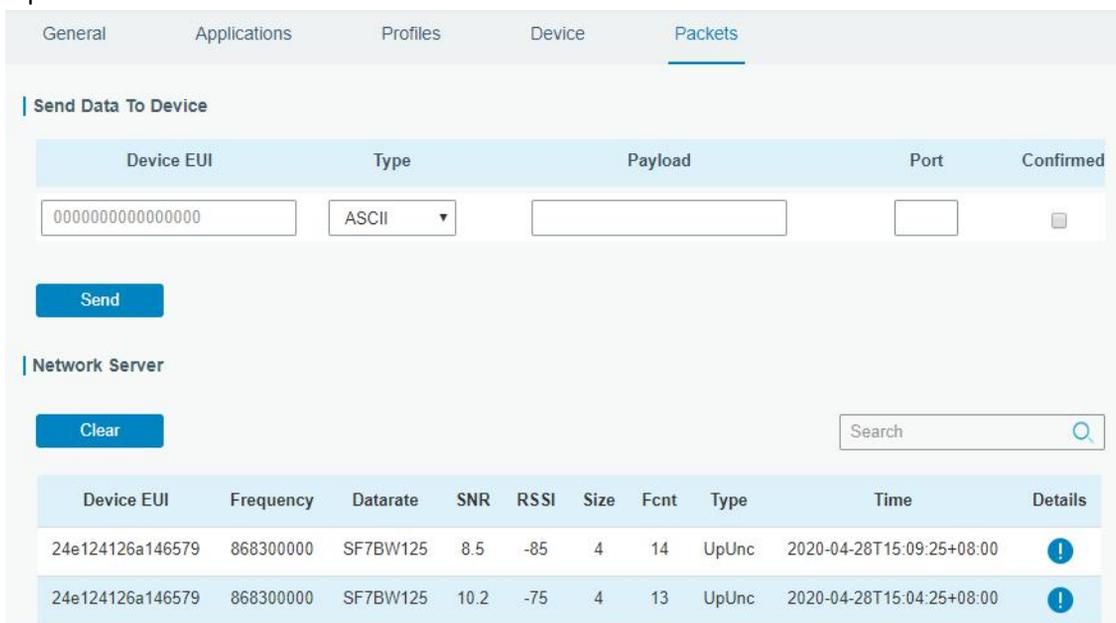


Click “Template Download” to download template file and add LoRaWAN device information to this file. Application and device profile should be the same as you created in web page.



Import this file to add bulks of devices.

G. Go to “Packets” page to check the packets from LoRaWAN node devices. The type starts from “Up” means uplinks and “Dn” means downlinks.



Click “Details” to check the properties and payload contents of packets.

Packets Details	
Fcnt	14
Port	85
Modulation	LORA
Bandwidth	125
SpreadFactor	7
Bitrate	0
CodeRate	4/5
SNR	8.5
RSSI	-85
Power	-
Payload(b64)	A3cYAA==
Payload(hex)	03771800
MIC	f5acdeb2

[END]