GW5000AIndustrial-grade gateway router

Product name: LoRaWAN gateway router

Model: GW5000A

Version: V3.4

Company name：Shenzhen Winext Technology Co., Ltd.

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Packing list

Packing list					
Image	Name	QTY	Image	Name	QTY
	Gateway	1pc		U shape buckle	2 sets
	POE power supply	1set		little U shape buckle	2 sets
	LoRa antenna	1pc		Shrinkable tube	3pcs
	4G antenna	1pc		Hexagon spanner, Φ5	1pc
	WIFI antenna	1pc		Inner hexagon screw, M6*14	6pcs
	GPS antenna	1pc		Feeder connection	1pc
	Fixed mount	1pc		Ground wire, M*6	1pc
	Fixed seat	1pc		Grounding screw, M3*6	1pc
	L shape fixed plate	1pc		Electrical tape	1pc
	Hoop	1pc			

Attention

1) Gateway should be installed in the place with at least 20 degrees of depression angle to building edges, and with at least 50cm clearance when installed at the side of a building wall.

2) LoRa Omni directional antenna should be as far as possible from the other antennas, and should be lower than the highest elevated point of the building.

3）The antenna should be installed vertically to the ground to achieve good effect.

4）Do the protection of lightning protection for gateway equipment, access network cable of gateway, gateway antennas(surge arrester/lightning protector), and make sure the antenna with the feeder to be connected to ground.

5）Using low power consumption RF coaxial cable of the feeder, as short as possible.

6）The feeder connector of antennas should be waterproof. If the feeder connector has been flooded for a long time, the contact resistance of the connector is increased, the line loss of the signal line is increased, and the antenna performance will be decreased.

7）If using 4G, you should choose a place with better LTE signal; The monthly traffic plan should be more than 6G (depending on the number of nodes).

8）When the gateway is power on, the sequence of connection is: Firstly, connect one end of network cable to gateway, and then the other end of the network cable to POE power source or the end of POE exchanger, otherwise, the POE power source or POE exchanger port will be damaged.

9）If using the PC side browser, it is strongly recommended that you use Google or Firefox.

10) We suggest connecting POE splitter with backup power supply to prevent damage of the log stored in TF card after power cut. If there is big data stored in TF card, it’ll take long time to restore the log of the TF card after restarting the gateway, and the gateway can work normally after you finished restoring the log of TF card.

11)The product requires professional installation and the certified antennas should be used.

Product introduction

1. Product definition

Winext Technology have launched the IoT base station gateway GW5000A based on low power LoRaWAN protocol, which can provide low power, mobile and safe local bidirectional communication service for IoT devices. LoRaWAN can simplify the interconnection of device, user and network, as well as provide standard.

GW5000A is designed to be used in long range star network architectures; it can achieve message delivery between front-end device and central network server. GW5000A is connected to the network server via standard IP connections while front-end devices use single-hop wireless communication to one or many GW5000A gateways.

The communication between front-end devices and GW5000A is established by different channels and data rate, which can be negotiated in advance. In order to save the battery life, GW5000A can maximize the power saving by implementing ADR (Adaptive Date Rate). With our IoT technology and our base station gateway GW5000A, users can then have their own IoT control system to achieve customized smart services, which will be widely applied in the fields of smart parking, smart fire-fighting, energy management, asset tracking, smart grid, industry 4.0, smart agriculture and ect in the future.

2. Interface introduction

ETH/POE: Standard POE port **SOLAR: solar power port**

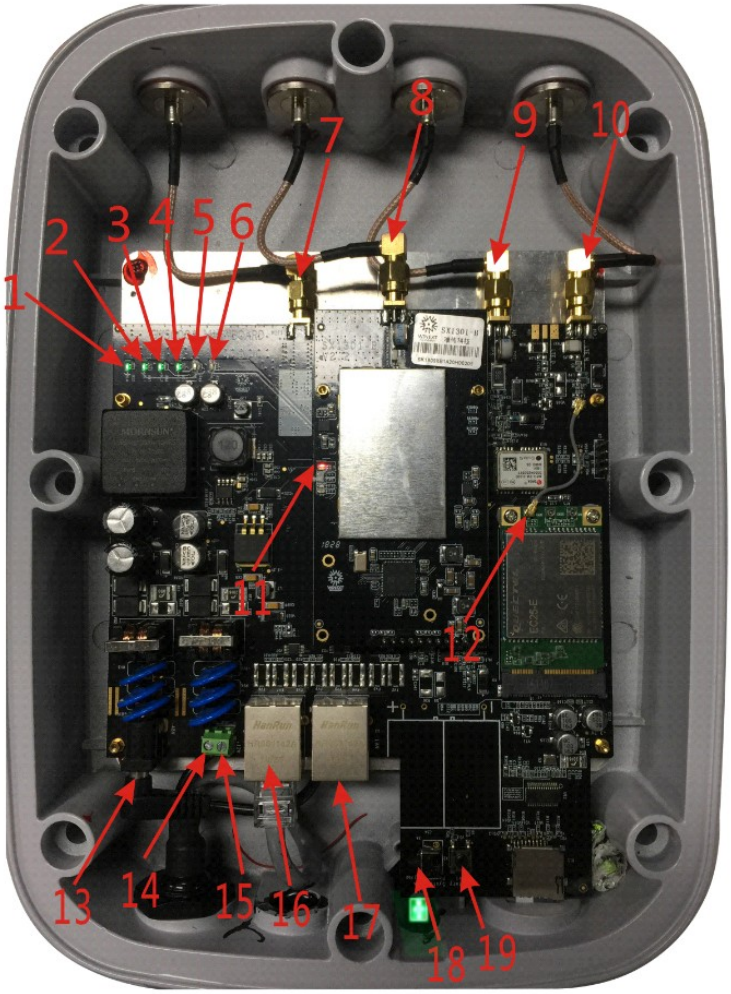
SYS: System indicator light **SIM/TF: SIM/TF card**

Interface introduction

Port 1: 4G antenna **Port 2:** GPS antenna

Port 3: LoRa antenna **Port 4:** Wifi antenna

Port 5: standard POE input



No	Name		No	Name
1	POWER indicator		2	Wi-Fi indicator
3	USB indicator		4	WAN indicator
5	LAN indicator		6	3G/4G indicator
7	SMA head port of WiFi antenna		8	SMA head port of LoRa antenna
9	SMA head port of GPS antenna		10	SMA head port of LTE antenna
11	Power indicator of SX1301 board		12	IPX port of the main antenna of 4G module
13	48V power port		14	Solar/standby power 12V grounding port
15	Solar/standby power 12V input port		16	WAN port
17	LAN port		18	Hardware reset button
19	Button to restore the factory settings			

3.Basic information

1）LAN IP: **192.168.3.1**, DHCP server is enabled by default;

2）Web page default user: **root**; login password: **WelcomeTo2018**;

3）WAN open DHCP client by default, need to connect with router;

4） 4G/LTE: Europe LTE, US 4G, support automatic dialing by default;

5） Wifi: 2.4GHz, AP mode, max transmit power:18dBm; WiFi hotspot：**GW5000_+the end 6 characters of gateway ID**； Password：**gateway2018better**

6）WAN and 4G network, priority in using the WAN traffic by default, 4G as a backup. When WAN is not working, switch to 4G; Gateway needs to be able to get normal access to the internet, network delay(ping lora.smartkit.io)less than 50ms, if using Ethernet, network speed should be above 2M; If using 4G card, the monthly data access plan should be above 6G(it depends on the nodes quantity)

7) The default file format of TFcard: FAT32, when the rest memory less than 2G, the oldest log files will be cleared.

8）Support foreign server, e.g. TTN;

9）Support reporting status regularly（WAN, LTE, LoRa, WiFi, TF card）

10）Support reporting LoRa configuration parameter regularly;

11）Support remote reboot;

12）Support remote administrator login and maintenance;

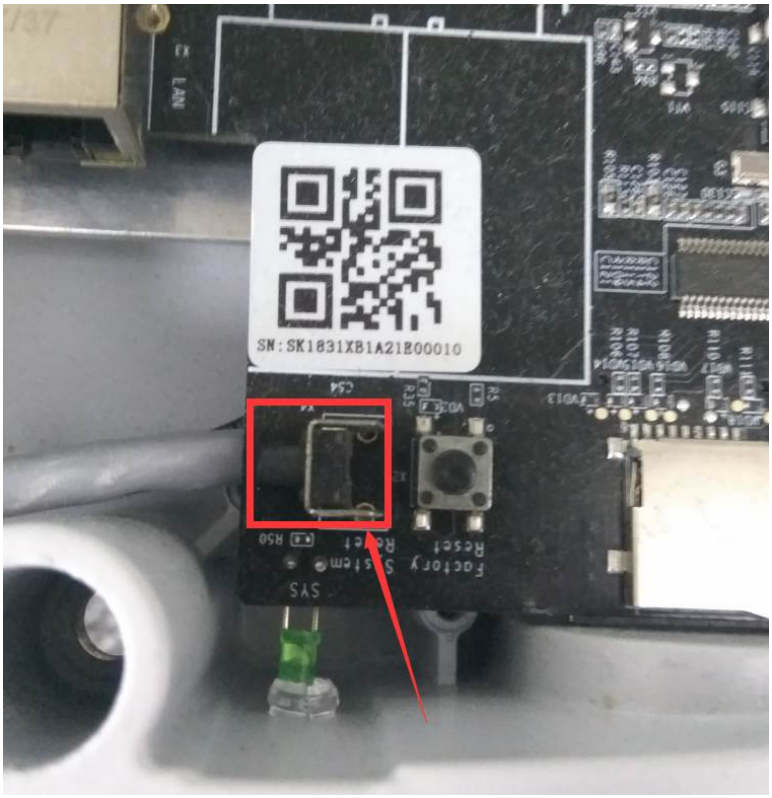
13）Support button or WEB operation to restore factory setting;

14）For security reasons, root login SSH2 and serial port have been disabled, and the account of login SSH2 and serial port is not open to the public.

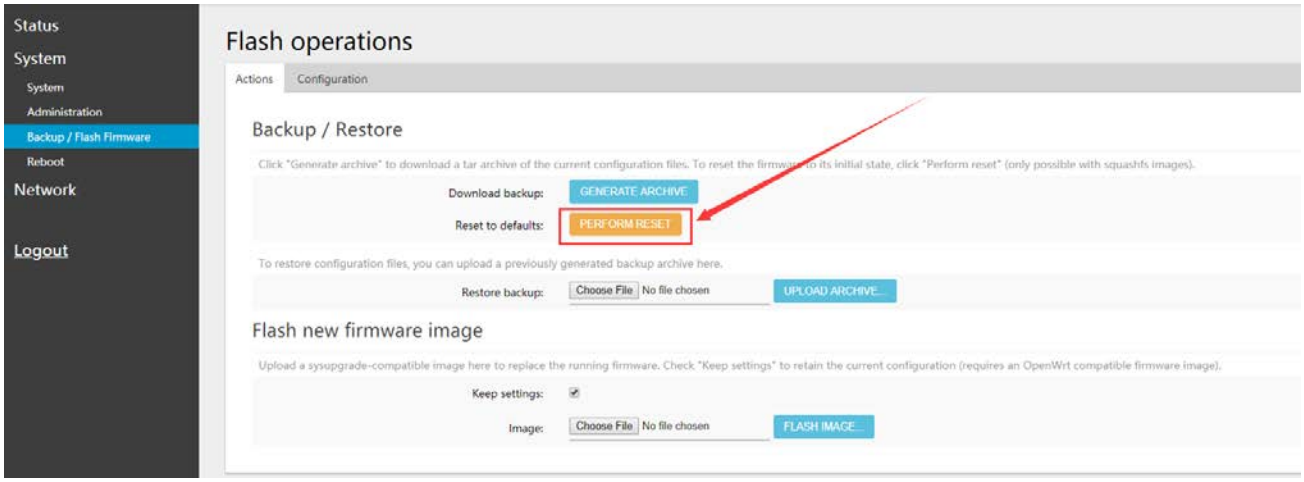
4. Restore factory setting

If you’ve modified some parameters of gateway, andthe gateway won't work properly, there are two methods to restore factory settings.

1) 1st method: press the reset button on the main board for more than 8 seconds(short press will restart the system) , the reset button is as below:

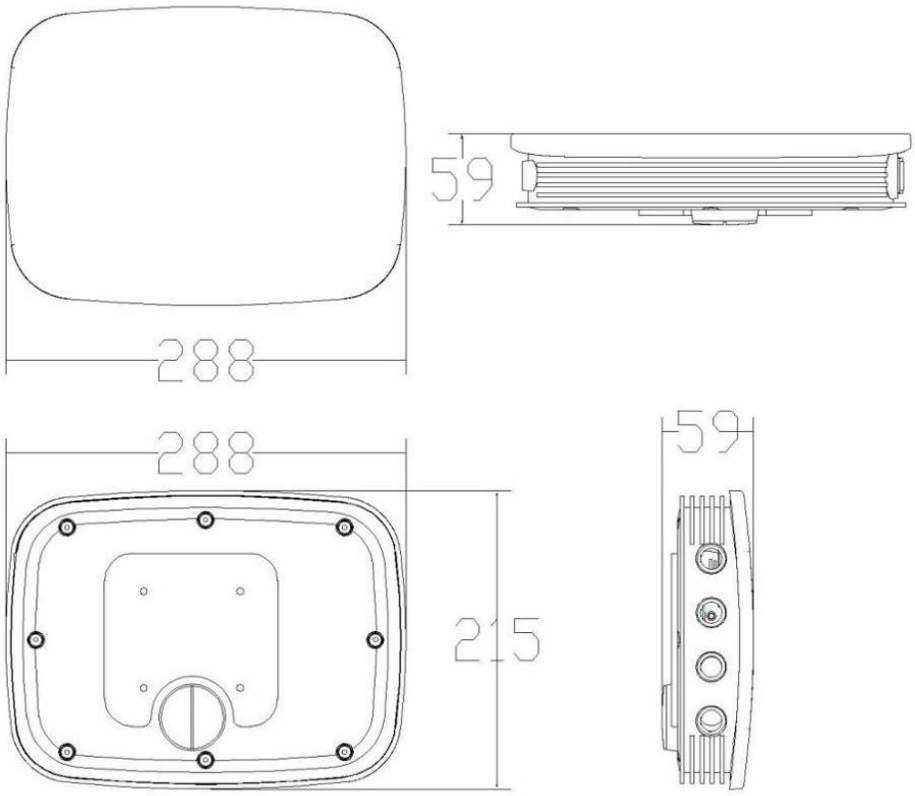


2) 2nd method: Login the following interface:



Wait 1~2 minutes, then login.

5. Product dimension



6. Technical parameter

Technical parameter	**CPU**	Industrial level CPU
		Linux system
Wireless parameter	**LoRa data rate**	300bps～5.4Kbps
	Ethernet communication rate	100Mbps
	LTE communication rate	50Mbps
	Rx sensitivity	-143dBm
	Communication interface	1xLAN ， 1xWAN，1xWIFI，1xLTE module
Electrical specification	**Input**	POE power supply with 48V input（24~48V）
	Working temperature	-30℃～65℃
	Working humidity	10%～90%
Physical parameter	**IP grade**	IP67
	Dimension	288mm*215mm*59mm
	Installation	Wall-mounted or with holding rod
	Certificate	CE/FCC
	Thunder protection	optional

7.Label

Neutral label as below:

Remark:

The “manufacturer address xxxxxx” and “importer name xxxxx, address xxxxx” shall be provided on the product before the product into the market.Model on label above can be replaced by other models.

Installation:

1.Open the SIM/TF card slot cover with a large screwdriver.

2.Insert SIM card into the card slot with the chip side upwards and the notch inwards.

3.Install the fixed seat on the back of the gateway with inner hexagon screws.

4.Install the gateway with U shape buckle to the holding pole and fix gateway with inner hexagon screws, and then install the LoRa antenna to the holding pole.

5.Wrap the antennas of wifi, 4G and GPS with shrinkable tube from the antenna port, and then tighten the antennas.

6.Usage of shrinkable tube: grasp the bottom about 2cm of the shrinkable tube with your left hand, and pull it up with your right hand until you pull all it up.

7.Connect one end of the feeder to the LoRa antenna port on the gateway, and the other end of the feeder to the LoRa antenna and tighten.

8.Pass the network cable through the RJ45 waterproof rubber ring, press the crystal head, insert the RJ45, and tighten the waterproof ring. Wrap a waterproof tape around the waterproof gasket when power on the gateway normally.

1. SIM card installation

Note: Supported LTE models as below:

LTE models	**China:** LTE-TDD: B38/B39/B40/B41; LTE-FDD: B1/B3/B5/B7/B8; TD-SCDMA: B34/B39; UMTS: B1/8; EVDO: 800MHz; CDMA1x: 800MHz; GSM: 850/900/1800/1900 **Europe:** FDD LTE: B1/B3/B5/B7/B8/B20; TDD LTE: B38/B40/B41; WCDMA: B1/B5/B8; GSM: B3/B8 **America:** FDD LTE: B2/B4/B12; WCDMA: B2/B4/B5

Open the SIM/TF card slot cover with a large screwdriver:

Insert SIM card into the card slot with the chip side upwards and the notch inwards（there are two card slots, the above one is for TF card, the below one is for SIM card）:

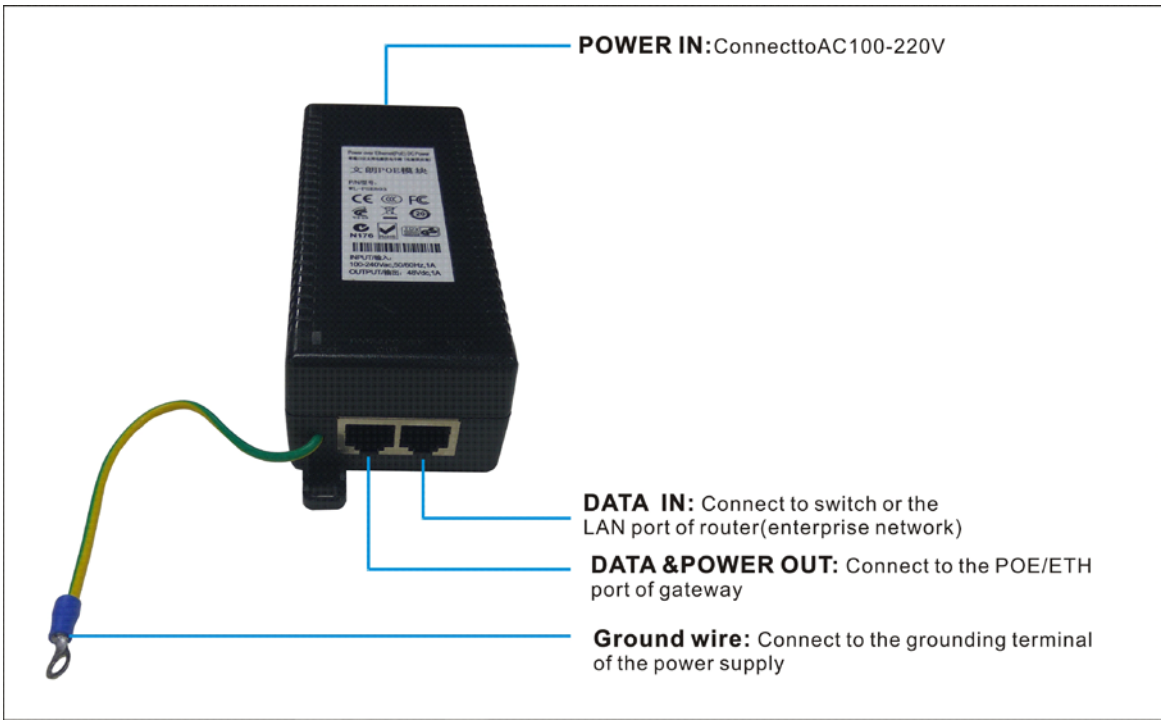
2. Installation of antenna

The gateway is mounted on a pole and the antenna is up, and from left to right, the antennas are: Wifi antenna, LoRa antenna, GPS antenna, and 4G antenna, fix the antenna to the corresponding interface, as below:

3. Installation of the whole kit

4. Power supply instruction

A) **Powered by POE, as below:**



(POE ports diagram)

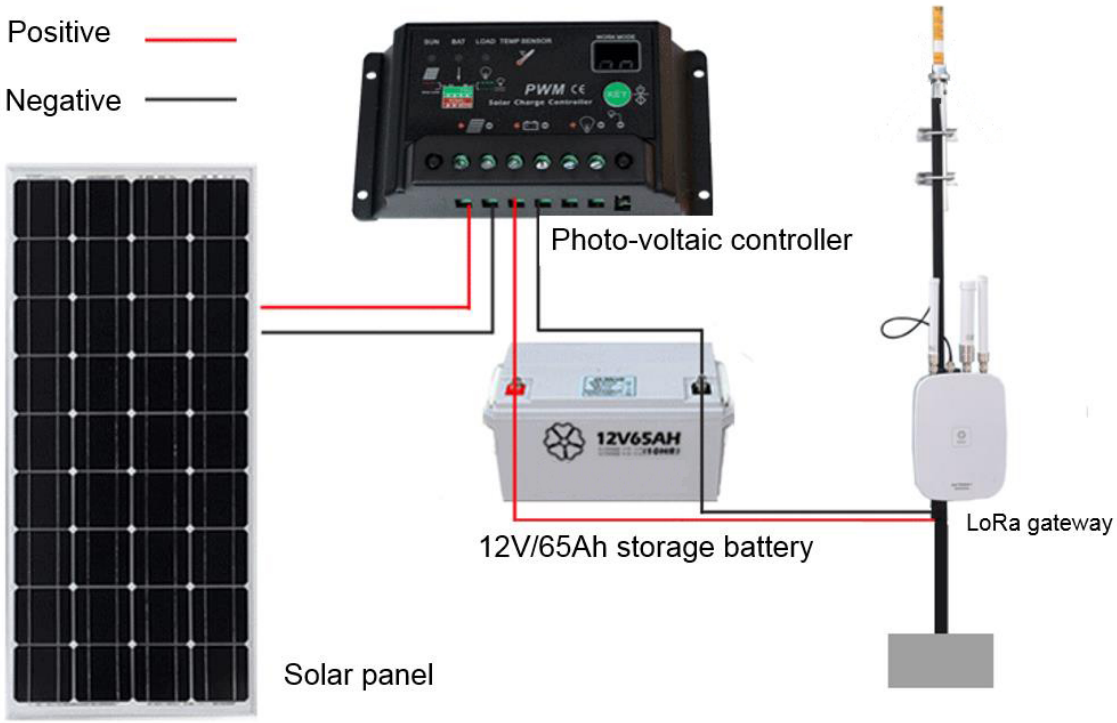
B) **Powered by solar panel**

Solar panel power supply includes: solar cell + photovoltaic controller + storage battery

The connection as below:

Solar cell--photovoltaic controller – storage battery—gateway

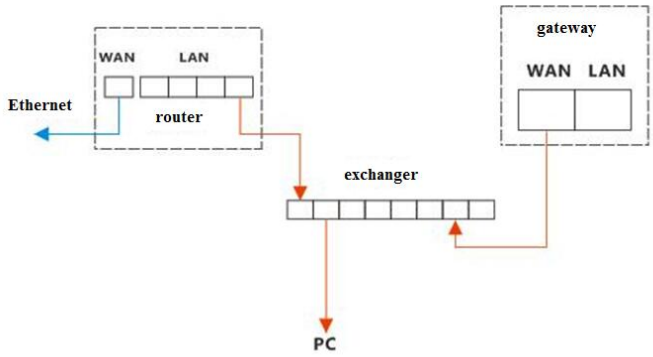
Solar panel recommendation: solar panel voltage 18V, no less than 30W, preferably with a controller; Storage battery: 12V/100Ah; The length of the 12V Power line is less than 3m.



Network setting

1. Routing mode of network

Splitter（exchanger） cable is connected to the WAN port, as below:

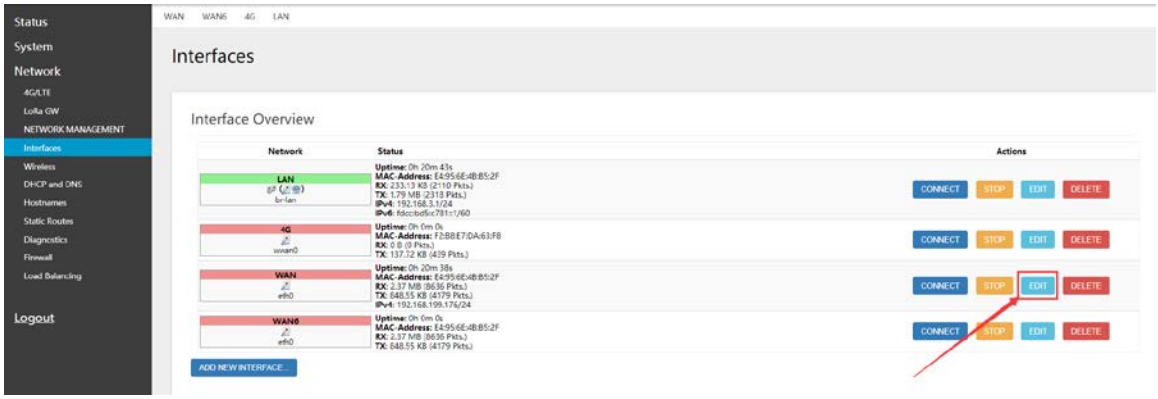


Remark：

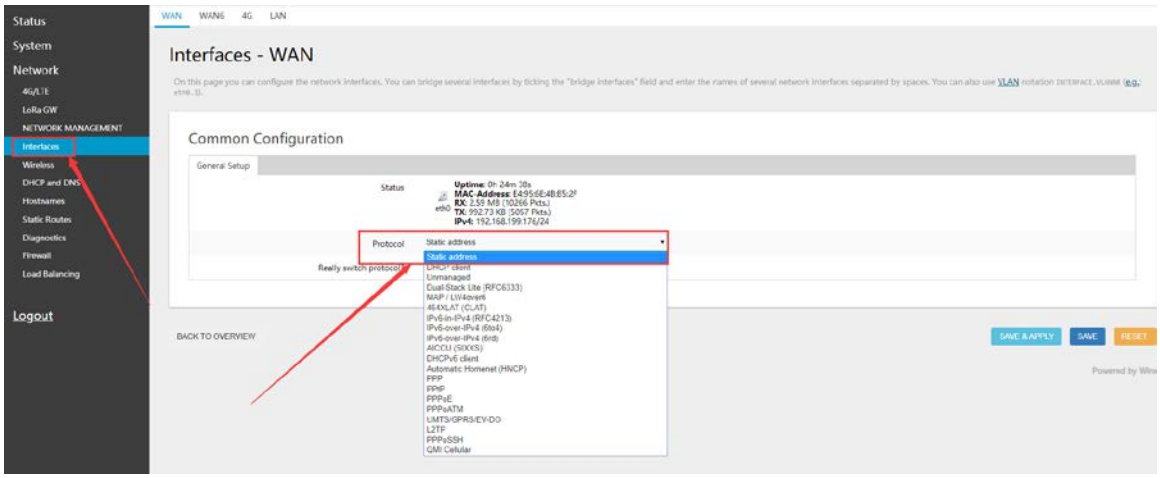
The router that the gateway is connected must be able to connect to Internet, and you should start the DHCP function for the router, and then the gateway automatically obtains the IP. If you do not start DHCP, or because of network security management, you need to assign a fixed IP to the gateway, then manually modify the assigned IP address in the

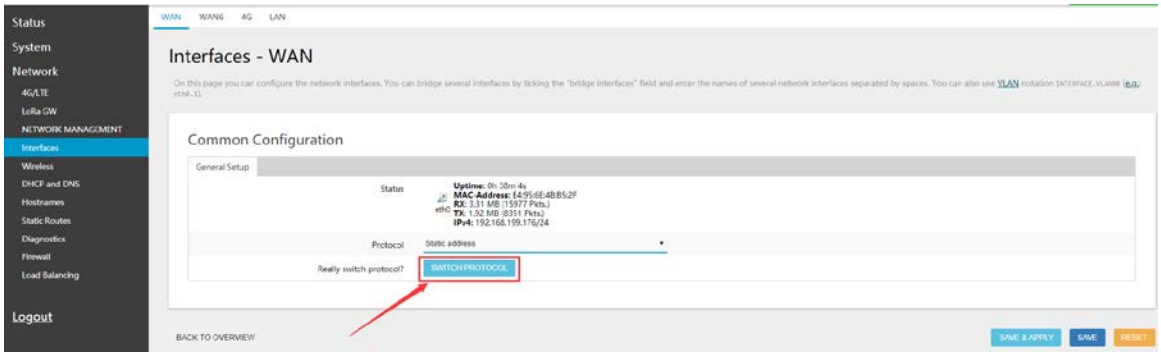
gateway interface, as below:

Select “Network/interfaces”, enter “interface overview”, come to WAN, then you can choose “EDIT” to modify, as below:

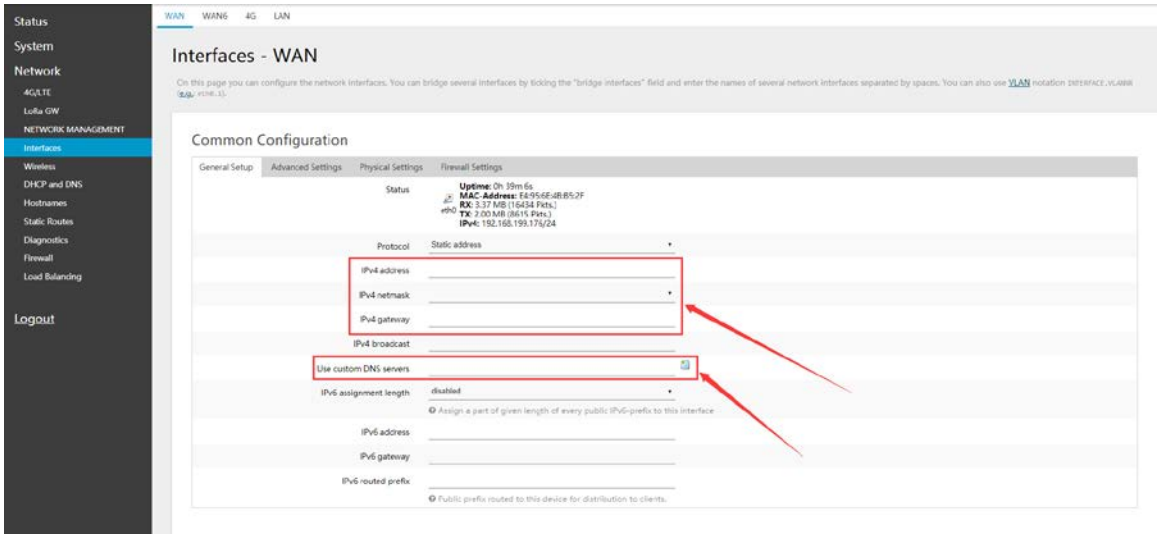


In “interfaces-WAN”, choose the Protocol to “DHCP client” and then “SAVE&APPLY”, then choose “Static address” in Protocol, then click “Switch protocol”, as below:

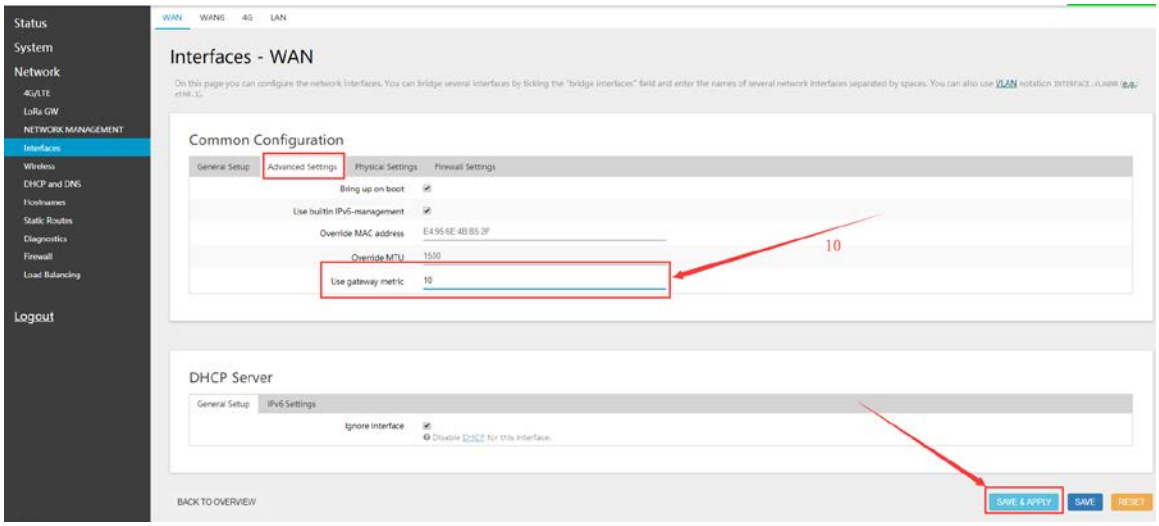




Then, you'll come to the below interface, and input the following items:



In "Advanced Settings", modify the "Use gateway metric" to be 10, click "SAVE&APPLY", as below:

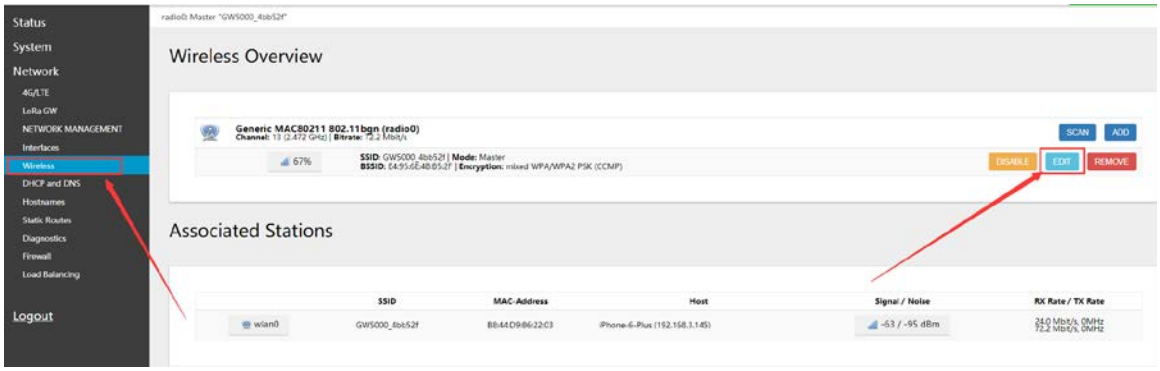


2. Wi-Fi setting

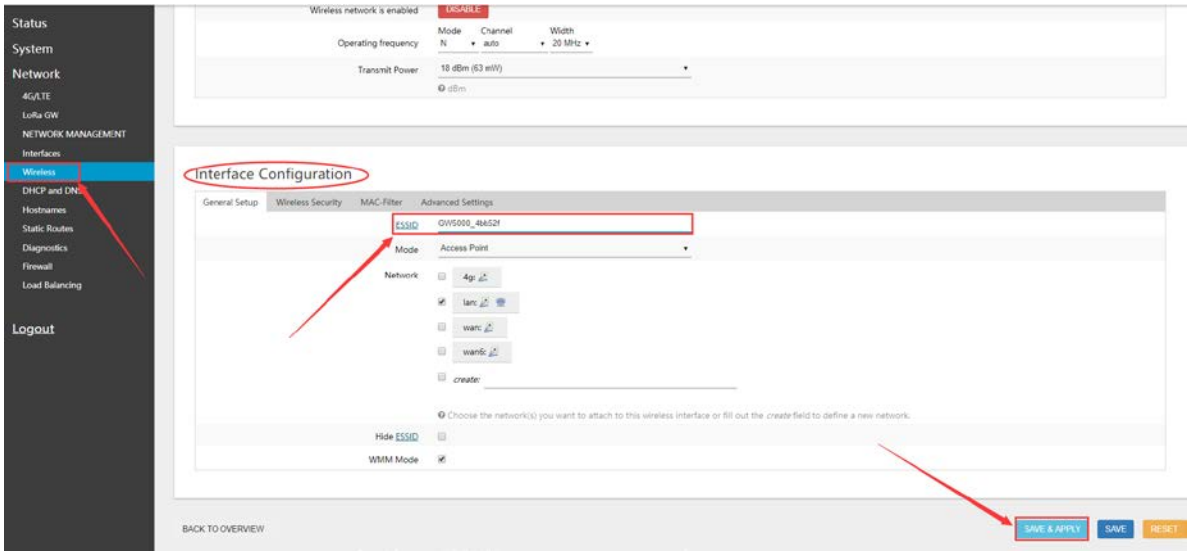
The default Wi-FiESSID: **GW5000_+ the last 6 characters of gateway ID**

The default password: **gateway2018better**

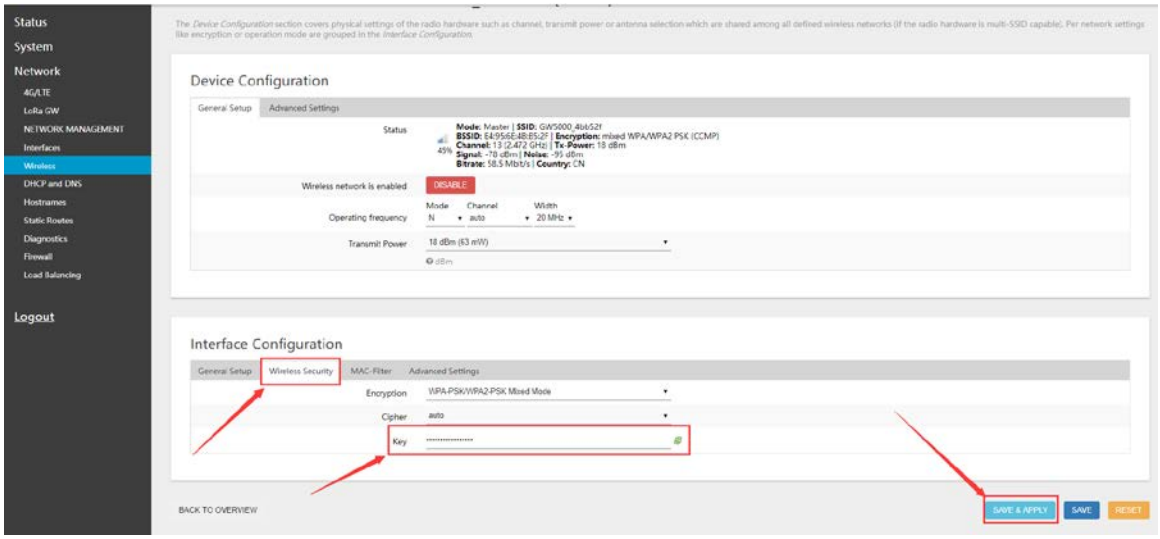
If you'd like to modify, click "Network/wireless/edit, as below:



Then, you'll come to wireless network interface, pulldown to "Interface C onfiguration", in the "General Setup", you can modify "ESSID"(wifi hotspot), then click "SAVE&APPLY", as below:

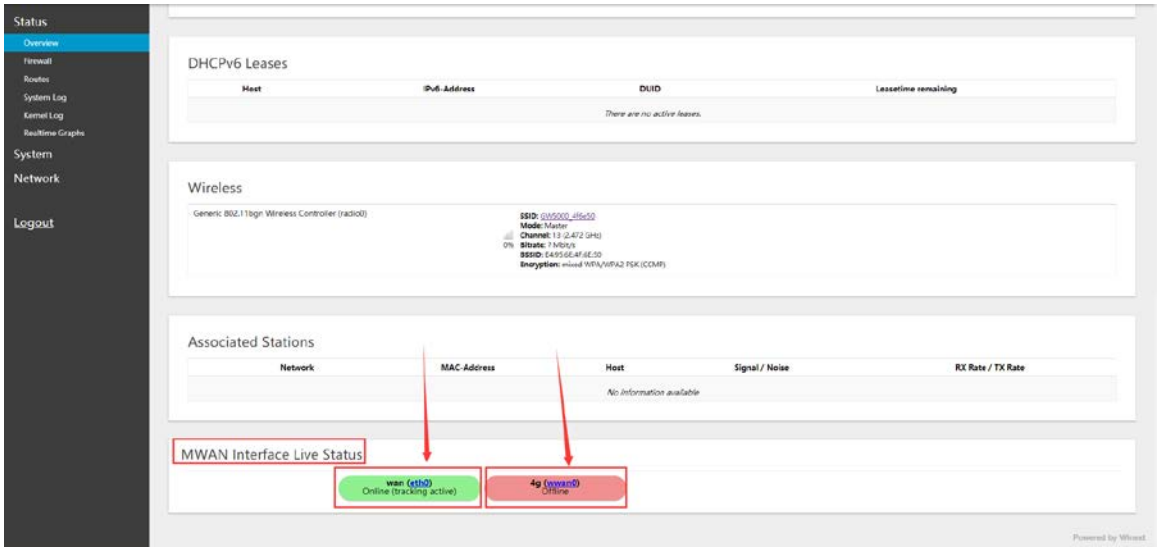


In “Wireless Security”, you can modify the password of wifi hotspot, click “SAVA&APPLY”, as below:



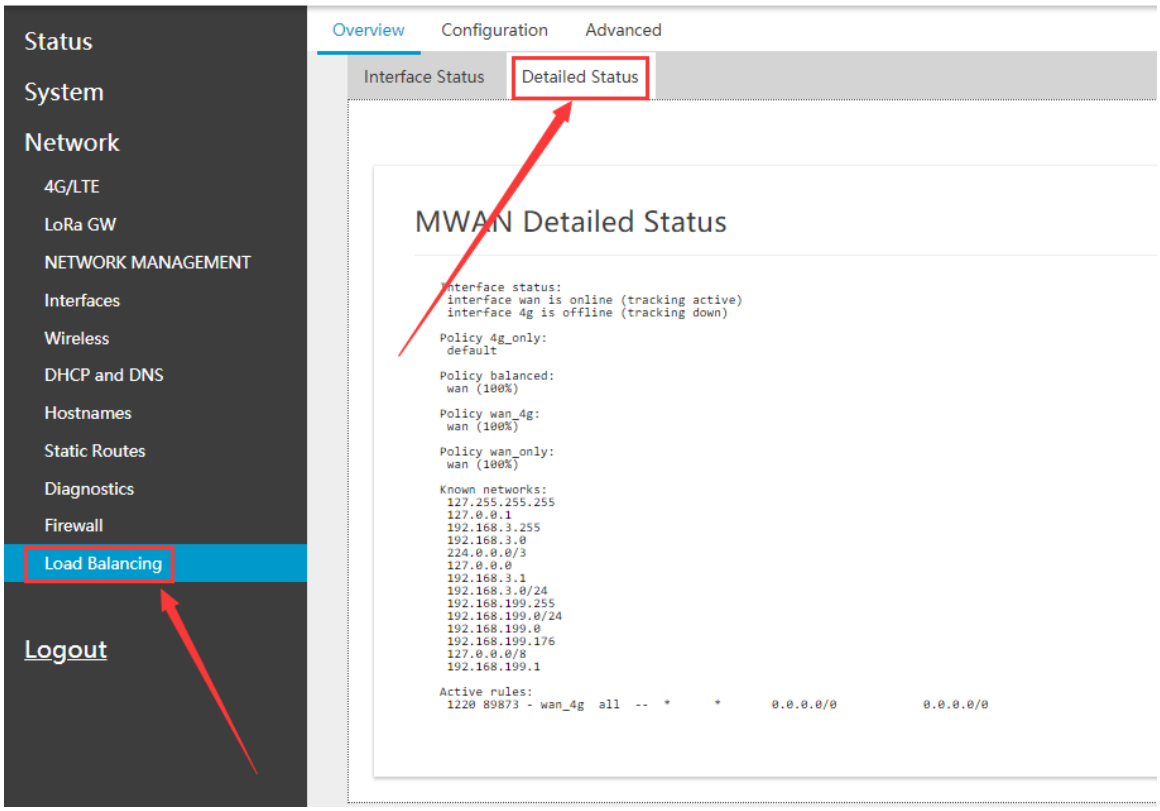
3. Check the current network status

Enter “Status/Overview”, as below:



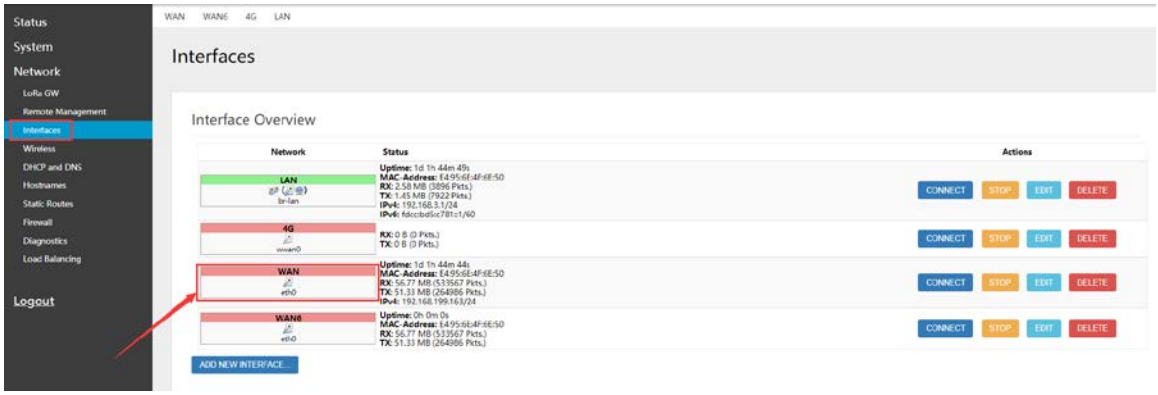
Here, it shows that WAN is online, 4G is offline.

Enter “Network/Load Balance/Detailed Status”, you can check the details as below:



4. Check the status of WAN(Ethernet)

Enter “Network/Interfaces”, as below:



Here, it shows run time and IP address, and RX and TX is not 0, it indicates the WAN is normal.

5. Check the network status of 4G

Enter:

Network->4G/LTE

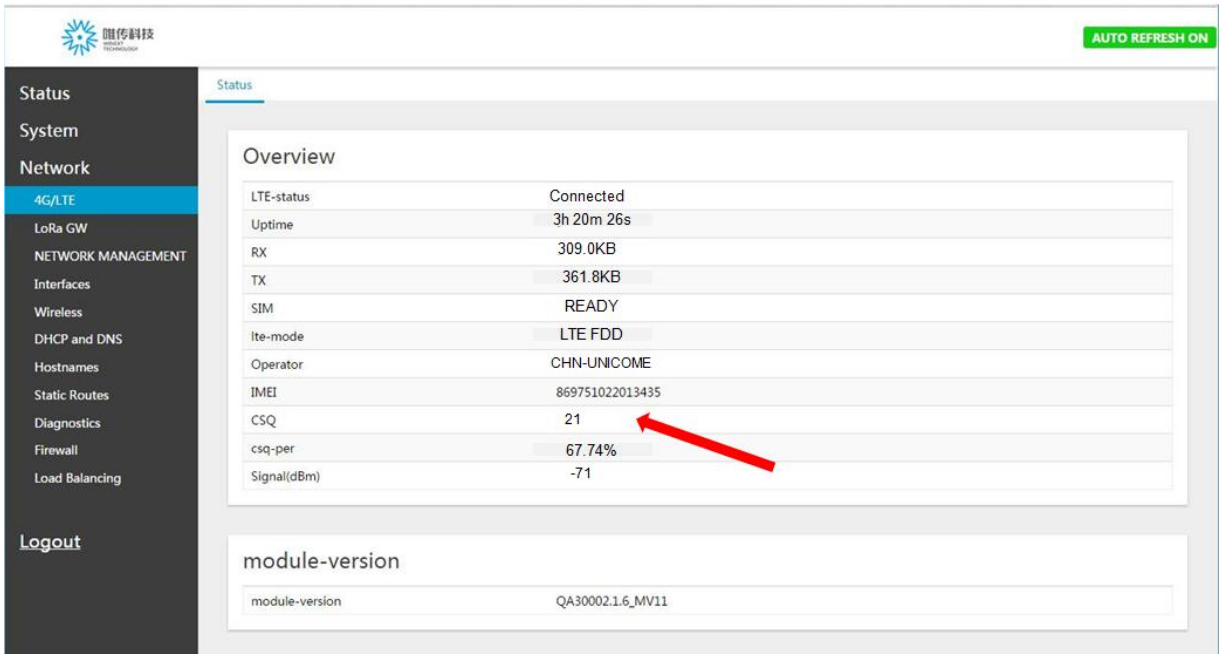
When deploying gateway, the network should be stable, and if there is no wired network, we can also use 4G network, but we should choose a position with strong 4G signal to deploy gateway.

Qualified LTE network should meet the following 2 points:

1）**Network mode display：LTE**（China Mobile: TDD, China Telecom and China Unicom: FDD

2）**Signal strength above 28**（the network signal should be stable the whole day）

As below, it’s under unqualified network:

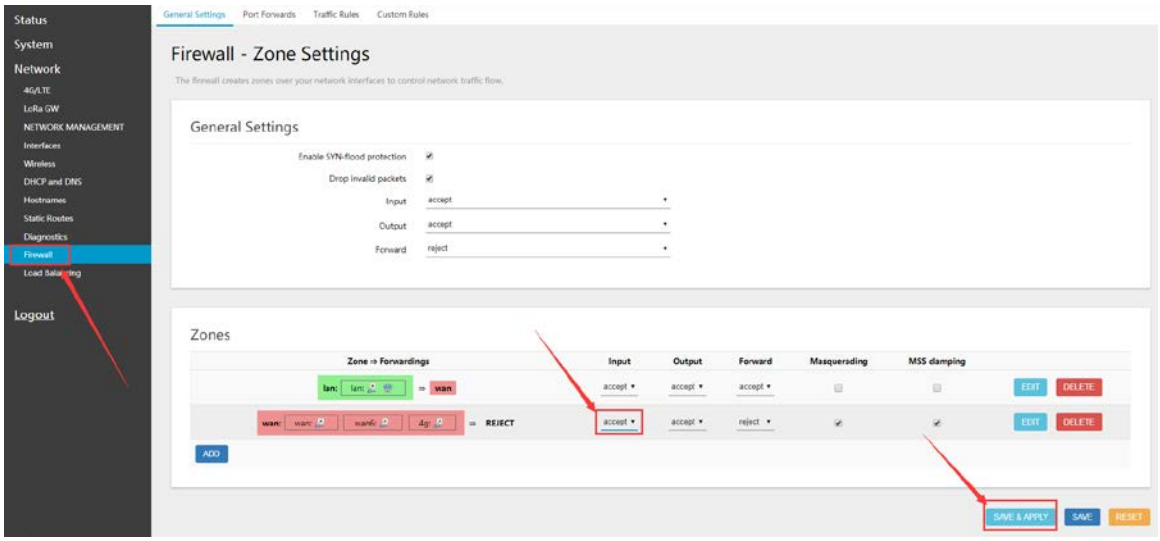


Here, it’s under unqualified network: weak signal and it’s not 4G network.

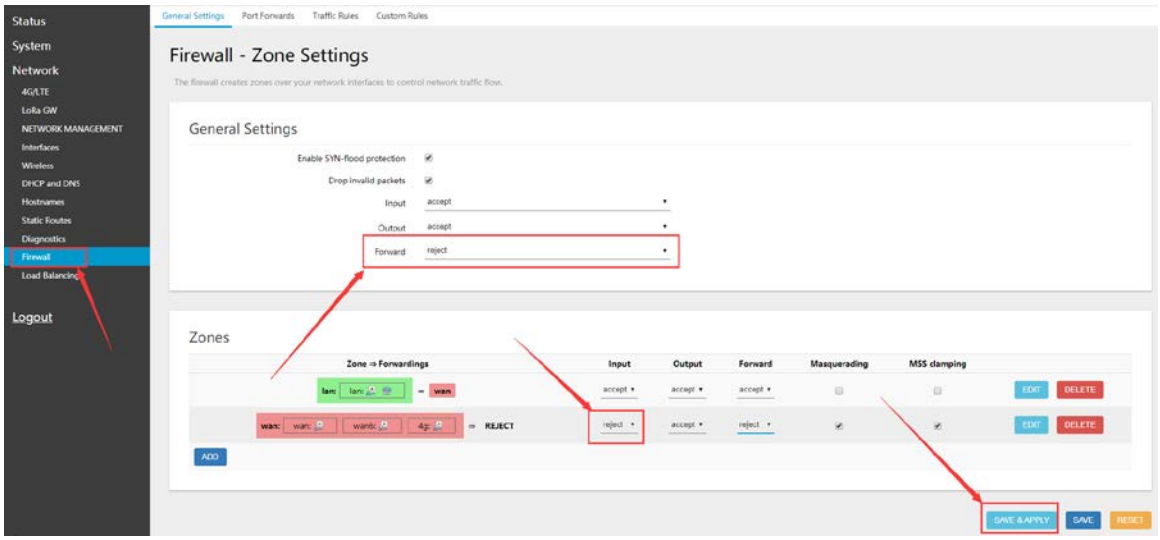
6. Enable/disable WAN port data entry

The WAN port data entry is enabled by default and the WAN port access gateway is supported

Access the gateway page via the WAN port IP（e.g. if IP of the PC is 192.168.8.x, and the gateway is 192.168.8.5, then access on the computer through a browser, enter: 192.168.8.5, you can directly access to the gateway）, configuration as below(default setting):



If you do not want to access the gateway via the WAN, you can use LAN or WiFi to enter the Settings as follows:

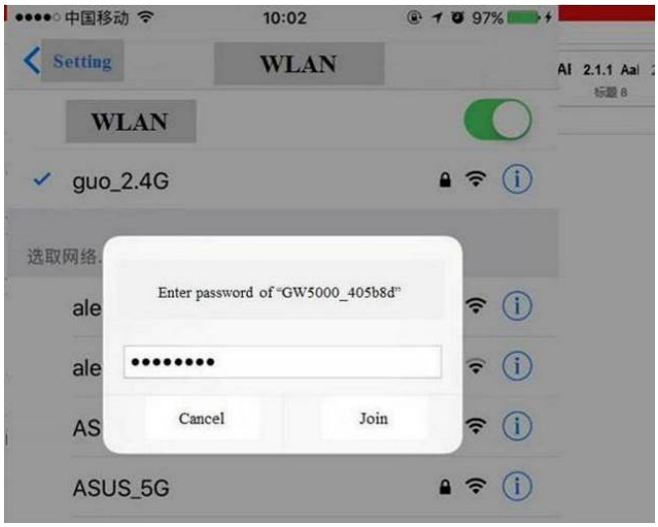


Configuration/upgrade of gateway

1. Login

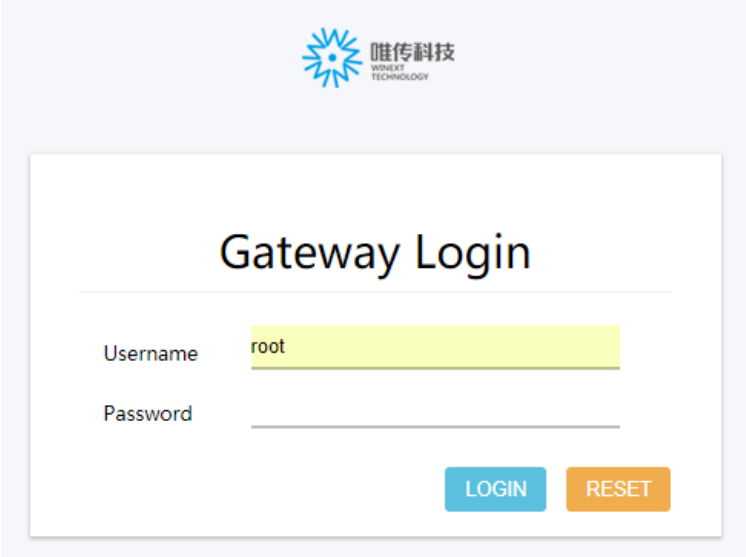
1.1.Gateway login by WI-FI hotspot of phone/laptop

Open the phone/laptop wi-fi setting and connect the GW5000Wi-Fi hotspot(Hotspot name: GW5000_the last 6 characters of gateway ID; Password: gateway2018better), as below:



1.2. Gateway login on computer

Using google browser on computer, login 192.168.3.1, you'll enter the interface of gateway login, input username and password (Username: root; Password: WelcomeTo2018), as below:



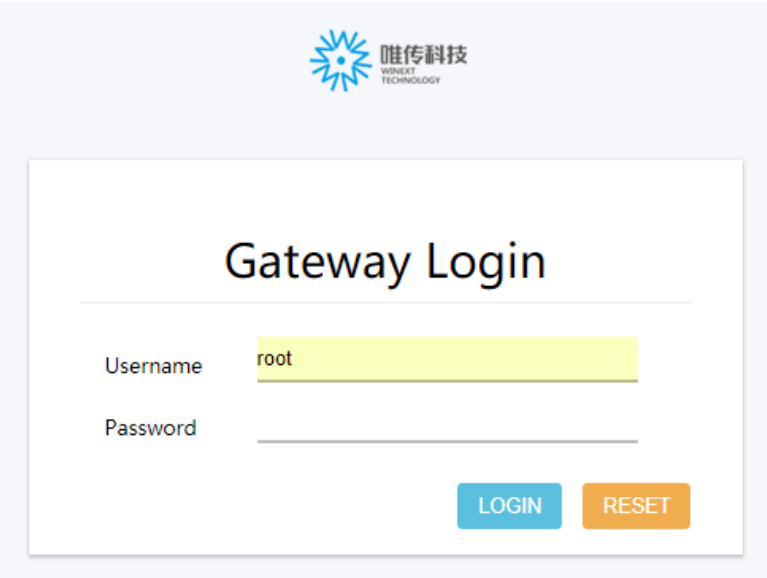
2. Configuration of gateway

Note: The gateway configuration includes wired configuration and wireless configuration. Wired configuration is achieved by using the network LAN port of the computer to connect with gateway; Wireless configuration is achieve by using mobile phone/laptop/PDA to connect to the gateway wi-fi hotspot.

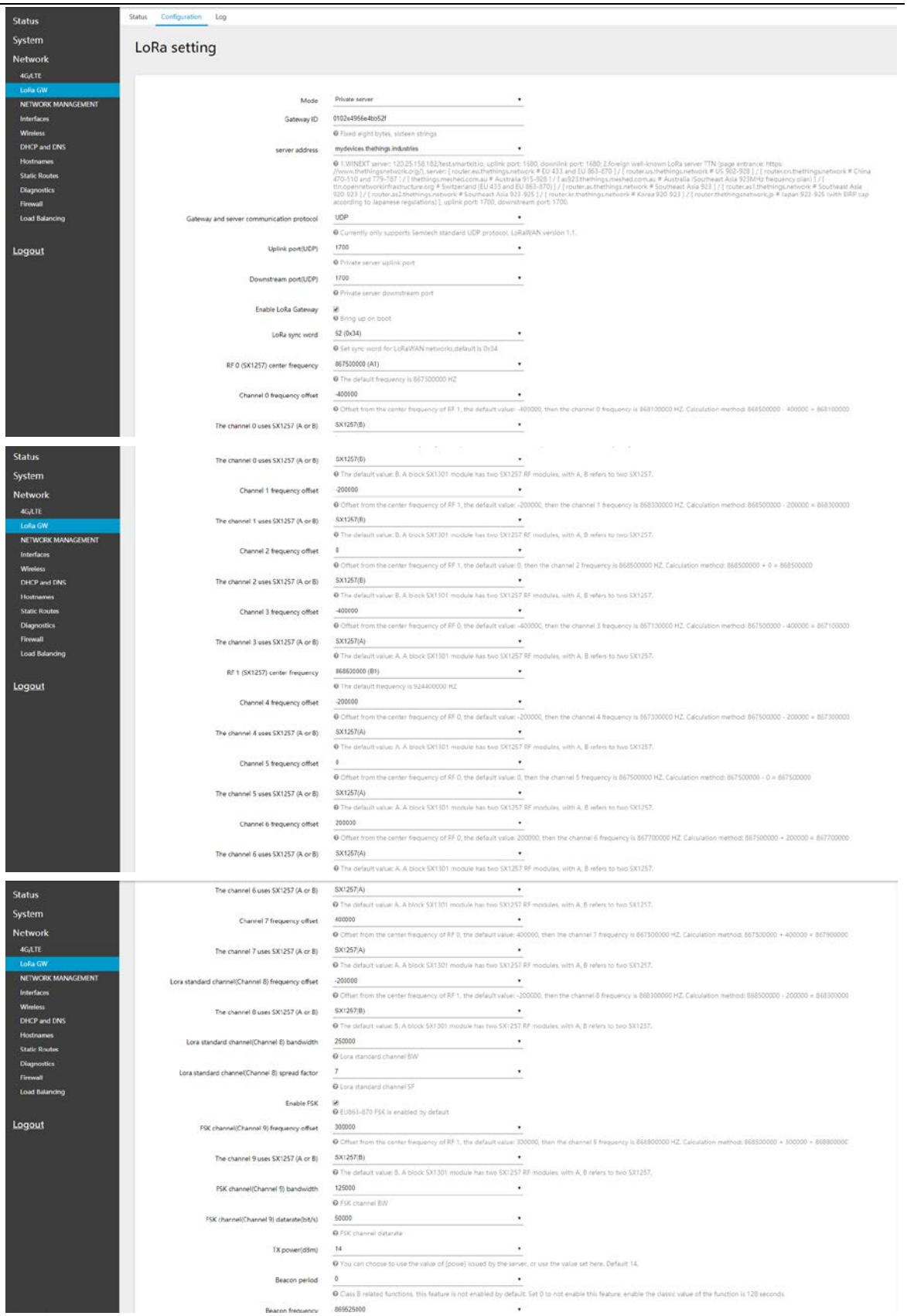
2.1 Wired configuration

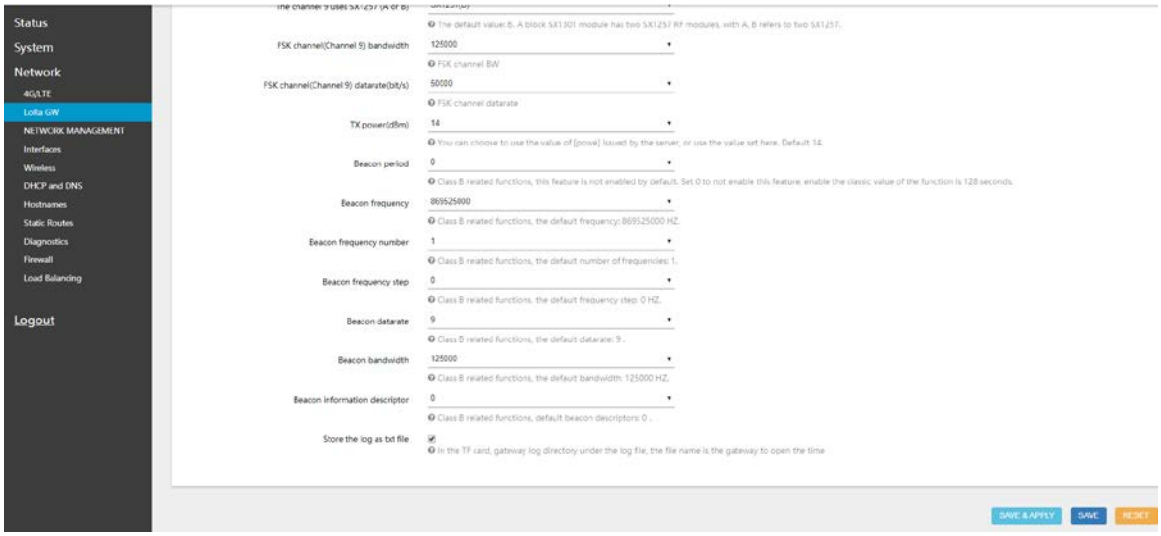
1）Connect the computer to the LAN port of gateway, and power on the gateway;

2）Using google browser to enter “192.168.3.1”, then you’ll come to the gateway login interface, as below:（Username: root; Password: WelcomeTo2018）



3）Select “Network/LoRa GW/Configuration, then you’ll come to LoRa setting interface, as below:


Status
System
Network
4G/LTE
LoRa GW
NETWORK MANAGEMENT
Interfaces
Wireless
DHCP and DNS
Hostnames
Static Routes
Diagnostics
Firewall
Load Balancing
Logout
Status
Configuration
Log
LoRa setting
Mode
Private server
Gateway ID
0102e4956e4bb52f
Fixed eight bytes, sixteen strings
server address
mydevices.thethings.industries
Gateway and server communication protocol
UDP
Currently only supports Semtech standard UDP protocol, LoRaWAN version 1.1.
Uplink port(UDP)
1700
Private server uplink port
Downstream port(UDP)
1700
Private server downstream port
Enable LoRa Gateway
Bring up on boot
LoRa sync word
52 (0x34)
Set sync word for LoRaWAN networks,default is 0x34
RF 0 (SX1257) center frequency
867500000 (A1)
The default frequency is 867500000 HZ
Channel 0 frequency offset
-400000
The channel 0 uses SX1257 (A or B)
SX1257(B)
The channel 0 uses SX1257 (A or B)
SX1257(B)
The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.
Channel 1 frequency offset
-200000
The channel 1 uses SX1257 (A or B)
SX1257(B)
Channel 2 frequency offset
0
The channel 2 uses SX1257 (A or B)
SX1257(B)
Channel 3 frequency offset
-400000
The channel 3 uses SX1257 (A or B)
SX1257(A)
The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.
RF 1 (SX1257) center frequency
868500000 (B1)
The default frequency is 924400000 HZ
Channel 4 frequency offset
-200000
The channel 4 uses SX1257 (A or B)
SX1257(A)
Channel 5 frequency offset
0
The channel 5 uses SX1257 (A or B)
SX1257(A)
Channel 6 frequency offset
200000
The channel 6 uses SX1257 (A or B)
SX1257(A)
The channel 6 uses SX1257 (A or B)
SX1257(A)
The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.
Channel 7 frequency offset
400000
The channel 7 uses SX1257 (A or B)
SX1257(A)
Lora standard channel(Channel 8) frequency offset
-200000
The channel 8 uses SX1257 (A or B)
SX1257(B)
The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.
Lora standard channel(Channel 8) bandwidth
250000
Lora standard channel BW
Lora standard channel(Channel 8) spread factor
7
Lora standard channel SF
Enable FSK
EU863-870 FSK is enabled by default
FSK channel(Channel 9) frequency offset
300000
The channel 9 uses SX1257 (A or B)
SX1257(B)
The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.
FSK channel(Channel 9) bandwidth
125000
FSK channel BW
FSK channel(Channel 9) datarate(bit/s)
50000
FSK channel datarate
TX power(dBm)
14
You can choose to use the value of [powe] issued by the server, or use the value set here. Default 14.
Beacon period
0
Class B related functions, this feature is not enabled by default. Set 0 to not enable this feature, enable the classic value of the function is 128 seconds.
Beacon frequency
869525000



4）In the “Configuration/LoRa setting” interface, you can configure the “server address”, “Enable LoRa Gateway”, “Store the log as txt file” ;

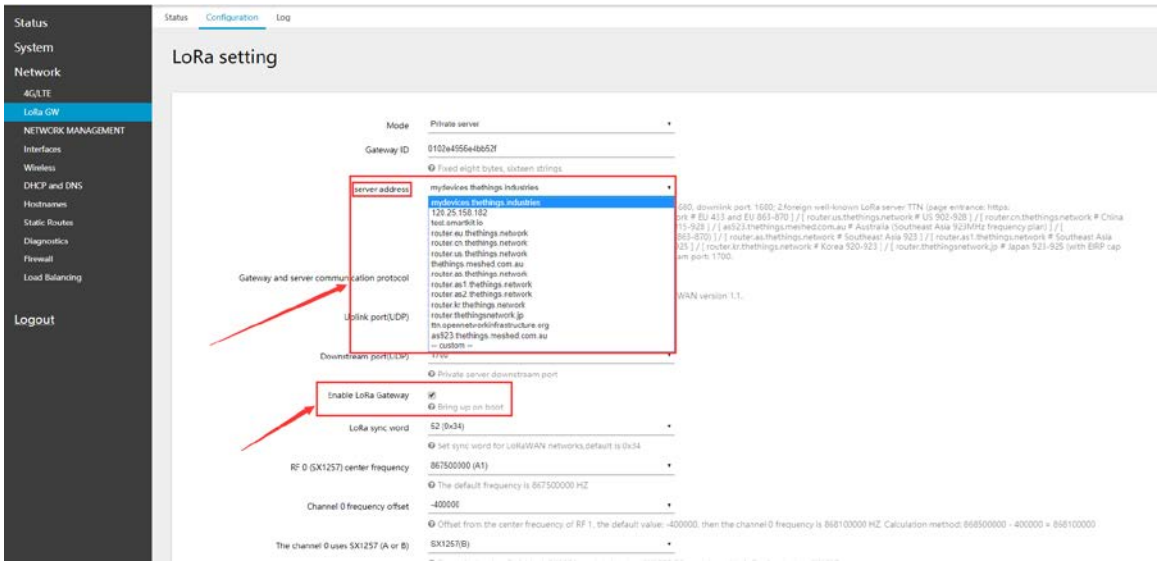
---Server address: choose your LoRa network server address, if there is nothing to choose, pls click “Custom” in the bottom, and input your own LoRa network server address;

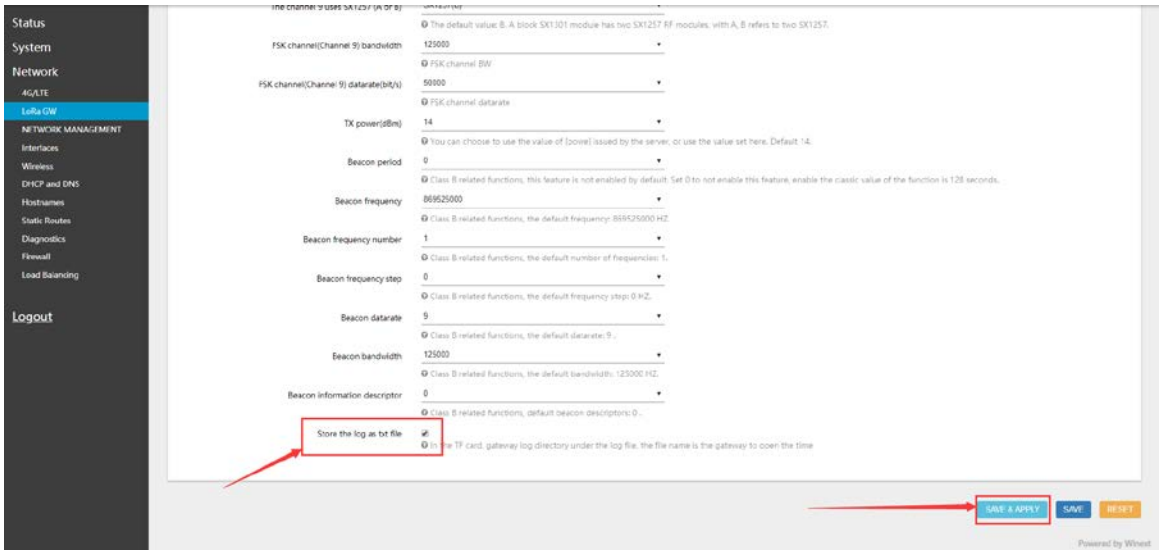
---Enable LoRa gateway: you should tick to choose it;

---Store the log as txt file: you should tick to choose it;

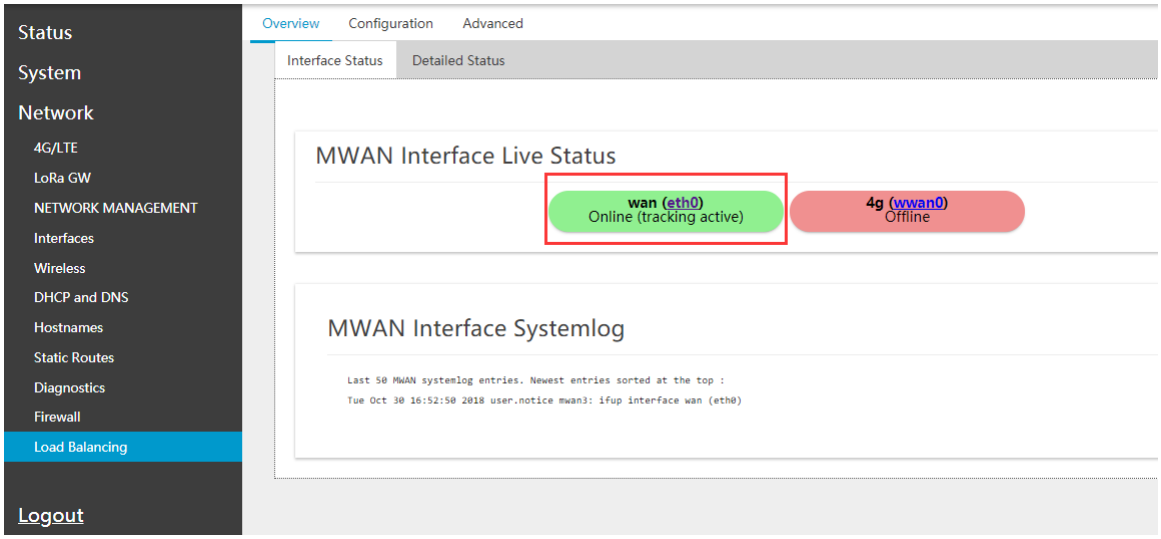
Finally, click SAVE&APPLY.

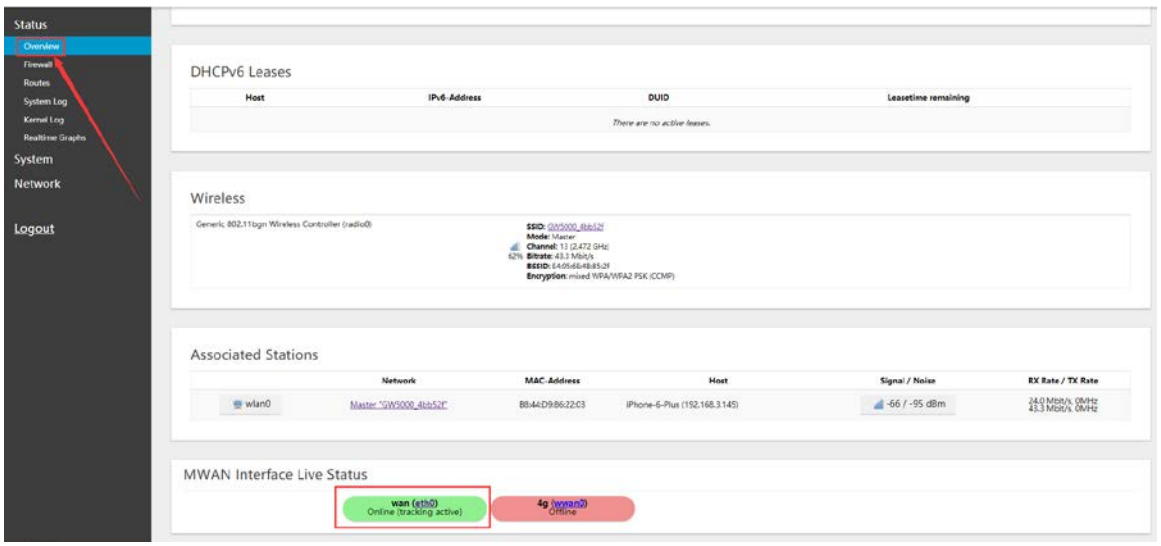
As below:





5）Check the network status of gateway, click “Network/Load Balancing/Overview”, as below:





Here, it shows WAN is online, you can access Ethernet; 4G is offline or 4G SIM card haven't been installed.

6）Check the status of GPS, click "Network/LoRa GW", you'll come to GPS overview, as below: (here, it shows the GPS is not in working status, as there is no information)

7） After the above confirmation is normal, the gateway box is closed with hexagonal screwdriver.

2.2 Wireless configuration

The steps are the similar as that of wired configuration, only displayed by mobilephone/PDA/laptop.

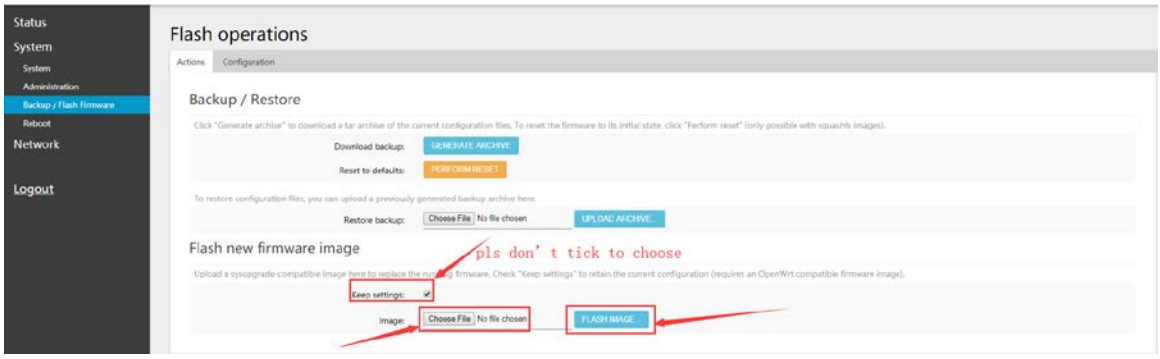
2.3 Firmware upgrade of gateway

Enter "System/backup/Flash Firmware/Action",

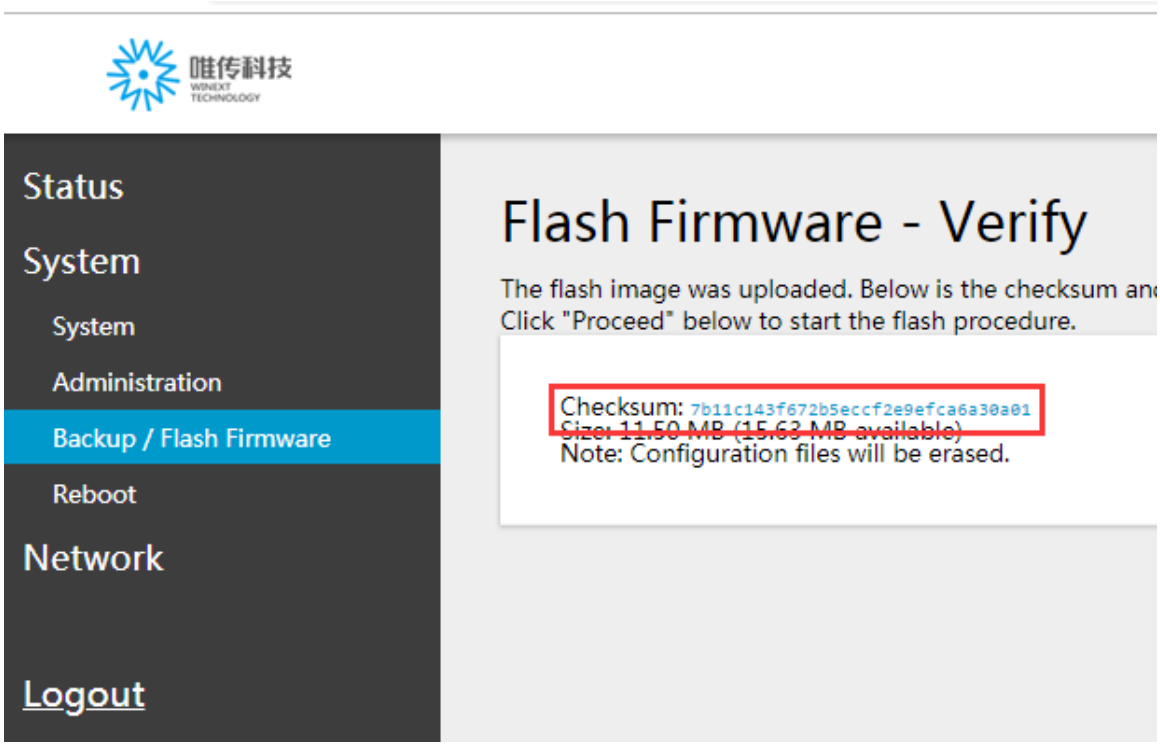
1）Keep settings: pls don't tick to choose;

2）Choose file: Choose the provided version in .bin format;

3）Click "Flash image"As below:



After click “Flash image” , pls wait for a moment until the upload complete, then come to the interface of “Flash Firmware-Verify”, as below:



Note: When file is finished uploading, wait and check to make sure the Checksum is as same as that of md5 file(which will be sent to customer together with the bin format file), if it’s the same, pls click PROCEED button. If the Checksum is not as same as that of md5 file, it’s possible that the upload file damages. You should click CANCEL button to re-upload, because the damaged file can make gateway to be brick. **As below:**

Note: After click PROCEED button, it’s flashing the firmware, pls make sure the

power supply be stable, and wait for **3~5** minutes until it finishes.

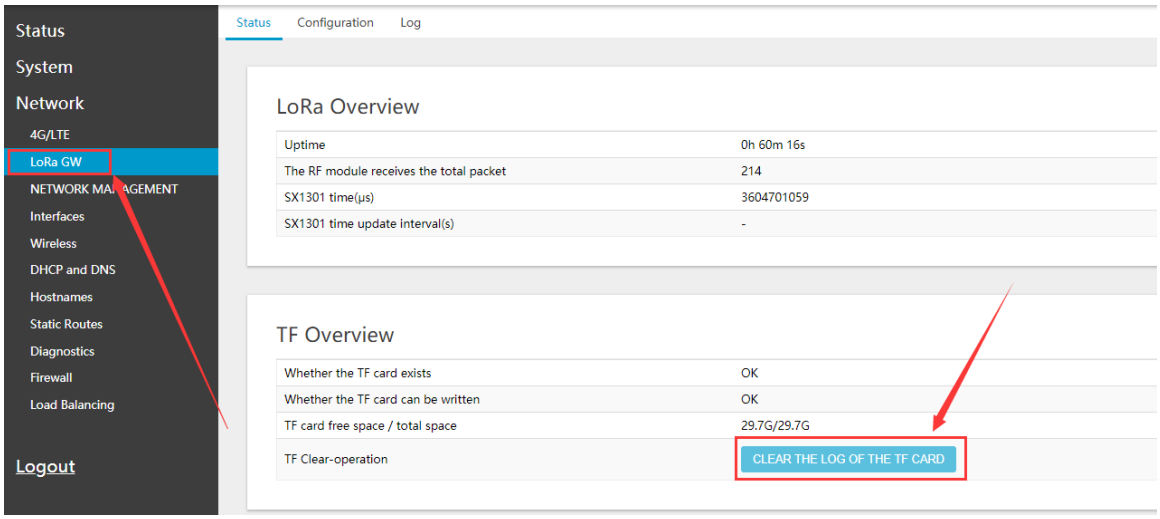
After finishing flash firmware, there is no need to enter the Web page, the gateway will enable by default.

FAQ

1. Gateway will not work after a power failure

When there is a power failure, the log on the TF card is damaged, after restart gateway, it'll do self-check to automatically repair log, if TF card data quantity is large, it'll take a long time to repair, in the process of repairing, the gateway is not working.

Solution: enter the configuration interface of gateway (192.168.3.1) , gateway login, select "Network/LoRa GW/Status", click "CLEAR THE LOG OF TF CARD", as below:



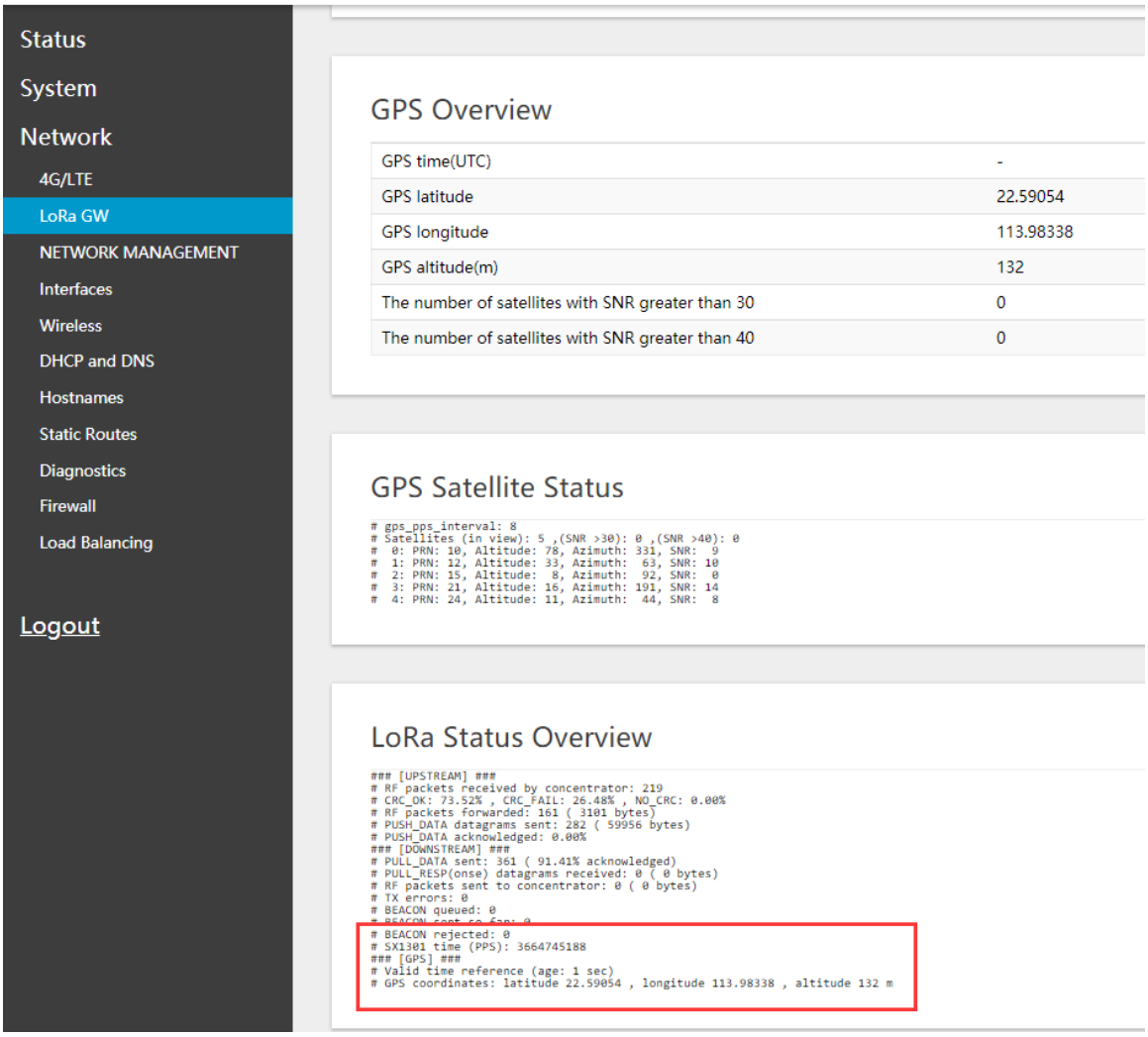
After clear the log of TF card, pls restart the gateway, then it'll work again.

2. GPS unable to locating

Enter 192.168.3.1 interface:

1） Check whether there is positioning information or not, if yes, it means GPS is normal

2）Check whether there is time synchronization or not, as below:



If GPS is normal, the time synchronization should be less than 5 seconds, the above picture shows “(age: 0 sec), that means the GPS is normal.

3）If GPS has no location information, you can re-plug the GPS antenna, or repositioning in an open area, or update GPS antenna.

3.Nodes cannot access to the network

1）Check whether the gateway works normally or not.

2）Check whether there is power supply for nodes

3) Nodes power on

4.LoRa signal and data rate

1）Received Signal Strength Indicator(RSSI)

125KHZband width, rate:300～5.4K bit/s, as below:

SF	Data rate (bit/sec)	Sensitivity (dBm)
7	5469	-130.0
8	3125	-132.5
9	1758	-135.0
10	977	-137.5
11	537	-140.0
12	293	-142.5

Note: the limit value of SF12 is -142. Generally speaking, if signal below -124 dBm, the packet drop rate(PDR) will be high, normal value should be during -120dBm~ -40dBm.

2）Signal Noise Ratio(SNR)

Modulation	Typical SNR
LoRa SF12	-20 dB
LoRa SF10	-15 dB
GMSK	9 dB

Note: The limit value of SF12 is -20db, the limit value of SF10 is -15db. The closer it's from the limit value, the worse the signal.

The above data is based on the basis of the gateway test, if you use a node test, the data is different.

AT	BE	CY	CZ	DK	EE	FI
FR	DE	EL	HU	IE	IT	LV
LT	LU	MT	NL	PL	PT	SK
SI	ES	SE	UK	BG	RO	HR

FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user′s authority to operate the 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 maycause undesired operation.

Radiation Exp osure Statement

This equipment complies with FCC radiation exposure limits set forth for anuncontrolled environment. This equipment should be installed and operated withminimum distance 20cm between the radiator & your body.

Note: 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 or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.