

## GW5000A Industrial-grade gateway router



**Product name: LoRaWAN gateway router**

**Model: GW5000A**

**Version: V6.1**

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## Packing list

| Packing list---V6.1 gateway                                                         |                                                                                                            |      |  |                                                                                     |                               |        |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------|--|-------------------------------------------------------------------------------------|-------------------------------|--------|
| Image                                                                               | Name                                                                                                       | QTY  |  | Image                                                                               | Name                          | QTY    |
|    | Gateway                                                                                                    | 1pc  |  |   | U shape buckle                | 2 sets |
|    | POE power supply<br>WL-PSE803<br><br>(Pls don't use this<br>POE to power the<br>version 3.4 of<br>GW5000A) | 1set |  |   | little U shape buckle         | 2 sets |
|    | LoRa antenna                                                                                               | 1pc  |  |   | Shrinkable tube               | 2pcs   |
|    | 4G antenna                                                                                                 | 1pc  |  |   | Hexagon spanner, Φ5           | 1pc    |
|    | GPS antenna                                                                                                | 1pc  |  |   | Inner hexagon screw,<br>M6*14 | 2pcs   |
|    | Fixed mount                                                                                                | 1pc  |  |   | Feeder connection             | 1pc    |
|   | Fixed seat(already on<br>the gateway)                                                                      | 1pc  |  |  | Ground wire, M*6              | 1pc    |
|  | Plastic tweezers                                                                                           | 1pc  |  |  | Grounding screw, M3*6         | 1pc    |
|  | Hoop                                                                                                       | 3pcs |  |  | Electrical tape               | 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.

## 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 etc. in the future.

## 2. Operation condition

- 1) Install the gateway and make sure that it's set up firmly;
- 2) Install all the antennas: 4G, WiFi, LoRa and GPS antennas;
- 3) make sure there is at least one way for data backhaul, Ethernet or 4G;
- 4) If LTE is used as the way for data backhaul, the monthly data access plan of LTE should be greater than 4G, and the specific traffic depends on the number of nodes and will change appropriately, and the 4G signal coverage in the place where the gateway is set up must be good.
- 5) Make sure the gateway be powered by PoE or solar.
- 6) Configure the LoRaWAN network server, add the gateway ID to the server, and open the UDP port of the server, allowing it to be ping (the gateway will use the server IP as the ping diagnostic address);
- 7) Configure the gateway's frequency point plan in the gateway WEB page, and there are a defaulted setting.
- 8) Make sure the gateway's network (whether WAN or 4G is used) is normal, and the gateway ping server delay is no less than 100ms, and the recommendation is no less than 50ms (PUSH\_ACK can be received). If the delay is too long, and when the server sends the data, it may miss the node RX1 receiving window of Class A.
- 9) In the gateway interface, you can check whether the LoRa part is working and you can check the log of the LoRa data.
- 10) Operation temperature: -30℃ ~ 65℃; Operation humidity: 5%~95%; Altitude below 5,000 meters.
- 11) If gateway is required to support Class B, GPS must be able to locate and synchronize normally in the place where the gateway is located (without GPS signal, gateway only supports Class A/C, as Class B requires GPS PPS signal to be provided to SX1301).

### 3. Interface introduction



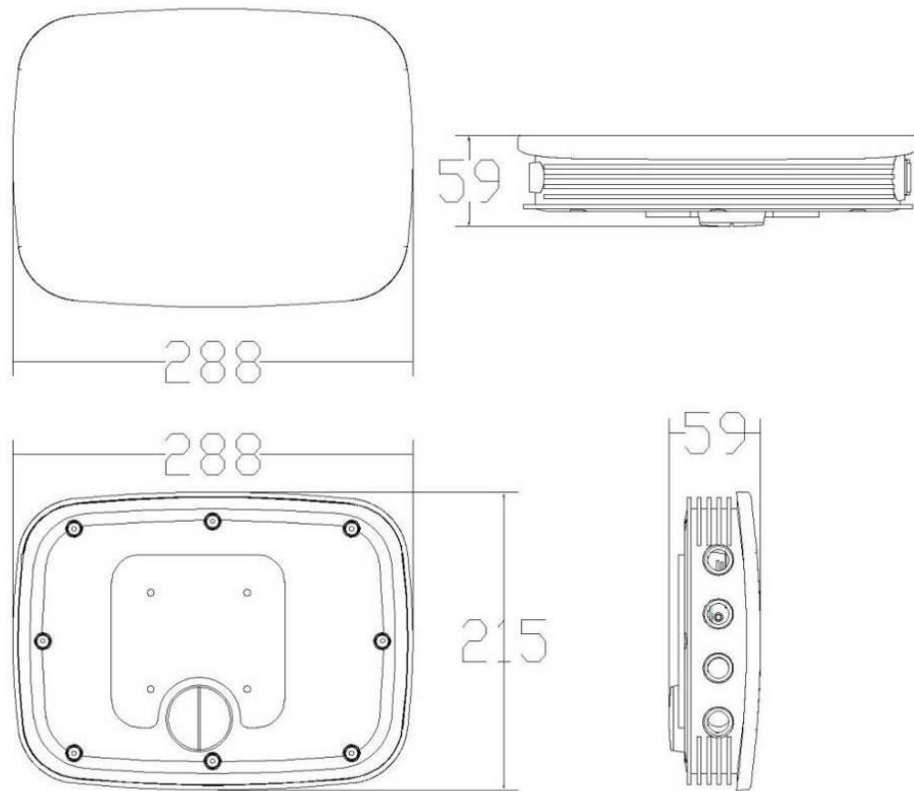
| Item | Interface name | Remarks                | Item | Interface name |
|------|----------------|------------------------|------|----------------|
| 1    | LoRa-1 antenna | Reserved<br>for GW8016 | 2    | LTE antenna    |
| 3    | GPS antenna    |                        | 4    | LoRa-2 antenna |





| Item | Interface name | Remarks | Item | Interface name   | Remarks                      |
|------|----------------|---------|------|------------------|------------------------------|
| 1    | ETH/POE port   |         | 2    | WIFI antenna     |                              |
| 3    | System port    |         | 4    | SIM/TF card port | big SIM card, not small card |

#### 4. Product dimension



## 5. Power supply instruction

A) Powered by POE, as below:

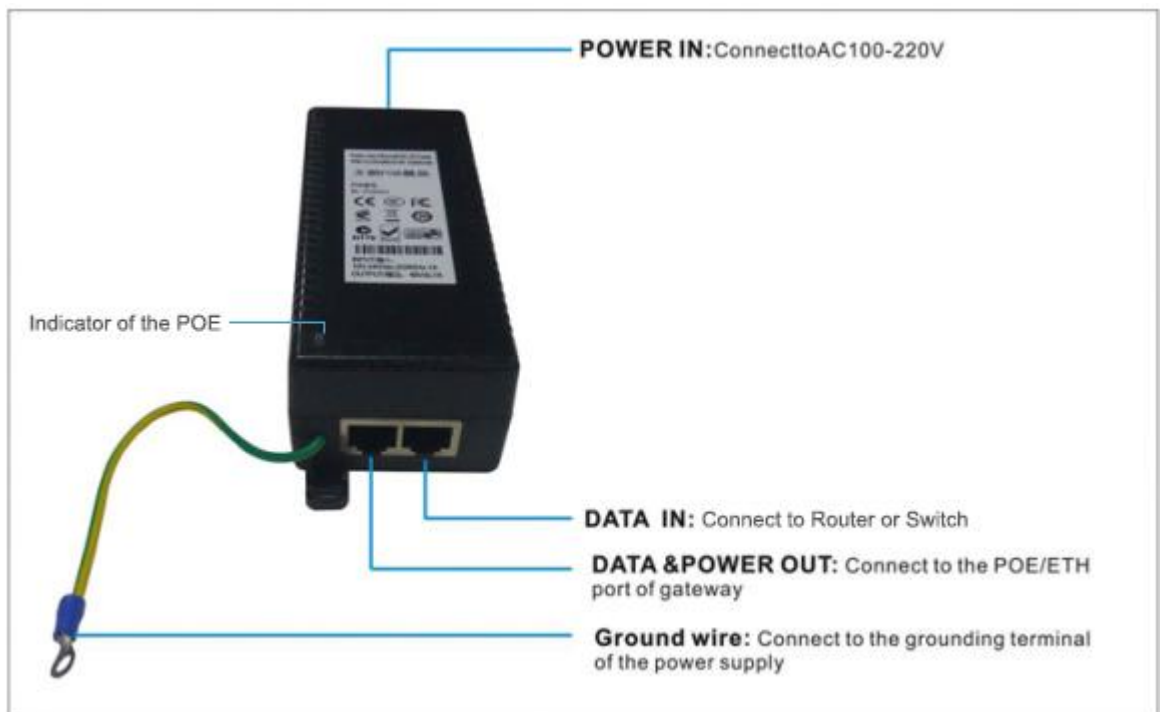
**Important Note:** for GW5000A version 3.4, it's with the POE model of our

**WL-PSE801;**

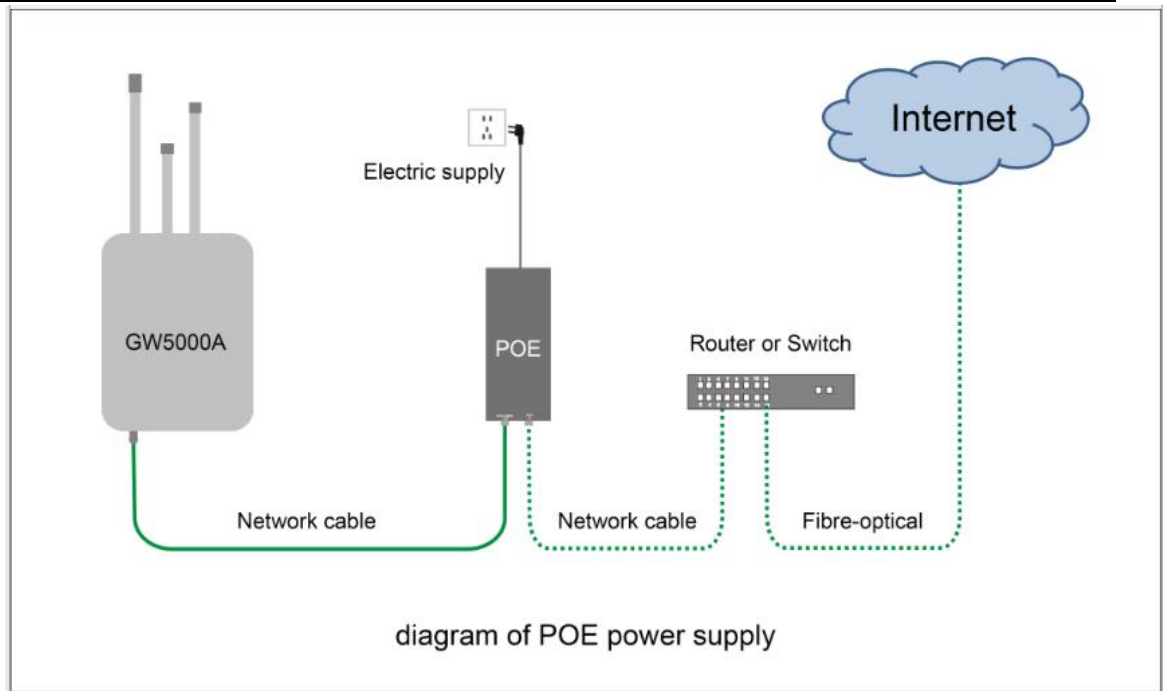
While GW5000A version 6.1, it's with the POE model of our

**WL-PSE803.**

**The POE is customized for the gateway, pls DON'T use POE from other suppliers or from your local market to power the gateway.**



*(POE ports diagram)*



## 6. 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 :

**WIFI-02\_+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)

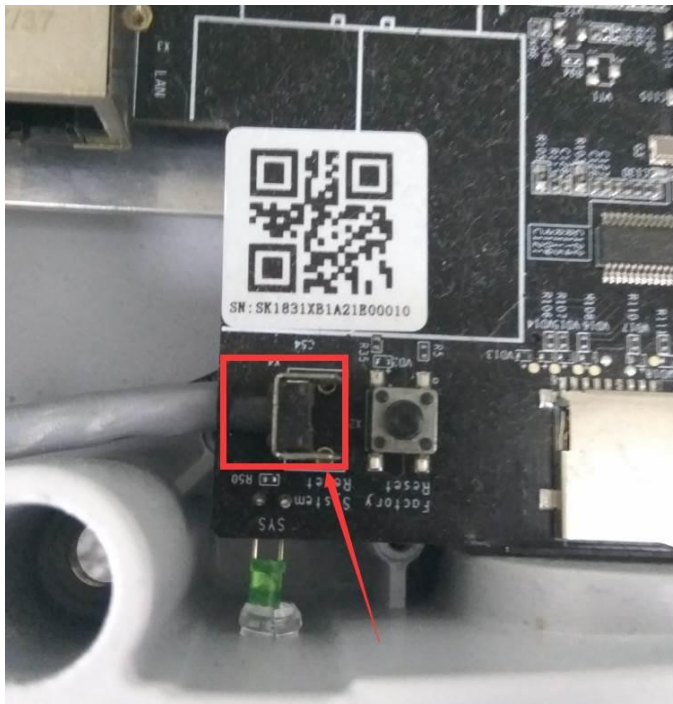
7) The default file format of TF card: FAT32, when the rest memory less than 2G, the oldest log files will be cleared.

- 8 ) Support foreign LoRaWAN 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 modification of LoRa parameter;
- 12 ) Support remote upgrade;
- 13 ) Support remote reboot;
- 14 ) Support remote administrator login and maintenance;
- 15 ) Support button or WEB operation to restore factory setting;
- 16 ) 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.

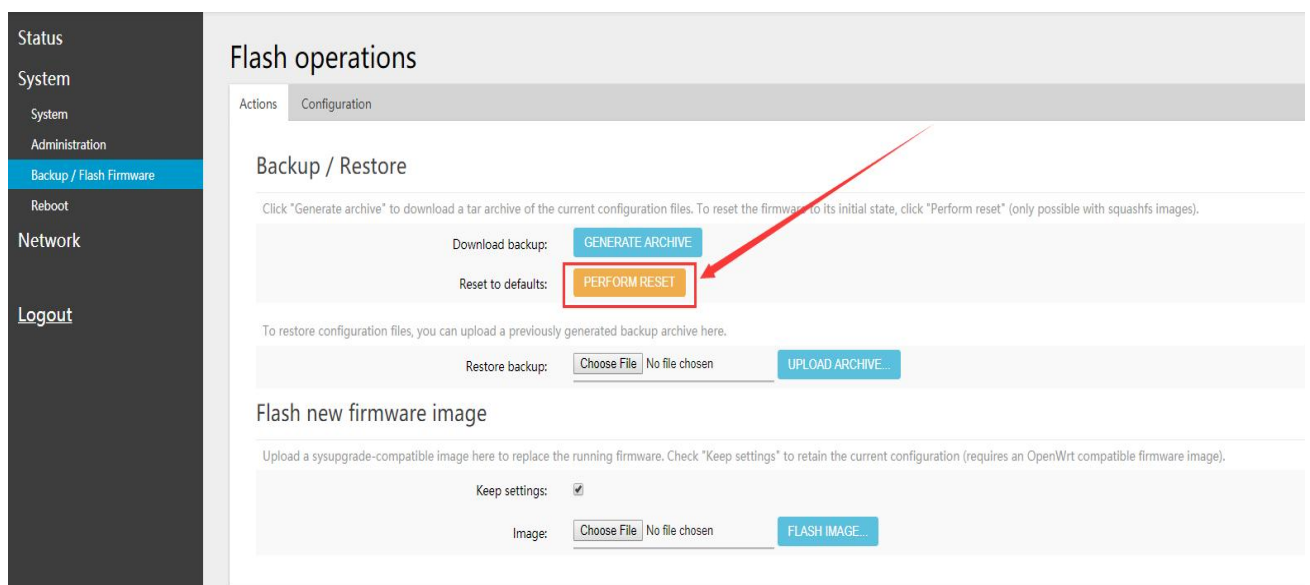
## 7. Restore factory setting

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

- 1) 1<sup>st</sup> 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) 2<sup>nd</sup> method: Login the following interface:



Wait 1~2 minutes, then login.

## 8. Gateway frequency setting

### 8.1 EU863-870MHz

The default frequency is as below: ( 8 frequencies, from 867.1MHz to 868.5MH ) :

| Channel plan No | Channel combination | Channel | 8 frequencies No | Uplink frequency of node           | The frequency of the 1st receiving window of node, BW125 | The frequency of the 2nd receiving window of node | The center frequency setting of SX1257 of gateway | The offset of channel and SX1257 center frequency point |
|-----------------|---------------------|---------|------------------|------------------------------------|----------------------------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------------|
| 1 (A1B1)        | A1                  | 3       | 0                | 867.1                              | 867.1                                                    | Frequency: 869.525M, bandwidth: 125K, SF12        | center frequency: 867.5                           | -400000                                                 |
|                 |                     | 4       | 1                | 867.3                              | 867.3                                                    |                                                   |                                                   | -200000                                                 |
|                 |                     | 5       | 2                | 867.5                              | 867.5                                                    |                                                   |                                                   | 0                                                       |
|                 |                     | 6       | 3                | 867.7                              | 867.7                                                    |                                                   |                                                   | 200000                                                  |
|                 | B1                  | 7       | 4                | 867.9                              | 867.9                                                    |                                                   | center frequency: 868.5                           | 400000                                                  |
|                 |                     | 0       | 5                | 868.1                              | 868.1                                                    |                                                   |                                                   | -400000                                                 |
|                 |                     | 1       | 6                | 868.3                              | 868.3                                                    |                                                   |                                                   | -200000                                                 |
|                 |                     | 2       | 7                | 868.5                              | 868.5                                                    |                                                   |                                                   | 0                                                       |
|                 |                     | 8       | 8                | 868.3 (BW250SF7)                   |                                                          |                                                   |                                                   | -200000                                                 |
|                 |                     | 9       | 9                | 868.8 (FSK, 125K, data rate 50000) |                                                          |                                                   |                                                   | 300000                                                  |

### 8.2 AS923

It consists of AS920-923MHz and AS923-925MHz, as below:

#### 1) AS920-923MHz defaulted frequency:

| Frequency-plans | Channel combination | Gateway channel number | 10 frequency points | Uplink (SF7BW125 to SF12BW125) | Downlink RX1 (SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|---------------------|--------------------------------|--------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                   | 922                            | 922                                  | 923.2-BW125SF10 | 922.2         | -20000      |
|                 |                     | 1                      | 1                   | 922.2                          | 922.2                                |                 |               | 0           |
|                 |                     | 2                      | 2                   | 922.4                          | 922.4                                |                 |               | 200000      |
|                 |                     | 3                      | 3                   | 922.6                          | 922.6                                |                 |               | 400000      |
|                 |                     | 8                      |                     | 921.8 (FSK, data rate 50000)   |                                      |                 |               | -400000     |
|                 | B1                  | 9                      |                     | 922.1 BW250SF7                 |                                      |                 | 923.2         | -100000     |
|                 |                     | 4                      | 4                   | 922.8                          | 922.8                                |                 |               | -400000     |
|                 |                     | 5                      | 5                   | 923                            | 923                                  |                 |               | -200000     |
|                 |                     | 6                      | 6                   | 923.2                          | 923.2                                |                 |               | 0           |
|                 |                     | 7                      | 7                   | 923.4                          | 923.4                                |                 |               | 200000      |

#### 2) AS923-925MHz defaulted frequency:

| Frequency-plans | Channel combination | Gateway channel number | 10 frequency points | Uplink (SF7BW125 to SF12BW125) | Downlink RX1 (SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|---------------------|--------------------------------|--------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                   | 923.2                          | 923.2                                | 923.2-BW125SF10 | 923.5         | -300000     |
|                 |                     | 1                      | 1                   | 923.4                          | 923.4                                |                 |               | -100000     |
|                 |                     | 2                      | 2                   | 923.6                          | 923.6                                |                 |               | 100000      |
|                 |                     | 3                      | 3                   | 923.8                          | 923.8                                |                 |               | 300000      |
|                 | B1                  | 4                      | 4                   | 924                            | 924                                  |                 | 924.4         | -400000     |
|                 |                     | 5                      | 5                   | 924.2                          | 924.2                                |                 |               | -200000     |
|                 |                     | 6                      | 6                   | 924.4                          | 924.4                                |                 |               | 0           |
|                 |                     | 7                      | 7                   | 924.6                          | 924.6                                |                 |               | 200000      |
|                 |                     | 8                      | 8                   | 924.5 BW250SF7                 |                                      |                 |               | 100000      |
|                 |                     | 9                      | 9                   | 924.8 (FSK, data rate)         |                                      |                 |               | 400000      |



### 8.3 US902-928MHz

Frequency as below: ( Default: A1B1, the red part: 8 frequencies, from 902.3 MHz to 903.7MHz )

| Frequency-plans | Channel combination | Gateway channel number | 64 frequency points | Uplink(SF7BW125 to SF12BW125) | Downlink RX1(SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|---------------------|-------------------------------|-------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                   | 902.3                         | 923.3                               | 923.3-BW500SF12 | 902.5         | -200000     |
|                 |                     | 1                      | 1                   | 902.5                         | 923.9                               |                 |               | 0           |
|                 |                     | 2                      | 2                   | 902.7                         | 924.5                               |                 |               | 200000      |
|                 |                     | 3                      | 3                   | 902.9                         | 925.1                               |                 |               | 400000      |
|                 | B1                  | 4                      | 4                   | 903.1                         | 925.7                               |                 | 903.3         | -200000     |
|                 |                     | 5                      | 5                   | 903.3                         | 926.3                               |                 |               | 0           |
|                 |                     | 6                      | 6                   | 903.5                         | 926.9                               |                 |               | 200000      |
|                 |                     | 7                      | 7                   | 903.7                         | 927.5                               |                 |               | 400000      |
| 2 (A2B2)        | A2                  | 8                      | 8                   | 903.9                         | 923.3                               | 923.3-BW500SF12 | 904.1         | -300000     |
|                 |                     | 1                      | 9                   | 904.1                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 10                  | 904.3                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 11                  | 904.5                         | 925.1                               |                 |               | 200000      |
|                 | B2                  | 4                      | 12                  | 904.7                         | 925.7                               |                 | 904.9         | 400000      |
|                 |                     | 5                      | 13                  | 904.9                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 14                  | 905.1                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 15                  | 905.3                         | 927.5                               |                 |               | 200000      |
| 3 (A3B3)        | A3                  | 8                      | 16                  | 905.5                         | 923.3                               | 923.3-BW500SF12 | 905.7         | -300000     |
|                 |                     | 1                      | 17                  | 905.7                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 18                  | 905.9                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 19                  | 906.1                         | 925.1                               |                 |               | 200000      |
|                 | B3                  | 4                      | 20                  | 906.3                         | 925.7                               |                 | 906.5         | 400000      |
|                 |                     | 5                      | 21                  | 906.5                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 22                  | 906.7                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 23                  | 906.9                         | 927.5                               |                 |               | 200000      |
| 4 (A4B4)        | A4                  | 8                      | 24                  | 907.1                         | 923.3                               | 923.3-BW500SF12 | 907.3         | -300000     |
|                 |                     | 1                      | 25                  | 907.3                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 26                  | 907.5                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 27                  | 907.7                         | 925.1                               |                 |               | 200000      |
|                 | B4                  | 4                      | 28                  | 907.9                         | 925.7                               |                 | 908.1         | 400000      |
|                 |                     | 5                      | 29                  | 908.1                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 30                  | 908.3                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 31                  | 908.5                         | 927.5                               |                 |               | 200000      |
| 5 (A5B5)        | A5                  | 8                      | 32                  | 908.7                         | 923.3                               | 923.3-BW500SF12 | 908.9         | -300000     |
|                 |                     | 1                      | 33                  | 908.9                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 34                  | 909.1                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 35                  | 909.3                         | 925.1                               |                 |               | 200000      |
|                 | B5                  | 4                      | 36                  | 909.5                         | 925.7                               |                 | 909.7         | 400000      |
|                 |                     | 5                      | 37                  | 909.7                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 38                  | 909.9                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 39                  | 910.1                         | 927.5                               |                 |               | 200000      |
| 6 (A6B6)        | A6                  | 8                      | 40                  | 910.3                         | 923.3                               | 923.3-BW500SF12 | 910.5         | -300000     |
|                 |                     | 1                      | 41                  | 910.5                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 42                  | 910.7                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 43                  | 910.9                         | 925.1                               |                 |               | 200000      |
|                 | B6                  | 4                      | 44                  | 911.1                         | 925.7                               |                 | 911.3         | 400000      |
|                 |                     | 5                      | 45                  | 911.3                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 46                  | 911.5                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 47                  | 911.7                         | 927.5                               |                 |               | 200000      |
| 7 (A7B7)        | A7                  | 8                      | 48                  | 911.9                         | 923.3                               | 923.3-BW500SF12 | 912.1         | -300000     |
|                 |                     | 1                      | 49                  | 912.1                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 50                  | 912.3                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 51                  | 912.5                         | 925.1                               |                 |               | 200000      |
|                 | B7                  | 4                      | 52                  | 912.7                         | 925.7                               |                 | 912.9         | 400000      |
|                 |                     | 5                      | 53                  | 912.9                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 54                  | 913.1                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 55                  | 913.3                         | 927.5                               |                 |               | 200000      |
| 8 (A8B8)        | A8                  | 8                      | 56                  | 913.5                         | 923.3                               | 923.3-BW500SF12 | 913.7         | -300000     |
|                 |                     | 1                      | 57                  | 913.7                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 58                  | 913.9                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 59                  | 914.1                         | 925.1                               |                 |               | 200000      |
|                 | B8                  | 4                      | 60                  | 914.3                         | 925.7                               |                 | 914.5         | 400000      |
|                 |                     | 5                      | 61                  | 914.5                         | 926.3                               |                 |               | -200000     |
|                 |                     | 6                      | 62                  | 914.7                         | 926.9                               |                 |               | 0           |
|                 |                     | 7                      | 63                  | 914.9                         | 927.5                               |                 |               | 200000      |
|                 |                     | 8                      |                     | 914.2                         | BW500SF8                            |                 |               | -300000     |
|                 |                     |                        |                     |                               |                                     |                 |               | -200000     |
|                 |                     |                        |                     |                               |                                     |                 |               | 0           |
|                 |                     |                        |                     |                               |                                     |                 |               | 200000      |
|                 |                     |                        |                     |                               |                                     |                 |               | 400000      |
|                 |                     |                        |                     |                               |                                     |                 |               | -200000     |
|                 |                     |                        |                     |                               |                                     |                 |               | 0           |
|                 |                     |                        |                     |                               |                                     |                 |               | 200000      |



## 8.4 AU915-928MHz

The defaulted is: A1B1, as below:

| Frequency-plans | Channel combination | Gateway channel number | 64 frequency points | Uplink(SF7BW125 to SF12BW125) | Downlink RX1(SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|---------------------|-------------------------------|-------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                   | 915.2                         | 923.3                               | 923.3-BW500SF12 | 915.6         | -400000     |
|                 |                     | 1                      | 1                   | 915.4                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 2                   | 915.6                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 3                   | 915.8                         | 925.1                               |                 |               | 200000      |
|                 | B1                  | 8                      |                     | 915.9 BW500SF8                | 923.3                               |                 | 916.3         | 300000      |
|                 |                     | 4                      | 4                   | 916                           | 925.7                               |                 |               | -300000     |
|                 |                     | 5                      | 5                   | 916.2                         | 926.3                               |                 |               | -100000     |
|                 |                     | 6                      | 6                   | 916.4                         | 926.9                               |                 |               | 100000      |
| 2 (A2B2)        | A2                  | 7                      | 7                   | 916.6                         | 927.5                               | 923.3-BW500SF12 | 917.2         | 300000      |
|                 |                     | 0                      | 8                   | 916.8                         | 923.3                               |                 |               | -400000     |
|                 |                     | 1                      | 9                   | 917                           | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 10                  | 917.2                         | 924.5                               |                 |               | 0           |
|                 | B2                  | 3                      | 11                  | 917.4                         | 925.1                               |                 | 917.9         | 200000      |
|                 |                     | 8                      |                     | 917.5 BW500SF8                | 923.9                               |                 |               | 300000      |
|                 |                     | 4                      | 12                  | 917.6                         | 925.7                               |                 |               | -300000     |
|                 |                     | 5                      | 13                  | 917.8                         | 926.3                               |                 |               | -100000     |
| 3 (A3B3)        | A3                  | 6                      | 14                  | 918                           | 926.9                               | 923.3-BW500SF12 | 918.8         | 100000      |
|                 |                     | 7                      | 15                  | 918.2                         | 927.5                               |                 |               | 300000      |
|                 |                     | 0                      | 16                  | 918.4                         | 923.3                               |                 |               | -400000     |
|                 |                     | 1                      | 17                  | 918.6                         | 923.9                               |                 |               | -200000     |
|                 | B3                  | 2                      | 18                  | 918.8                         | 924.5                               |                 | 919.5         | 0           |
|                 |                     | 3                      | 19                  | 919                           | 925.1                               |                 |               | 200000      |
|                 |                     | 8                      |                     | 919.1 BW500SF8                | 924.5                               |                 |               | 300000      |
|                 |                     | 4                      | 20                  | 919.2                         | 925.7                               |                 |               | -300000     |
| 4 (A4B4)        | A4                  | 5                      | 21                  | 919.4                         | 926.3                               | 923.3-BW500SF12 | 920.4         | -100000     |
|                 |                     | 6                      | 22                  | 919.6                         | 926.9                               |                 |               | 100000      |
|                 |                     | 7                      | 23                  | 919.8                         | 927.5                               |                 |               | 300000      |
|                 |                     | 0                      | 24                  | 920                           | 923.3                               |                 | 921.1         | -400000     |
|                 | B4                  | 1                      | 25                  | 920.2                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 26                  | 920.4                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 27                  | 920.6                         | 925.1                               |                 |               | 200000      |
|                 |                     | 8                      |                     | 920.7 BW500SF8                | 925.1                               |                 |               | 300000      |
| 5 (A5B5)        | A5                  | 4                      | 28                  | 920.8                         | 925.7                               | 923.3-BW500SF12 | 922           | -300000     |
|                 |                     | 5                      | 29                  | 921                           | 926.3                               |                 |               | -100000     |
|                 |                     | 6                      | 30                  | 921.2                         | 926.9                               |                 |               | 100000      |
|                 |                     | 7                      | 31                  | 921.4                         | 927.5                               |                 |               | 300000      |
|                 | B5                  | 0                      | 32                  | 921.6                         | 923.3                               |                 | 922.7         | -400000     |
|                 |                     | 1                      | 33                  | 921.8                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 34                  | 922                           | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 35                  | 922.2                         | 925.1                               |                 |               | 200000      |
| 6 (A6B6)        | A6                  | 8                      |                     | 922.3 BW500SF8                | 925.7                               | 923.3-BW500SF12 | 923.6         | 300000      |
|                 |                     | 4                      | 36                  | 922.4                         | 925.7                               |                 |               | -300000     |
|                 |                     | 5                      | 37                  | 922.6                         | 926.3                               |                 |               | -100000     |
|                 |                     | 6                      | 38                  | 922.8                         | 926.9                               |                 |               | 100000      |
|                 | B6                  | 7                      | 39                  | 923                           | 927.5                               |                 | 924.3         | 300000      |
|                 |                     | 0                      | 40                  | 923.2                         | 923.3                               |                 |               | -400000     |
|                 |                     | 1                      | 41                  | 923.4                         | 923.9                               |                 |               | -200000     |
|                 |                     | 2                      | 42                  | 923.6                         | 924.5                               |                 |               | 0           |
| 7 (A7B7)        | A7                  | 3                      | 43                  | 923.8                         | 925.1                               | 923.3-BW500SF12 | 925.2         | 200000      |
|                 |                     | 8                      |                     | 923.9 BW500SF8                | 926.3                               |                 |               | 300000      |
|                 |                     | 4                      | 44                  | 924                           | 925.7                               |                 |               | -300000     |
|                 |                     | 5                      | 45                  | 924.2                         | 926.3                               |                 |               | -100000     |
|                 | B7                  | 6                      | 46                  | 924.4                         | 926.9                               |                 | 925.9         | 100000      |
|                 |                     | 7                      | 47                  | 924.6                         | 927.5                               |                 |               | 300000      |
|                 |                     | 0                      | 48                  | 924.8                         | 923.3                               |                 |               | -400000     |
|                 |                     | 1                      | 49                  | 925                           | 923.9                               |                 |               | -200000     |
| 8 (A8B8)        | A8                  | 2                      | 50                  | 925.2                         | 924.5                               | 923.3-BW500SF12 | 926.8         | 0           |
|                 |                     | 3                      | 51                  | 925.4                         | 925.1                               |                 |               | 200000      |
|                 |                     | 8                      |                     | 925.5 BW500SF8                | 926.9                               |                 |               | 300000      |
|                 |                     | 4                      | 52                  | 925.6                         | 925.7                               |                 | 927.5         | -300000     |
|                 | B8                  | 5                      | 53                  | 925.8                         | 926.3                               |                 |               | -100000     |
|                 |                     | 6                      | 54                  | 926                           | 926.9                               |                 |               | 100000      |
|                 |                     | 7                      | 55                  | 926.2                         | 927.5                               |                 |               | 300000      |
|                 |                     | 0                      | 56                  | 926.4                         | 923.3                               |                 |               | -400000     |
| 9 (A9B9)        | A9                  | 1                      | 57                  | 926.6                         | 923.9                               | 923.3-BW500SF12 | 927.5         | -200000     |
|                 |                     | 2                      | 58                  | 926.8                         | 924.5                               |                 |               | 0           |
|                 |                     | 3                      | 59                  | 927                           | 925.1                               |                 |               | 200000      |
|                 |                     | 8                      |                     | 927.1 BW500SF8                | 927.5                               |                 |               | 300000      |
|                 | B9                  | 4                      | 60                  | 927.2                         | 925.7                               |                 | 928.2         | -300000     |
|                 |                     | 5                      | 61                  | 927.4                         | 926.3                               |                 |               | -100000     |
|                 |                     | 6                      | 62                  | 927.6                         | 926.9                               |                 |               | 100000      |
|                 |                     | 7                      | 63                  | 927.8                         | 927.5                               |                 |               | 300000      |

## 8.5 KR920-923MHz

The defaulted is as below:

| Frequency-plans | Channel combination | Gateway channel number | 8 frequency points | Uplink(SF7BW125 to SF12BW125) | Downlink RX1(SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|--------------------|-------------------------------|-------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                  | 921.9                         | 921.9                               | 921.9-BW125SF12 | 922.3         | -400000     |
|                 |                     | 1                      | 1                  | 922.1                         | 922.1                               |                 |               | -200000     |
|                 |                     | 2                      | 2                  | 922.3                         | 922.3                               |                 |               | 0           |
|                 |                     | 3                      | 3                  | 922.5                         | 922.5                               |                 |               | 200000      |
|                 | B1                  | 4                      | 4                  | 922.7                         | 922.7                               |                 | 923           | -300000     |
|                 |                     | 5                      | 5                  | 922.9                         | 922.9                               |                 |               | -100000     |
|                 |                     | 6                      | 6                  | 923.1                         | 923.1                               |                 |               | 100000      |
|                 |                     | 7                      | 7                  | 923.3                         | 923.3                               |                 |               | 300000      |

## 8.6 RU864-870MHz

The defaulted is as below:

| Frequency-plans | Channel combination | Gateway channel number | 8 frequency points | Uplink(SF7BW125 to SF12BW125) | Downlink RX1(SF7BW125 to SF12BW125) | Downlink RX2    | SX1257 center | chan offset |
|-----------------|---------------------|------------------------|--------------------|-------------------------------|-------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                  | 864.1                         | 864.1                               | 869.1-BW125SF12 | 864.5         | -400000     |
|                 |                     | 1                      | 1                  | 864.3                         | 864.3                               |                 |               | -200000     |
|                 |                     | 2                      | 2                  | 864.5                         | 864.5                               |                 |               | 0           |
|                 |                     | 3                      | 3                  | 864.7                         | 864.7                               |                 |               | 200000      |
|                 | B1                  | 4                      | 4                  | 868.7                         | 868.7                               |                 | 869           | -300000     |
|                 |                     | 5                      | 5                  | 868.9                         | 868.9                               |                 |               | -100000     |
|                 |                     | 6                      | 6                  | 869.1                         | 869.1                               |                 |               | 100000      |
|                 |                     | 7                      | 7                  | 869.3                         | 869.3                               |                 |               | 300000      |
|                 |                     | 8                      | 8                  | 868.8(BW250SF7)               |                                     |                 |               | -200000     |
|                 |                     | 9                      | 9                  | 869.4 (FSK, datarate 50000)   |                                     |                 |               | 400000      |

## 8.7 CN470-510MHz

The defaulted is in red part as below:

| Frequency plans | Channel combination | Gateway channel number | 96 frequency points | Uplink(SF7 BW125 to SF12BW125) | Downlink RX1(SF7BW125 to SF12BW125) | Downlink RX2    | SX1255 center | chan offset |
|-----------------|---------------------|------------------------|---------------------|--------------------------------|-------------------------------------|-----------------|---------------|-------------|
| 1 (A1B1)        | A1                  | 0                      | 0                   | 470.3                          | 500.3                               | 505.3-SF12BW125 | 470.6         | -300000     |
|                 |                     | 1                      | 1                   | 470.5                          | 500.5                               |                 |               | -100000     |
|                 |                     | 2                      | 2                   | 470.7                          | 500.7                               |                 |               | 100000      |
|                 |                     | 3                      | 3                   | 470.9                          | 500.9                               |                 |               | 300000      |
|                 | B1                  | 4                      | 4                   | 471.1                          | 501.1                               |                 | 471.4         | -300000     |
|                 |                     | 5                      | 5                   | 471.3                          | 501.3                               |                 |               | -100000     |
|                 |                     | 6                      | 6                   | 471.5                          | 501.5                               |                 |               | 100000      |
|                 |                     | 7                      | 7                   | 471.7                          | 501.7                               |                 |               | 300000      |
| 2 (A2B2)        | A2                  | 0                      | 8                   | 471.9                          | 501.9                               | 505.3-SF12BW125 | 472.2         | -300000     |
|                 |                     | 1                      | 9                   | 472.1                          | 502.1                               |                 |               | -100000     |
|                 |                     | 2                      | 10                  | 472.3                          | 502.3                               |                 |               | 100000      |
|                 |                     | 3                      | 11                  | 472.5                          | 502.5                               |                 |               | 300000      |
|                 | B2                  | 4                      | 12                  | 472.7                          | 502.7                               |                 | 473           | -300000     |
|                 |                     | 5                      | 13                  | 472.9                          | 502.9                               |                 |               | -100000     |
|                 |                     | 6                      | 14                  | 473.1                          | 503.1                               |                 |               | 100000      |
|                 |                     | 7                      | 15                  | 473.3                          | 503.3                               |                 |               | 300000      |
| 3 (A3B3)        | A3                  | 0                      | 16                  | 473.5                          | 503.5                               | 505.3-SF12BW125 | 473.8         | -300000     |
|                 |                     | 1                      | 17                  | 473.7                          | 503.7                               |                 |               | -100000     |
|                 |                     | 2                      | 18                  | 473.9                          | 503.9                               |                 |               | 100000      |
|                 |                     | 3                      | 19                  | 474.1                          | 504.1                               |                 |               | 300000      |
|                 | B3                  | 4                      | 20                  | 474.3                          | 504.3                               |                 | 474.6         | -300000     |
|                 |                     | 5                      | 21                  | 474.5                          | 504.5                               |                 |               | -100000     |
|                 |                     | 6                      | 22                  | 474.7                          | 504.7                               |                 |               | 100000      |
|                 |                     | 7                      | 23                  | 474.9                          | 504.9                               |                 |               | 300000      |
| 4 (A4B4)        | A4                  | 0                      | 24                  | 475.1                          | 505.1                               | 505.3-SF12BW125 | 475.4         | -300000     |
|                 |                     | 1                      | 25                  | 475.3                          | 505.3                               |                 |               | -100000     |
|                 |                     | 2                      | 26                  | 475.5                          | 505.5                               |                 |               | 100000      |
|                 |                     | 3                      | 27                  | 475.7                          | 505.7                               |                 |               | 300000      |
|                 | B4                  | 4                      | 28                  | 475.9                          | 505.9                               |                 | 476.2         | -300000     |
|                 |                     | 5                      | 29                  | 476.1                          | 506.1                               |                 |               | -100000     |
|                 |                     | 6                      | 30                  | 476.3                          | 506.3                               |                 |               | 100000      |
|                 |                     | 7                      | 31                  | 476.5                          | 506.5                               |                 |               | 300000      |
| 5 (A5B5)        | A5                  | 0                      | 32                  | 476.7                          | 506.7                               | 505.3-SF12BW125 | 477           | -300000     |
|                 |                     | 1                      | 33                  | 476.9                          | 506.9                               |                 |               | -100000     |
|                 |                     | 2                      | 34                  | 477.1                          | 507.1                               |                 |               | 100000      |
|                 |                     | 3                      | 35                  | 477.3                          | 507.3                               |                 |               | 300000      |
|                 | B5                  | 4                      | 36                  | 477.5                          | 507.5                               |                 | 477.8         | -300000     |
|                 |                     | 5                      | 37                  | 477.7                          | 507.7                               |                 |               | -100000     |
|                 |                     | 6                      | 38                  | 477.9                          | 507.9                               |                 |               | 100000      |
|                 |                     | 7                      | 39                  | 478.1                          | 508.1                               |                 |               | 300000      |
| 6 (A6B6)        | A6                  | 0                      | 40                  | 478.3                          | 508.3                               | 505.3-SF12BW125 | 478.6         | -300000     |
|                 |                     | 1                      | 41                  | 478.5                          | 508.5                               |                 |               | -100000     |
|                 |                     | 2                      | 42                  | 478.7                          | 508.7                               |                 |               | 100000      |
|                 |                     | 3                      | 43                  | 478.9                          | 508.9                               |                 |               | 300000      |
|                 | B6                  | 4                      | 44                  | 479.1                          | 509.1                               |                 | 479.4         | -300000     |
|                 |                     | 5                      | 45                  | 479.3                          | 509.3                               |                 |               | -100000     |
|                 |                     | 6                      | 46                  | 479.5                          | 509.5                               |                 |               | 100000      |
|                 |                     | 7                      | 47                  | 479.7                          | 509.7                               |                 |               | 300000      |
| 7 (A7B7)        | A7                  | 0                      | 48                  | 479.9                          | 500.3                               | 505.3-SF12BW125 | 480.2         | -300000     |
|                 |                     | 1                      | 49                  | 480.1                          | 500.5                               |                 |               | -100000     |
|                 |                     | 2                      | 50                  | 480.3                          | 500.7                               |                 |               | 100000      |
|                 |                     | 3                      | 51                  | 480.5                          | 500.9                               |                 |               | 300000      |
|                 | B7                  | 4                      | 52                  | 480.7                          | 501.1                               |                 | 481           | -300000     |
|                 |                     | 5                      | 53                  | 480.9                          | 501.3                               |                 |               | -100000     |
|                 |                     | 6                      | 54                  | 481.1                          | 501.5                               |                 |               | 100000      |
|                 |                     | 7                      | 55                  | 481.3                          | 501.7                               |                 |               | 300000      |
| 8 (A8B8)        | A8                  | 0                      | 56                  | 481.5                          | 501.9                               | 505.3-SF12BW125 | 481.8         | -300000     |
|                 |                     | 1                      | 57                  | 481.7                          | 502.1                               |                 |               | -100000     |
|                 |                     | 2                      | 58                  | 481.9                          | 502.3                               |                 |               | 100000      |
|                 |                     | 3                      | 59                  | 482.1                          | 502.5                               |                 |               | 300000      |
|                 | B8                  | 4                      | 60                  | 482.3                          | 502.7                               |                 | 482.6         | -300000     |
|                 |                     | 5                      | 61                  | 482.5                          | 502.9                               |                 |               | -100000     |
|                 |                     | 6                      | 62                  | 482.7                          | 503.1                               |                 |               | 100000      |
|                 |                     | 7                      | 63                  | 482.9                          | 503.3                               |                 |               | 300000      |
| 9 (A9B9)        | A9                  | 0                      | 64                  | 483.1                          | 503.5                               | 505.3-SF12BW125 | 483.4         | -300000     |
|                 |                     | 1                      | 65                  | 483.3                          | 503.7                               |                 |               | -100000     |
|                 |                     | 2                      | 66                  | 483.5                          | 503.9                               |                 |               | 100000      |
|                 |                     | 3                      | 67                  | 483.7                          | 504.1                               |                 |               | 300000      |
|                 | B9                  | 4                      | 68                  | 483.9                          | 504.3                               |                 | 484.2         | -300000     |
|                 |                     | 5                      | 69                  | 484.1                          | 504.5                               |                 |               | -100000     |
|                 |                     | 6                      | 70                  | 484.3                          | 504.7                               |                 |               | 100000      |
|                 |                     | 7                      | 71                  | 484.5                          | 504.9                               |                 |               | 300000      |
| 10 (A10B10)     | A10                 | 0                      | 72                  | 484.7                          | 505.1                               | 505.3-SF12BW125 | 485           | -300000     |
|                 |                     | 1                      | 73                  | 484.9                          | 505.3                               |                 |               | -100000     |
|                 |                     | 2                      | 74                  | 485.1                          | 505.5                               |                 |               | 100000      |
|                 |                     | 3                      | 75                  | 485.3                          | 505.7                               |                 |               | 300000      |
|                 | B10                 | 4                      | 76                  | 485.5                          | 505.9                               |                 | 485.8         | -300000     |
|                 |                     | 5                      | 77                  | 485.7                          | 506.1                               |                 |               | -100000     |
|                 |                     | 6                      | 78                  | 485.9                          | 506.3                               |                 |               | 100000      |
|                 |                     | 7                      | 79                  | 486.1                          | 506.5                               |                 |               | 300000      |
| 11 (A11B11)     | A11                 | 0                      | 80                  | 486.3                          | 506.7                               | 505.3-SF12BW125 | 486.6         | -300000     |
|                 |                     | 1                      | 81                  | 486.5                          | 506.9                               |                 |               | -100000     |
|                 |                     | 2                      | 82                  | 486.7                          | 507.1                               |                 |               | 100000      |
|                 |                     | 3                      | 83                  | 486.9                          | 507.3                               |                 |               | 300000      |
|                 | B11                 | 4                      | 84                  | 487.1                          | 507.5                               |                 | 487.4         | -300000     |
|                 |                     | 5                      | 85                  | 487.3                          | 507.7                               |                 |               | -100000     |
|                 |                     | 6                      | 86                  | 487.5                          | 507.9                               |                 |               | 100000      |
|                 |                     | 7                      | 87                  | 487.7                          | 508.1                               |                 |               | 300000      |
| 12 (A12B12)     | A12                 | 0                      | 88                  | 487.9                          | 508.3                               | 505.3-SF12BW125 | 488.2         | -300000     |
|                 |                     | 1                      | 89                  | 488.1                          | 508.5                               |                 |               | -100000     |
|                 |                     | 2                      | 90                  | 488.3                          | 508.7                               |                 |               | 100000      |
|                 |                     | 3                      | 91                  | 488.5                          | 508.9                               |                 |               | 300000      |
|                 | B12                 | 4                      | 92                  | 488.7                          | 509.1                               |                 | 489           | -300000     |
|                 |                     | 5                      | 93                  | 488.9                          | 509.3                               |                 |               | -100000     |
|                 |                     | 6                      | 94                  | 489.1                          | 509.5                               |                 |               | 100000      |
|                 |                     | 7                      | 95                  | 489.3                          | 509.7                               |                 |               | 300000      |



## 9. Technical parameter

### Hardware:

| Item                | Description                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MCU                 | Industrial grade CPU, 64M memory, 16M Flash                                                                                                                                                                                                                                                                                                                                                 |
| Power supply        | PoE, support IEEE802.3at/af.<br>POE UPS is optional, support battery or solar power supply                                                                                                                                                                                                                                                                                                  |
| LoRa frequency      | CN470-510/EU863-870/US902-928/AS923/AU915-928/KR920-923/RU864~870MHz/IN865-867MHz                                                                                                                                                                                                                                                                                                           |
| LoRa data rate      | 292bps~5.4kbps, support SF7~SF12                                                                                                                                                                                                                                                                                                                                                            |
| LoRa Tx power       | 17dBm (26dBm Max)                                                                                                                                                                                                                                                                                                                                                                           |
| LoRa Rx sensitivity | -142dBm@SF12                                                                                                                                                                                                                                                                                                                                                                                |
| LoRa antenna        | FRP antenna, omni-directional, 2dBi, 5dBi, 10dBi optional                                                                                                                                                                                                                                                                                                                                   |
| Channels            | 8 uplink channels, 1 downlink channel                                                                                                                                                                                                                                                                                                                                                       |
| LoRa working mode   | Half-duplex                                                                                                                                                                                                                                                                                                                                                                                 |
| Timing              | GPS, network                                                                                                                                                                                                                                                                                                                                                                                |
| LTE module          | <b>LTE module of the gateway support:</b><br><b>China:</b><br>LTE-TDD : B38/B39/B40/B41<br>LTE-FDD: B1/B3/B5/B7/B8<br>TD-SCDMA: B34/B39<br>UMTS: B1/8<br>EVDO: 800MHz<br>CDMA1x: 800MHz<br>GSM: 850/900/1800/1900<br><br><b>Europe:</b><br>FDD LTE: B1/B3/B5/B8/B20<br>TDD LTE: B38/B40/B41<br>WCDMA: B1/B5/B8<br>GSM: B3/B8<br><br><b>America</b><br>FDD LTE: B2/B4/B12<br>WCDMA: B2/B4/B5 |
| WiFi                | 2.4GHz, AP mode, max power: 18dBm                                                                                                                                                                                                                                                                                                                                                           |
| Data Backhaul       | 10/100M Ethnet or 3G/4G                                                                                                                                                                                                                                                                                                                                                                     |
| Debug interface     | WiFi, LAN, serial port                                                                                                                                                                                                                                                                                                                                                                      |
| Protection grade    | IP67                                                                                                                                                                                                                                                                                                                                                                                        |

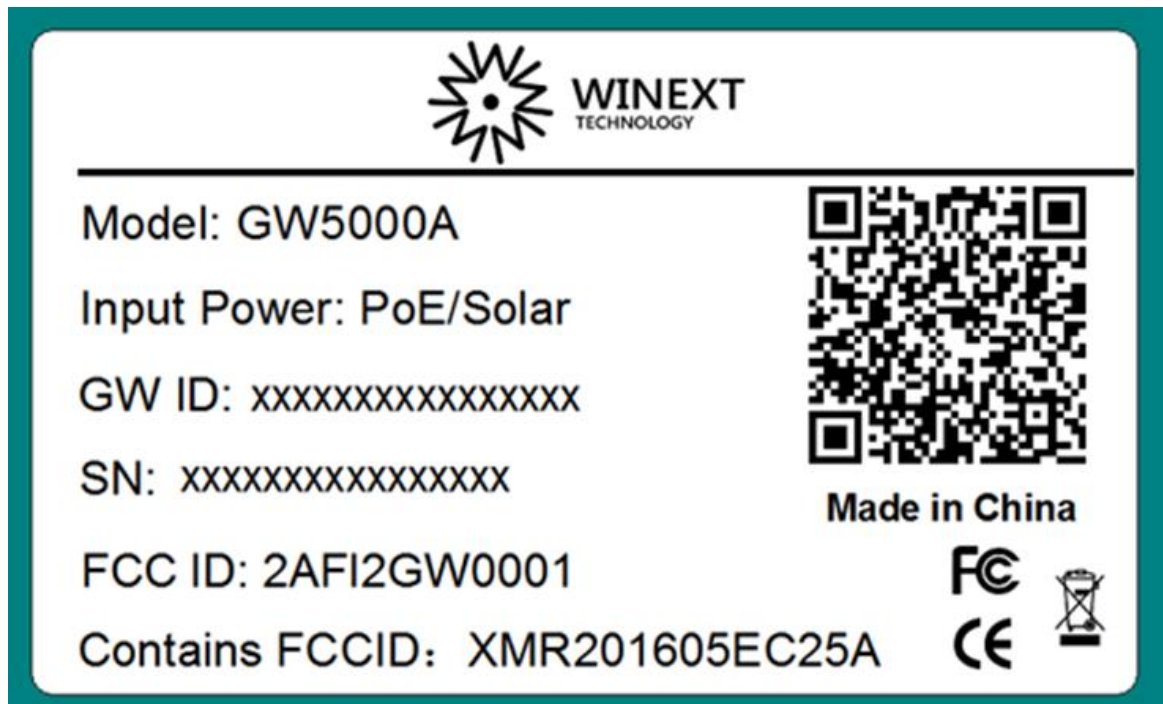
|                      |                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------|
| Working temperature  | -30℃~65℃                                                                                    |
| Working humidity     | 5%~95%RH no condensing                                                                      |
| Installation         | Supplied with kits, wall hanging/pole holding, with feeder for installation of LoRa antenna |
| Lightning protection | In line with the GB50343-2004 provisions of the B lightning protection class                |
| Power Consumption    | 7W                                                                                          |
| Dimension            | 288mm*215mm*59mm(gateway)、486 mm *400 mm *150mm (brown box for packing)                     |
| Certification        | CE/FCC                                                                                      |
| Weight               | 2.9Kg(net weight)                                                                           |

**Software:**

| Item                                 | Description                                                                                                                                                   |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kernel                               | Linux-4.14.88                                                                                                                                                 |
| Protocol                             | LoRaWAN V1.1 GWMP protocol,support Class A/B/C                                                                                                                |
| LoRa full duplex                     | support FDD for CN470-510(China frequency)                                                                                                                    |
| User interface                       | User-friendly WEB Interface                                                                                                                                   |
| Language and Interface               | Chinese/English, with Winext logo or without any logo                                                                                                         |
| 3G/4G dial-up networking             | Support Qualcomm QMI dial-up                                                                                                                                  |
| Local Time synchronization           | Supports the NTP client. You can set the time in different time zones                                                                                         |
| WAN port protocol support            | Static, DHCP client, and PPPOE                                                                                                                                |
| Upgrading                            | Support WEB interface upload firmware brush, OTA remote update                                                                                                |
| WiFi Debug connection                | AP mode, 2.4GHz, 802.11 BGN, WPA2 PSK encryption                                                                                                              |
| Firewall                             | iptables v1.4.21,supports the addition or modification of user-defined rules, and provides SYN-flood defense                                                  |
| Network Load Balance                 | Automatic switchover between WAN and 4G networks is supported. WAN traffic is preferred and 4G is standby                                                     |
| Automatical generation of gateway ID | Use the MAC address of wifi to form the gateway ID                                                                                                            |
| Local log storage management         | Daily communication logs are recorded by TF card. When the TF card is nearly full, the oldest logs are cleared                                                |
| Automatic fault detection            | Supports system fault self-detection, self-repair, and timely report to the server                                                                            |
| Remote management                    | Periodically report gateway status (WAN, 4G, WiFi, LoRa, and TF card), and remotely send configuration parameters, upgrade, restart, and maintain by downlink |

## 10. 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.

## 11. Installation:

### 1) SIM card installation

Note: Supported LTE models as below:

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

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, pls use big SIM car, not small one ) :





## 2) Whole kit 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. The fixed seat has already been installed on the back of the gateway when you get it



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



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



6. Usage of the 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 up



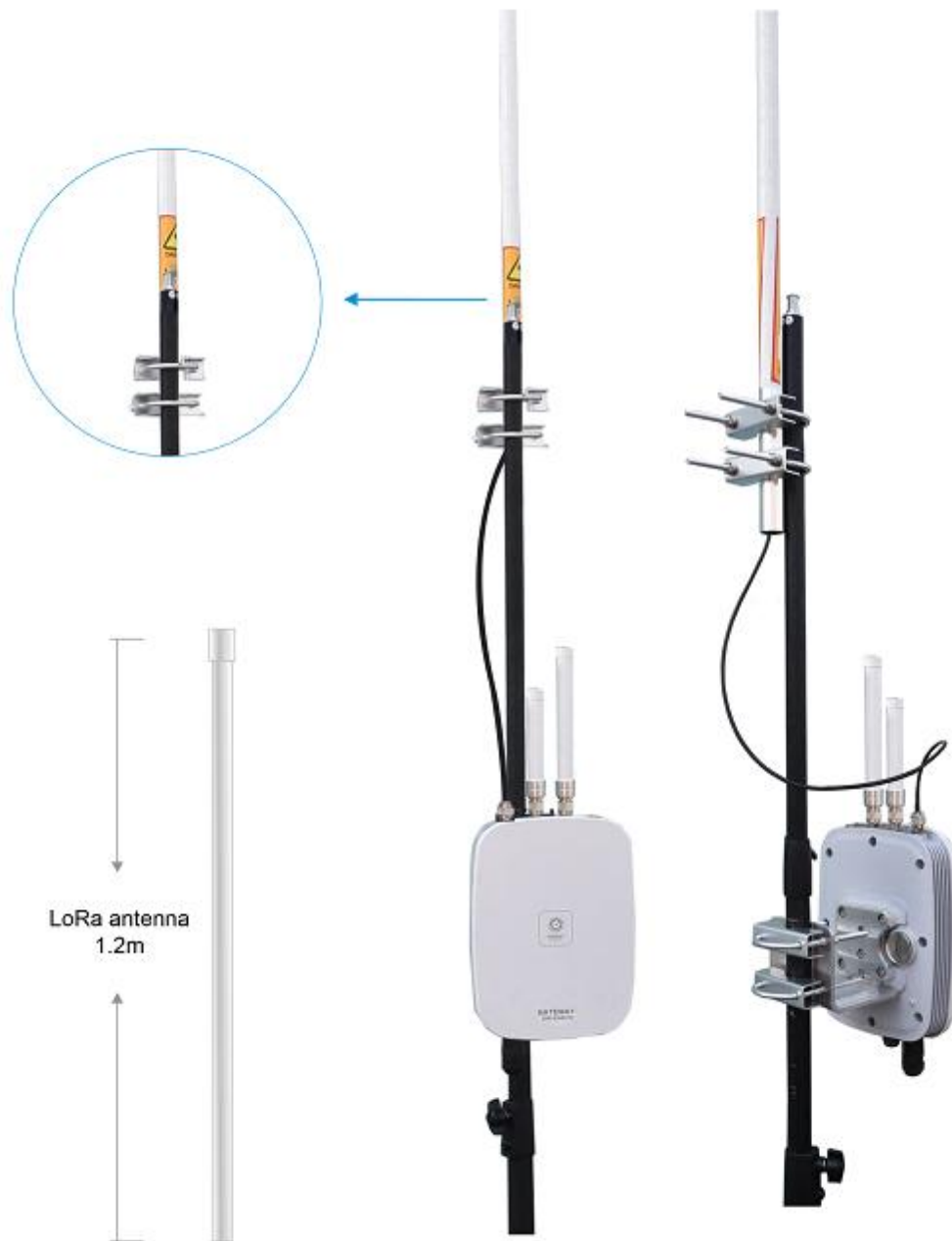
7. Connect one end of the feeder to the LoRa antenna port on the gateway, and the other end of the feeder to the LoRa antenna and tighten.



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.



**Pole installation picture:**

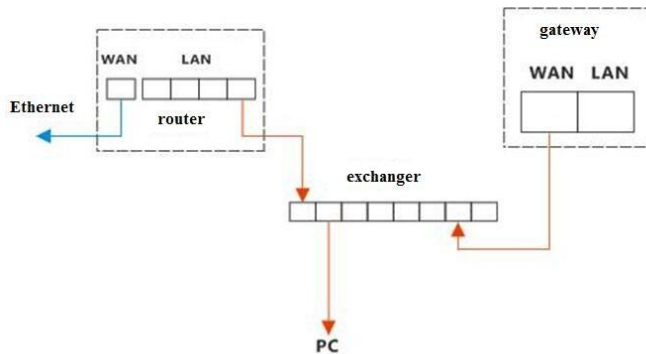




## 12. Network setting

### 1. Routing mode of network

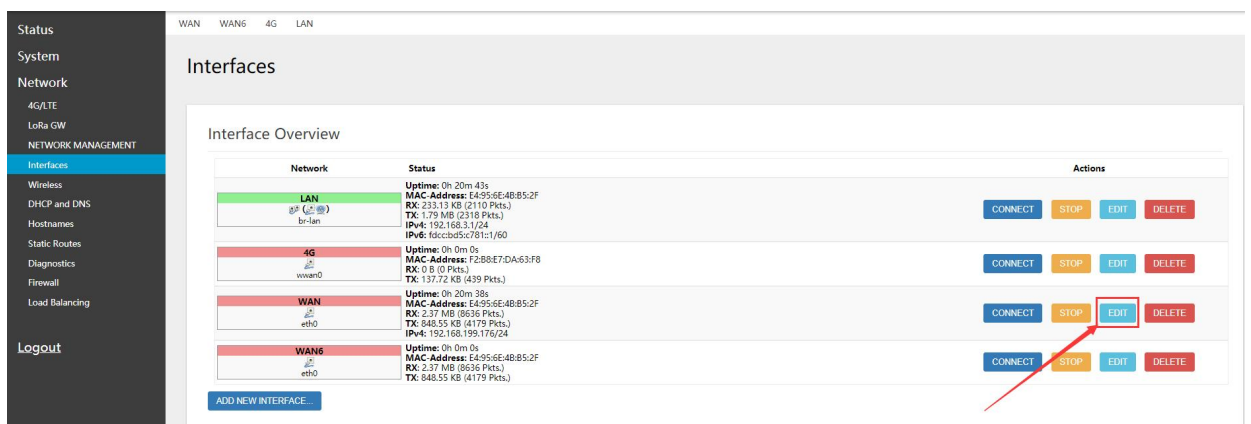
Splitter ( exchanger ) cable is connected to the WAN port, as below:



#### 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:



WAN WANG 4G LAN

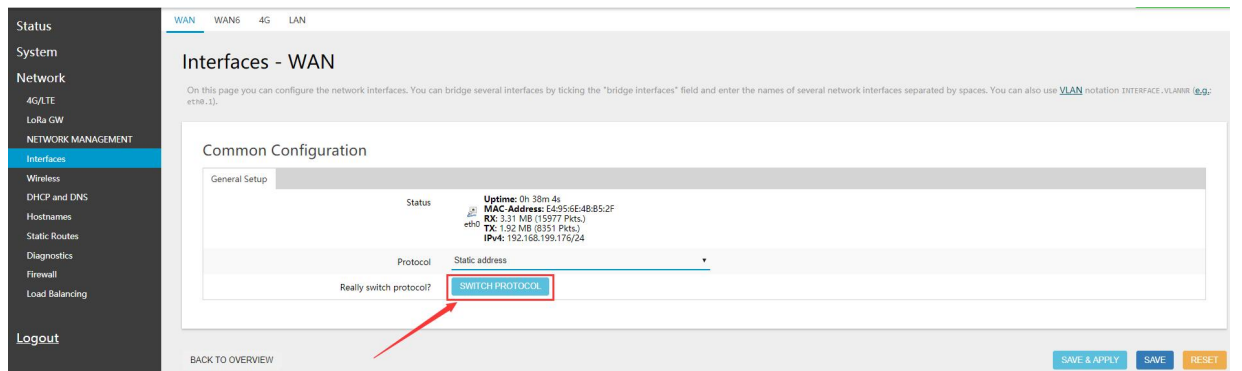
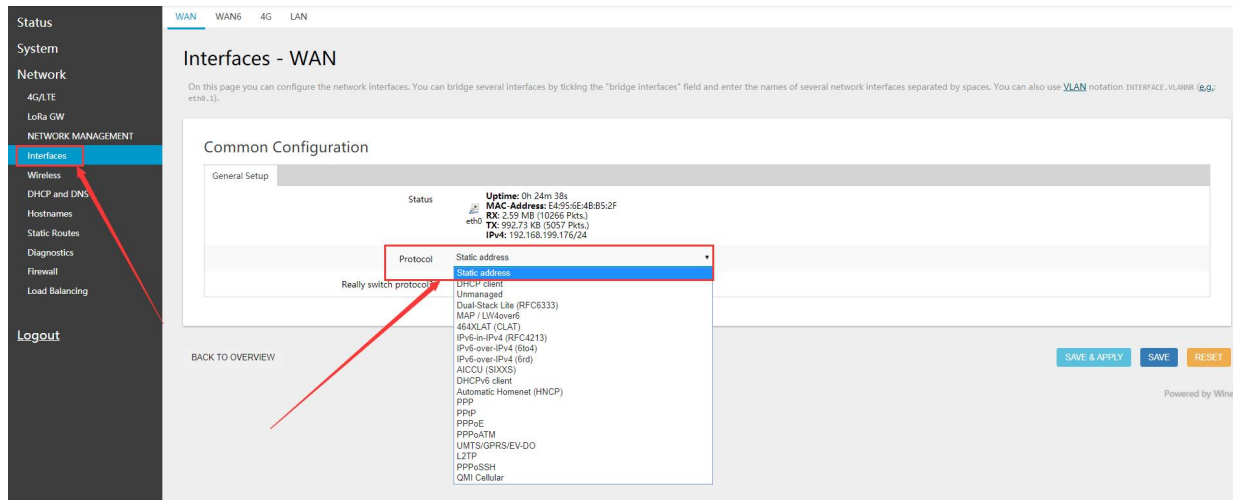
### Interfaces

#### Interface Overview

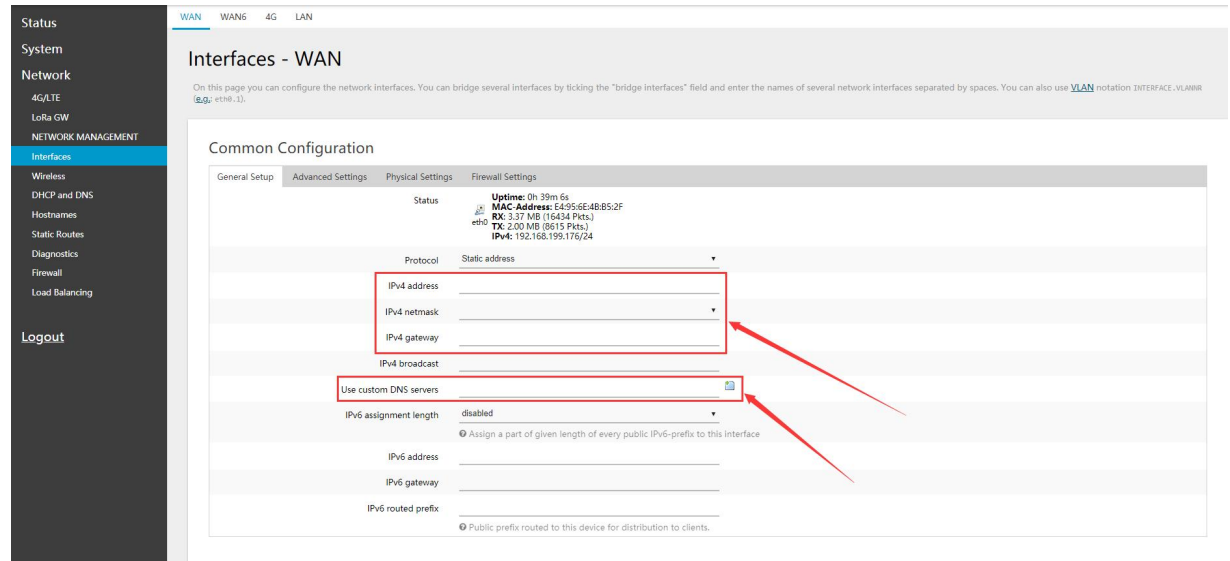
| Network       | Status                                                                                                                                                               | Actions                  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| LAN<br>br-lan | Uptime: 0h 20m 43s<br>MAC-Address: E4:95:6E:4B:85:2F<br>RX: 233.13 KB (2110 Pkts.)<br>TX: 1.79 MB (2318 Pkts.)<br>IPv4: 192.168.3.1/24<br>IPv6: fdcd:cd5c:2701::1/60 | CONNECT STOP EDIT DELETE |
| 4G<br>wwan0   | Uptime: 0h 0m 0s<br>MAC-Address: F2:B8:E7:DA:63:F8<br>RX: 0 B (0 Pkts.)<br>TX: 137.2 KB (439 Pkts.)                                                                  | CONNECT STOP EDIT DELETE |
| WAN<br>eth0   | Uptime: 0h 20m 38s<br>MAC-Address: E4:95:6E:4B:85:2F<br>RX: 2.37 MB (8636 Pkts.)<br>TX: 848.55 KB (4179 Pkts.)<br>IPv4: 192.168.199.176/24                           | CONNECT STOP EDIT DELETE |
| WAN6<br>eth0  | Uptime: 0h 0m 0s<br>MAC-Address: E4:95:6E:4B:85:2F<br>RX: 2.37 MB (8636 Pkts.)<br>TX: 848.55 KB (4179 Pkts.)                                                         | CONNECT STOP EDIT DELETE |

ADD NEW INTERFACE...

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:



**Interfaces - WAN**

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use [VLAN](#) notation INTERFACE.VLANID (e.g., eth0.1).

**Common Configuration**

General Setup | **Advanced Settings** | Physical Settings | Firewall Settings

Status: Uptime: 0h:39m:5s  
MAC Address: E4:95:6E:4B:B5:2F  
RX: 3.37 MB (16434 Pkts.)  
TX: 2.00 MB (8615 Pkts.)  
IPv4: 192.168.199.176/24

Protocol: Static address

IPv4 address:

IPv4 netmask:

IPv4 gateway:

IPv4 broadcast:

Use custom DNS servers: ☐

IPv6 assignment length: disabled

Assign a part of given length of every public IPv6-prefix to this interface

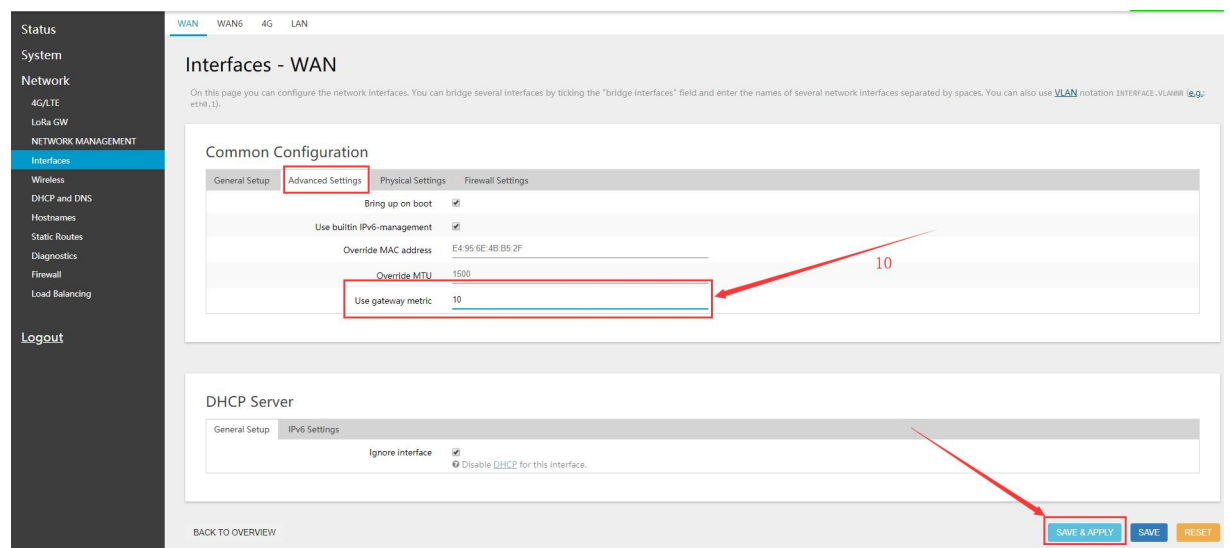
IPv6 address:

IPv6 gateway:

IPv6 routed prefix:

Public prefix routed to this device for distribution to clients.

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



**Interfaces - WAN**

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use [VLAN](#) notation INTERFACE.VLANID (e.g., eth0.1).

**Common Configuration**

General Setup | **Advanced Settings** | Physical Settings | Firewall Settings

Bring up on boot: ☒

Use builtin IPv6-management: ☒

Override MAC address: E4:95:6E:4B:B5:2F

Override MTU: 1500

Use gateway metric:

**DHCP Server**

General Setup | IPv6 Settings

Ignore interface: ☒

Disable DHCP for this interface.

BACK TO OVERVIEW

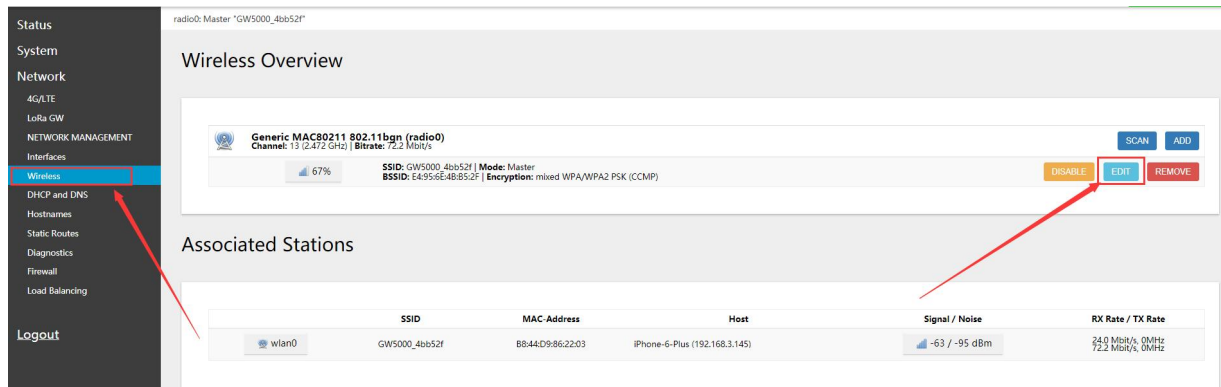
SAVE & APPLY | SAVE | RESET

## 2. Wi-Fi setting

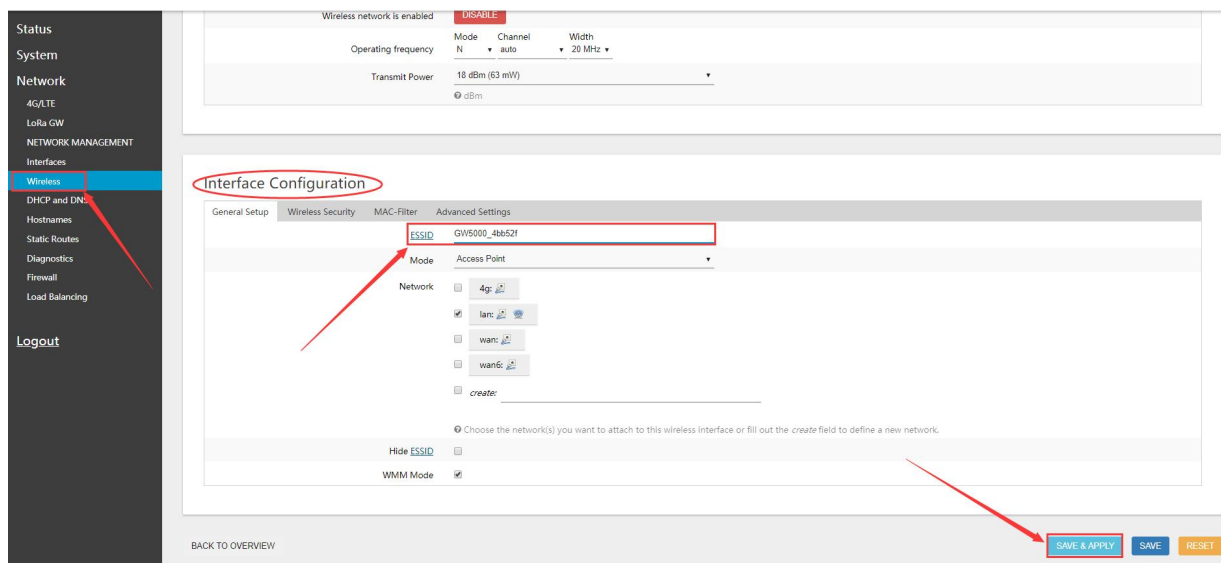
The default Wi-Fi ESSID: **GW5000\_+ the last 6 characters of gateway ID**

The default password: **gateway2018better**

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

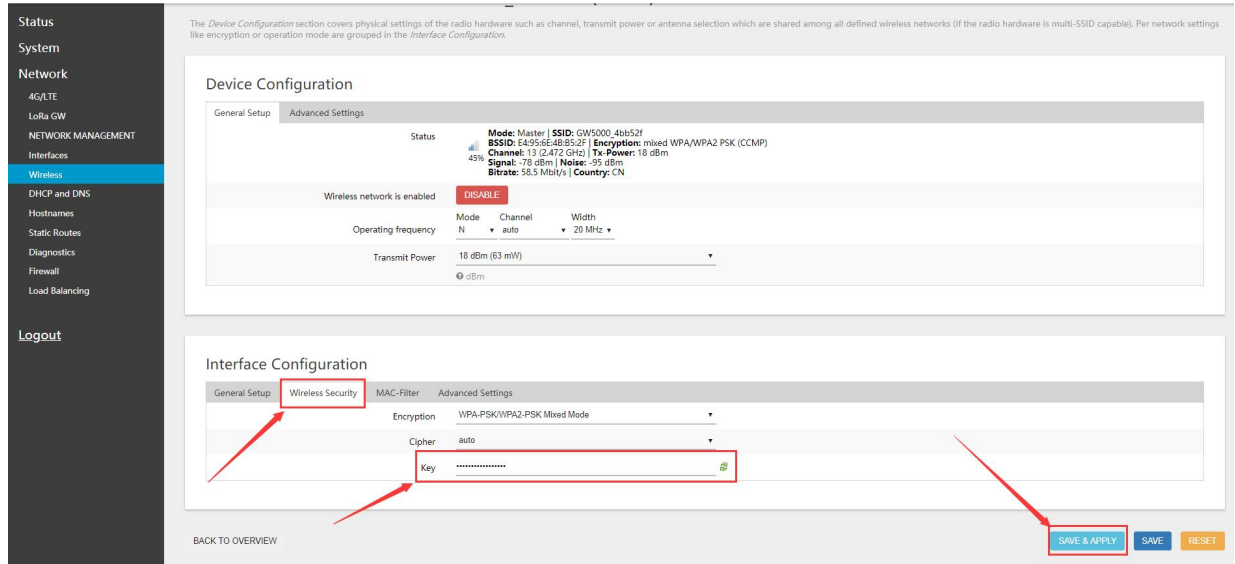


Then, you'll come to wireless network interface, pulldown to "Interface C onfiguration", in the "General Setup", you can modify "ESSID"(wifi hotspot), then click "SAVE&APPLY", as below:



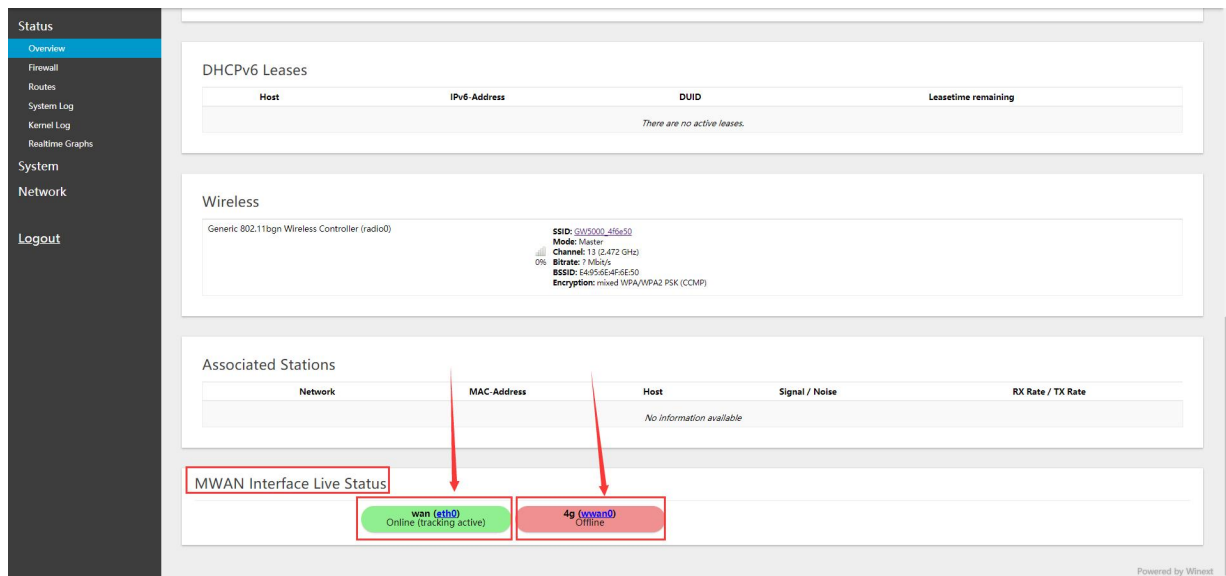


In “Wireless Security”, you can modify the password of wifi hotspot, click  
“SAVE&APPLY”, as below:



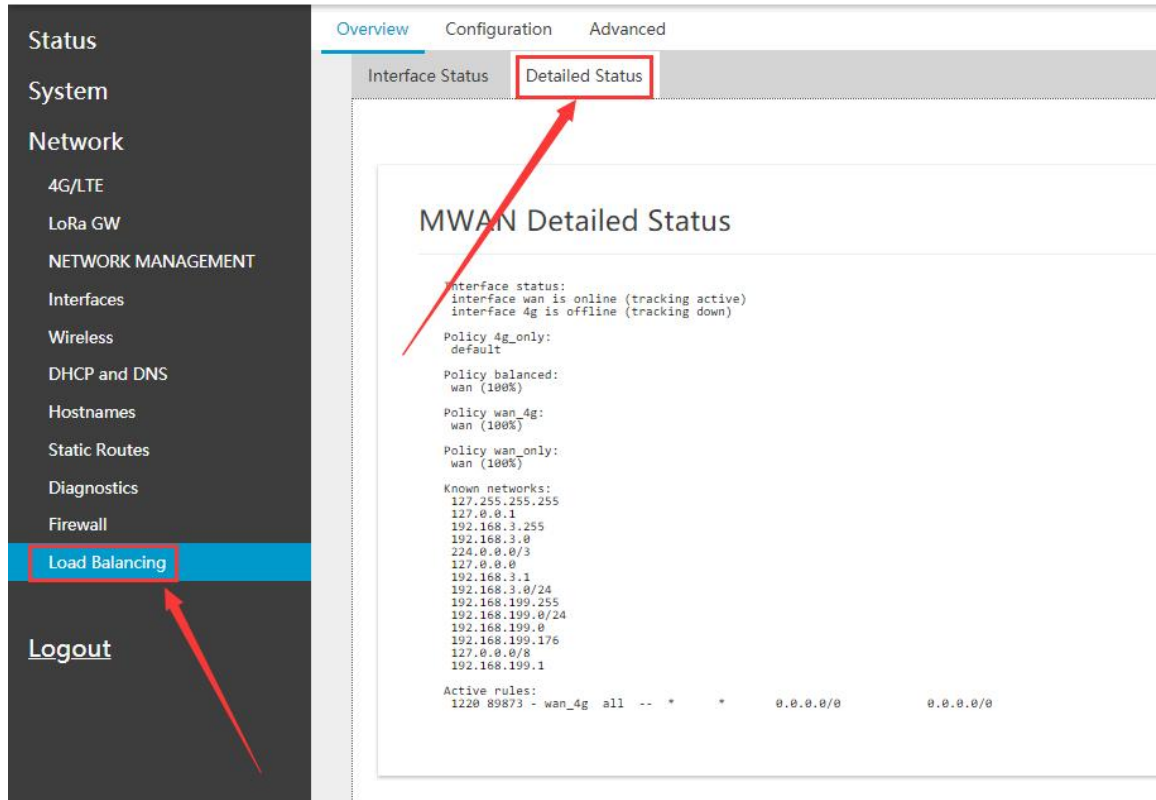
### 3. Check the current network status

Enter “Status/Overview”, as below:



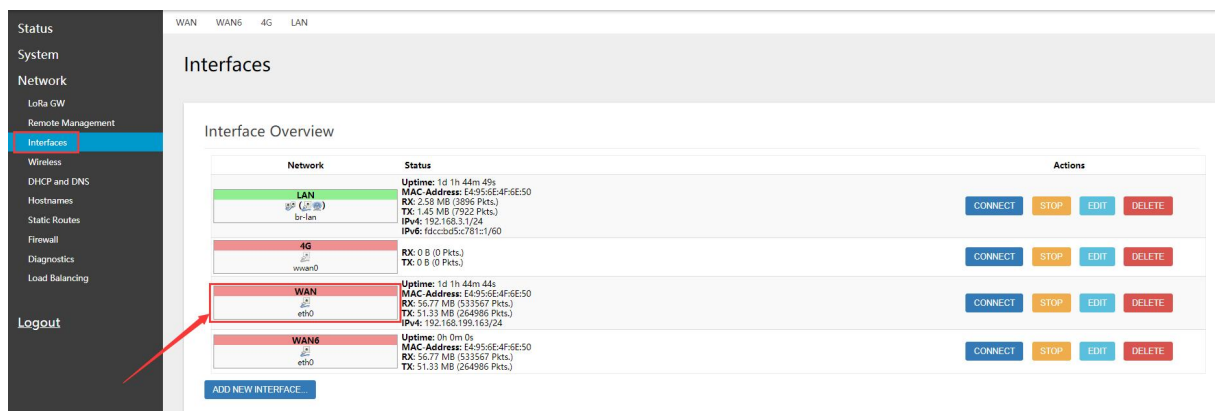
Here, it shows that WAN is online, 4G is offline.

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.

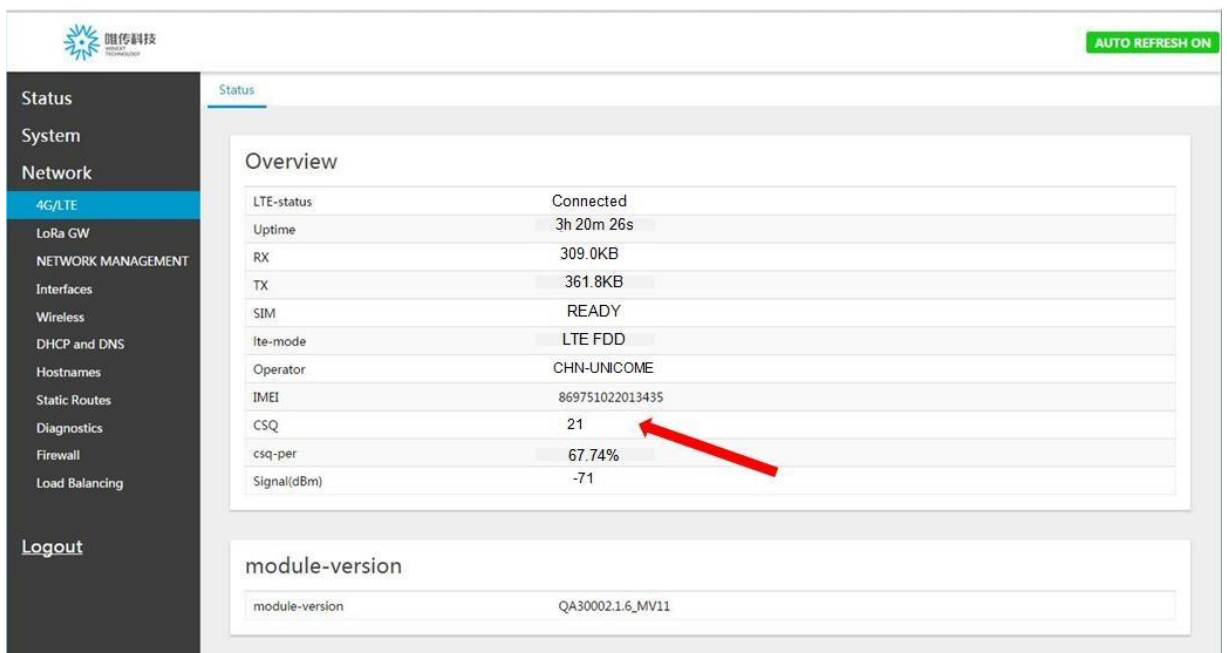
Qualified LTE network should meet the following 2 points:

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

2 ) **Signal strength above 25** ( the network signal should be stable the whole day )

3) **The network delay from the gateway to the server is less than 100ms, and if the delay is too big, the server cannot send packets to the RX1 window of nodes with Class A.**

As below, it's under unqualified network:



The screenshot shows the Winext Technology network status interface. The left sidebar contains a menu with options: Status, System, Network, 4G/LTE (selected), LoRa GW, NETWORK MANAGEMENT, Interfaces, Wireless, DHCP and DNS, Hostnames, Static Routes, Diagnostics, Firewall, Load Balancing, and Logout. The main content area displays the 'Status' tab with an 'Overview' section. The 'Overview' section shows the following data:

|             |                 |
|-------------|-----------------|
| LTE-status  | Connected       |
| Uptime      | 3h 20m 26s      |
| RX          | 309.0KB         |
| TX          | 361.8KB         |
| SIM         | READY           |
| lte-mode    | LTE FDD         |
| Operator    | CHN-UNICOM      |
| IMEI        | 869751022013435 |
| CSQ         | 21              |
| csq-per     | 67.74%          |
| Signal(dBm) | -71             |

A red arrow points to the CSQ value of 21. Below the 'Overview' section, there is a 'module-version' section showing the module-version as QA30002.1.6\_MV11.

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

If you insert a usable 4G card, the picture above should appear. If there is no card, the content of the interface is basically empty like "--". 4G dialing adopts QMI dialing, and the protocol is set as DHCP, so the parameters of 4G do not need to be modified.

The APN for 4G is empty by default and does not need to be set (it is known that China mobile/Unicom/Telecom, most operators in Southeast Asia and most operators in Europe do not need to set up APN).

#### **About 4G disconnection protection:**

The range of CSQ is **0~31**,

wherein: **<15**: the gateway believes that 4G signal is not enough to connect to LTE 4G network (the signal is so bad that it will drop continuously and connected to 2G or 3G network), and the service layer will not be forced to dial again when disconnected.

**15~31**: dial on (or fail to dial), however, if there is no connection to ping public network IP (for example, 114.114.114.114, 8.8.8.8), forced dialing will be conducted, try 10 times of dialing per 3 minutes. But if the 10 times of dialing is still not connected, and WAN port is also not connected, the gateway will restart, and reset its 4G module; Then try again to enter the dial, again 10 consecutive rounds; As long as one of the dials succeeds, the number of dials is counted from 0. A total of three 10 attempts will be made. A total of 30 times cannot be dialed, and the IP of the public network is not connected, then the SIM card is considered overdue, and it will not be forced to dial again, but the 4G module will still redial per 1 hour by its own reconnection mechanism.

The network operators will switch the network mode from 4G to 3G or 2G networks if fees are due generally.

| Network Operator | Normal Display | Display if fees are due |
|------------------|----------------|-------------------------|
| Mobile           | LTE TDD        | TDSCDMA or other        |
| Unicom           | FDD LTE        | WCDMA or other          |
| Telecom          | FDD LTE        | EVDO or other           |

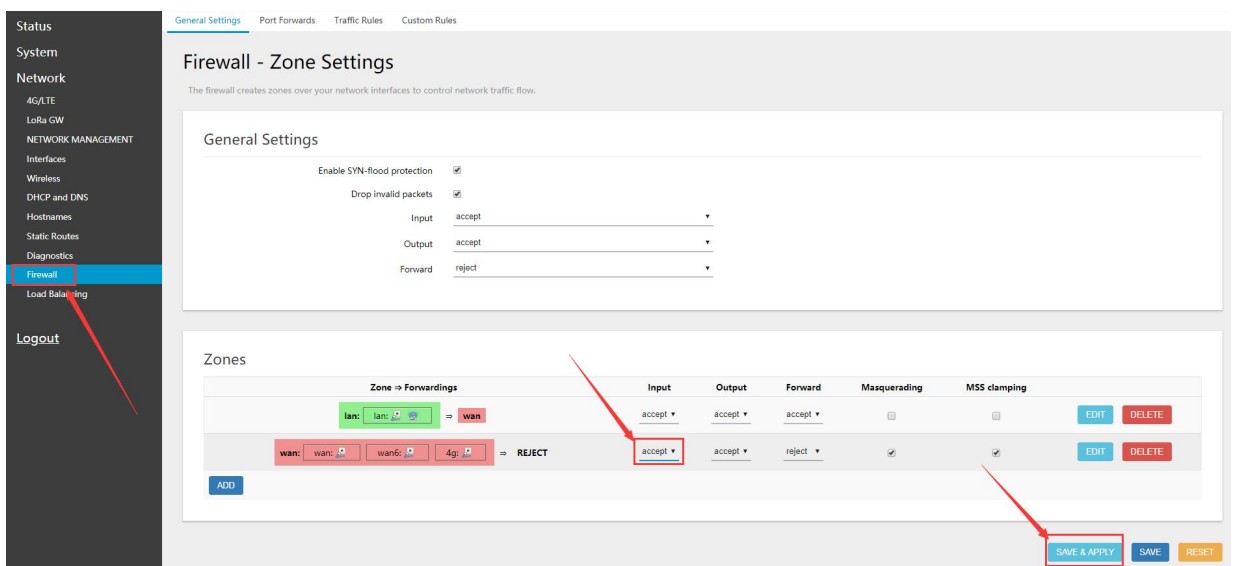
4G network signal display goes from Online to Offline and Offline to Online:

- As display shows **Online** and lasts for 15 seconds, it means 4G network is well connected.
- If SIM card is not inserted, it will not redial 4G network.

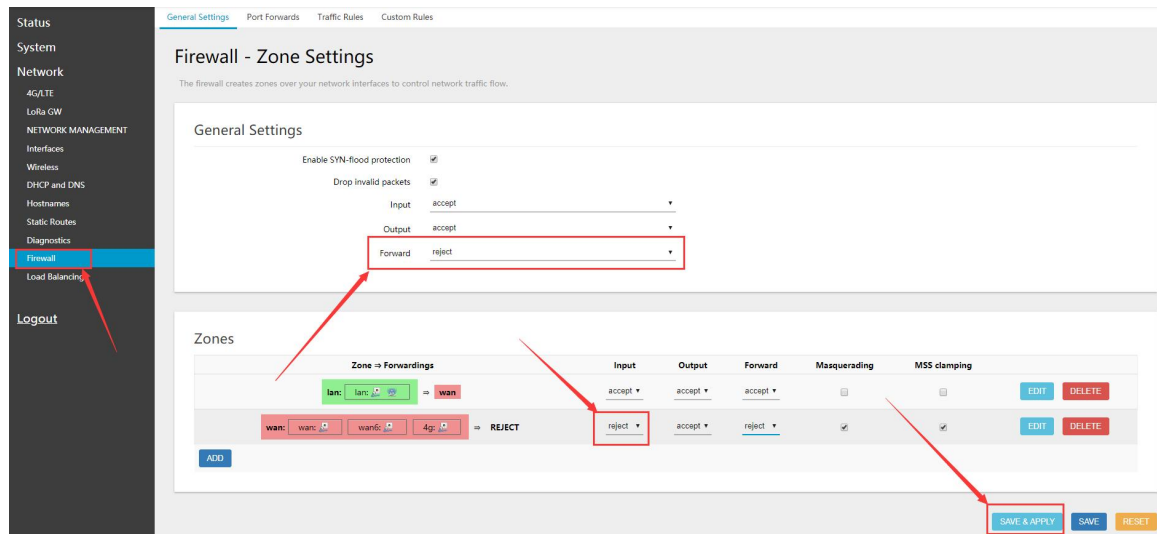
## 6. Enable/disable WAN port data entry

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:

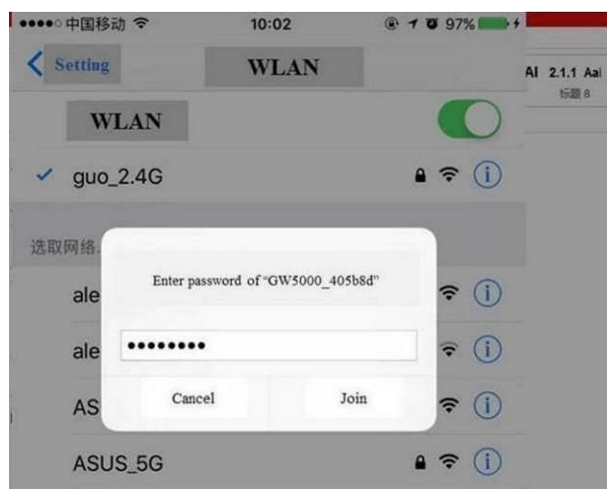


## 13. Configuration/upgrade of gateway

### 1. Login

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

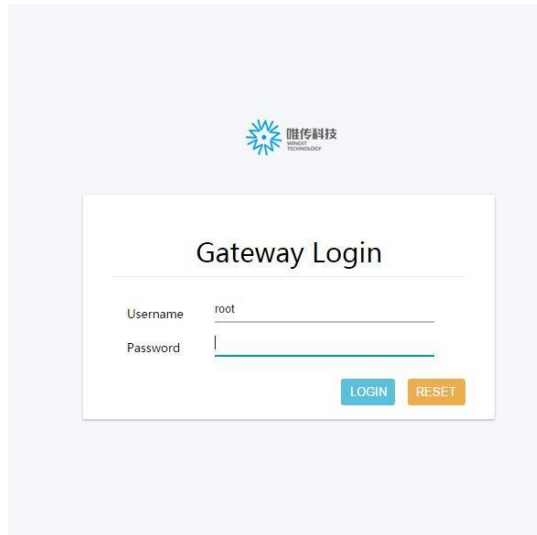
Open the phone/laptop wi-fi setting and connect the GW5000 Wi-Fi hotspot(Hotspot name: WIFI-02\_the last 6 characters of gateway ID; Password: gateway2018better ), as below:





## 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:

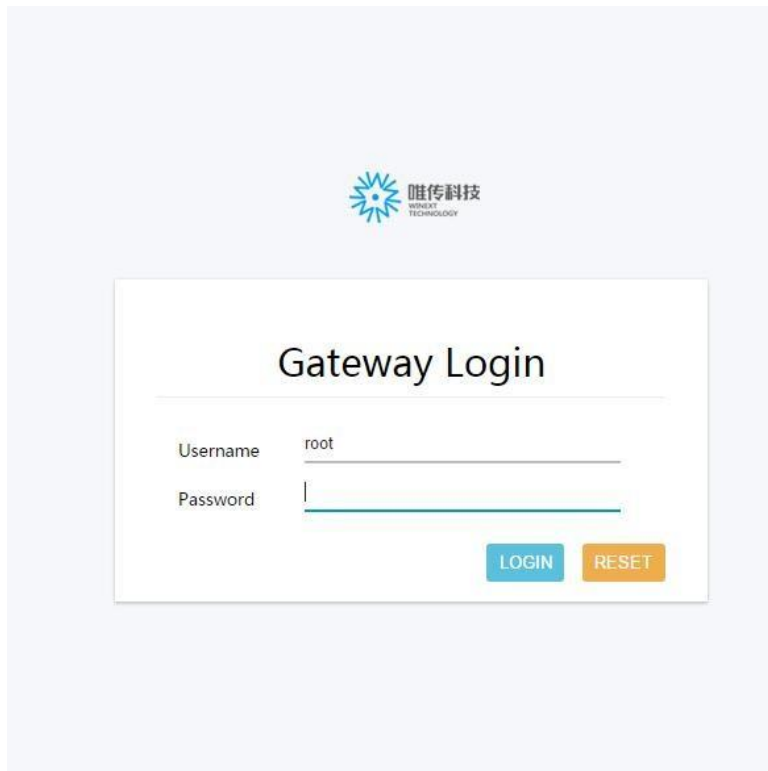


## 2. Configuration of gateway

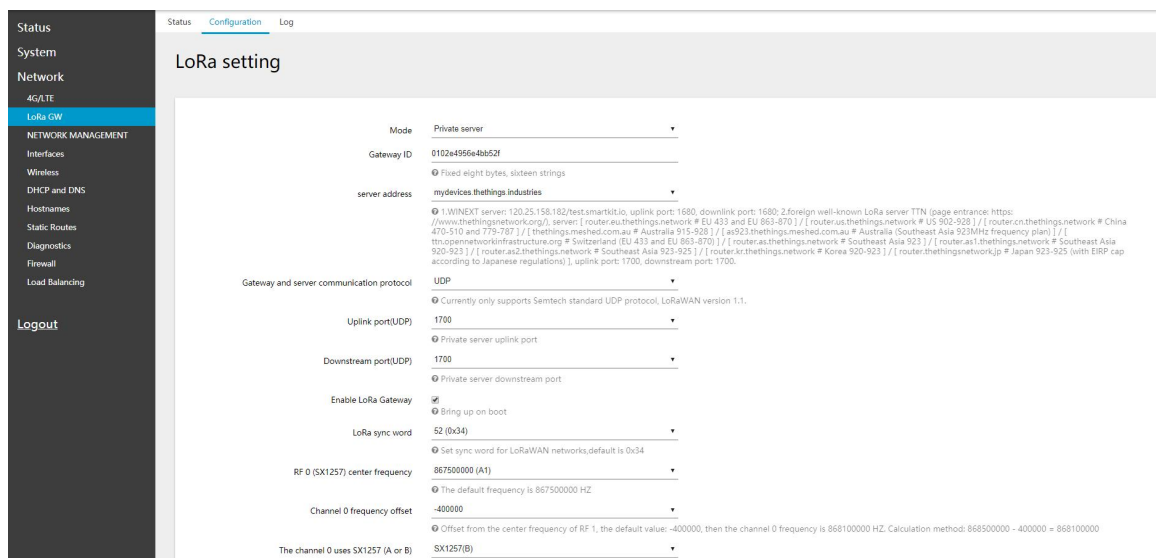
**Note:** The gateway configuration includes wired configuration and wireless configuration. Wired configuration is achieved by using the network LAN port of the computer to connect with gateway; Wireless configuration is achieved by using mobile phone/laptop/PDA to connect to the gateway wi-fi hotspot.

### 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             | The channel 0 uses SX1257 (A or B)                | SX1257(B)                           |                                                                                                                                                                                 |
| System             | Channel 1 frequency offset                        | -200000                             | <p>ⓘ The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Network            | The channel 1 uses SX1257 (A or B)                | SX1257(B)                           |                                                                                                                                                                                 |
| 4G/LTE             | Channel 2 frequency offset                        | 0                                   | <p>ⓘ Offset from the center frequency of RF 1, the default value: -200000, then the channel 1 frequency is 868300000 HZ. Calculation method: 868300000 - 200000 = 868300000</p> |
| LoRa GW            | The channel 2 uses SX1257 (A or B)                | SX1257(B)                           |                                                                                                                                                                                 |
| NETWORK MANAGEMENT | Channel 3 frequency offset                        | -400000                             | <p>ⓘ The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Interfaces         | The channel 3 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| Wireless           | RF 1 (SX1257) center frequency                    | 868500000 (B1)                      | <p>ⓘ Offset from the center frequency of RF 0, the default value: 0, then the channel 2 frequency is 868500000 HZ. Calculation method: 868500000 + 0 = 868500000</p>            |
| DHCP and DNS       | Channel 4 frequency offset                        | -200000                             | <p>ⓘ The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Hostnames          | The channel 4 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| Static Routes      | Channel 5 frequency offset                        | 0                                   | <p>ⓘ The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Diagnostics        | The channel 5 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| Firewall           | Channel 6 frequency offset                        | 200000                              | <p>ⓘ Offset from the center frequency of RF 0, the default value: 200000, then the channel 5 frequency is 867500000 HZ. Calculation method: 867500000 - 0 = 867500000</p>       |
| Load Balancing     | The channel 6 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| Logout             | Channel 7 frequency offset                        | -400000                             | <p>ⓘ The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Status             | The channel 7 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| System             | The channel 7 uses SX1257 (A or B)                | SX1257(A)                           |                                                                                                                                                                                 |
| Network            | Lora standard channel(Channel 8) frequency offset | -200000                             | <p>ⓘ The default value: A. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| 4G/LTE             | The channel 8 uses SX1257 (A or B)                | SX1257(B)                           |                                                                                                                                                                                 |
| LoRa GW            | Lora standard channel(Channel 8) bandwidth        | 250000                              | <p>ⓘ The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| NETWORK MANAGEMENT | Lora standard channel(Channel 8) spread factor    | 7                                   | <p>ⓘ Lora standard channel BW</p>                                                                                                                                               |
| Interfaces         | Enable FSK                                        | <input checked="" type="checkbox"/> | <p>ⓘ Lora standard channel SF</p>                                                                                                                                               |
| Wireless           | FSK channel(Channel 9) frequency offset           | 300000                              | <p>ⓘ EU863-870 FSK is enabled by default</p>                                                                                                                                    |
| DHCP and DNS       | The channel 9 uses SX1257 (A or B)                | SX1257(B)                           | <p>ⓘ Offset from the center frequency of RF 1, the default value: 300000, then the channel 8 frequency is 868300000 HZ. Calculation method: 868300000 + 300000 = 868300000</p>  |
| Hostnames          | FSK channel(Channel 9) bandwidth                  | 125000                              | <p>ⓘ The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Static Routes      | FSK channel(Channel 9) datarate(bit/s)            | 50000                               | <p>ⓘ FSK channel BW</p>                                                                                                                                                         |
| Diagnostics        | TX power(dBm)                                     | 14                                  | <p>ⓘ FSK channel datarate</p>                                                                                                                                                   |
| Firewall           | Beacon period                                     | 0                                   | <p>ⓘ You can choose to use the value of [power] issued by the server, or use the value set here. Default: 14.</p>                                                               |
| Load Balancing     | Beacon frequency                                  | 869525000                           | <p>ⓘ 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.</p>          |
| Logout             | FSK channel(Channel 9) bandwidth                  | 125000                              | <p>ⓘ The default value: B. A block SX1301 module has two SX1257 RF modules, with A, B refers to two SX1257.</p>                                                                 |
| Status             | FSK channel(Channel 9) datarate(bit/s)            | 50000                               | <p>ⓘ FSK channel BW</p>                                                                                                                                                         |
| System             | TX power(dBm)                                     | 14                                  | <p>ⓘ FSK channel datarate</p>                                                                                                                                                   |
| Network            | Beacon period                                     | 0                                   | <p>ⓘ You can choose to use the value of [power] issued by the server, or use the value set here. Default: 14.</p>                                                               |
| 4G/LTE             | Beacon frequency                                  | 869525000                           | <p>ⓘ 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.</p>          |
| LoRa GW            | Beacon frequency number                           | 1                                   | <p>ⓘ Class B related functions, the default frequency: 869525000 HZ.</p>                                                                                                        |
| NETWORK MANAGEMENT | Beacon frequency step                             | 0                                   | <p>ⓘ Class B related functions, the default number of frequencies: 1.</p>                                                                                                       |
| Interfaces         | Beacon datarate                                   | 9                                   | <p>ⓘ Class B related functions, the default frequency step: 0 HZ.</p>                                                                                                           |
| Wireless           | Beacon bandwidth                                  | 125000                              | <p>ⓘ Class B related functions, the default datarate: 9 .</p>                                                                                                                   |
| DHCP and DNS       | Beacon information descriptor                     | 0                                   | <p>ⓘ Class B related functions, the default bandwidth: 125000 HZ.</p>                                                                                                           |
| Hostnames          | Store the log as txt file                         | <input checked="" type="checkbox"/> | <p>ⓘ Class B related functions, default beacon descriptors: 0 .</p>                                                                                                             |
| Static Routes      |                                                   |                                     | <p>ⓘ In the TF card, gateway log directory under the log file, the file name is the gateway to open the time</p>                                                                |
| Diagnostics        |                                                   |                                     |                                                                                                                                                                                 |
| Firewall           |                                                   |                                     |                                                                                                                                                                                 |
| Load Balancing     |                                                   |                                     |                                                                                                                                                                                 |
| Logout             |                                                   |                                     |                                                                                                                                                                                 |

[SAVE & APPLY](#)[SAVE](#)[RESET](#)

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

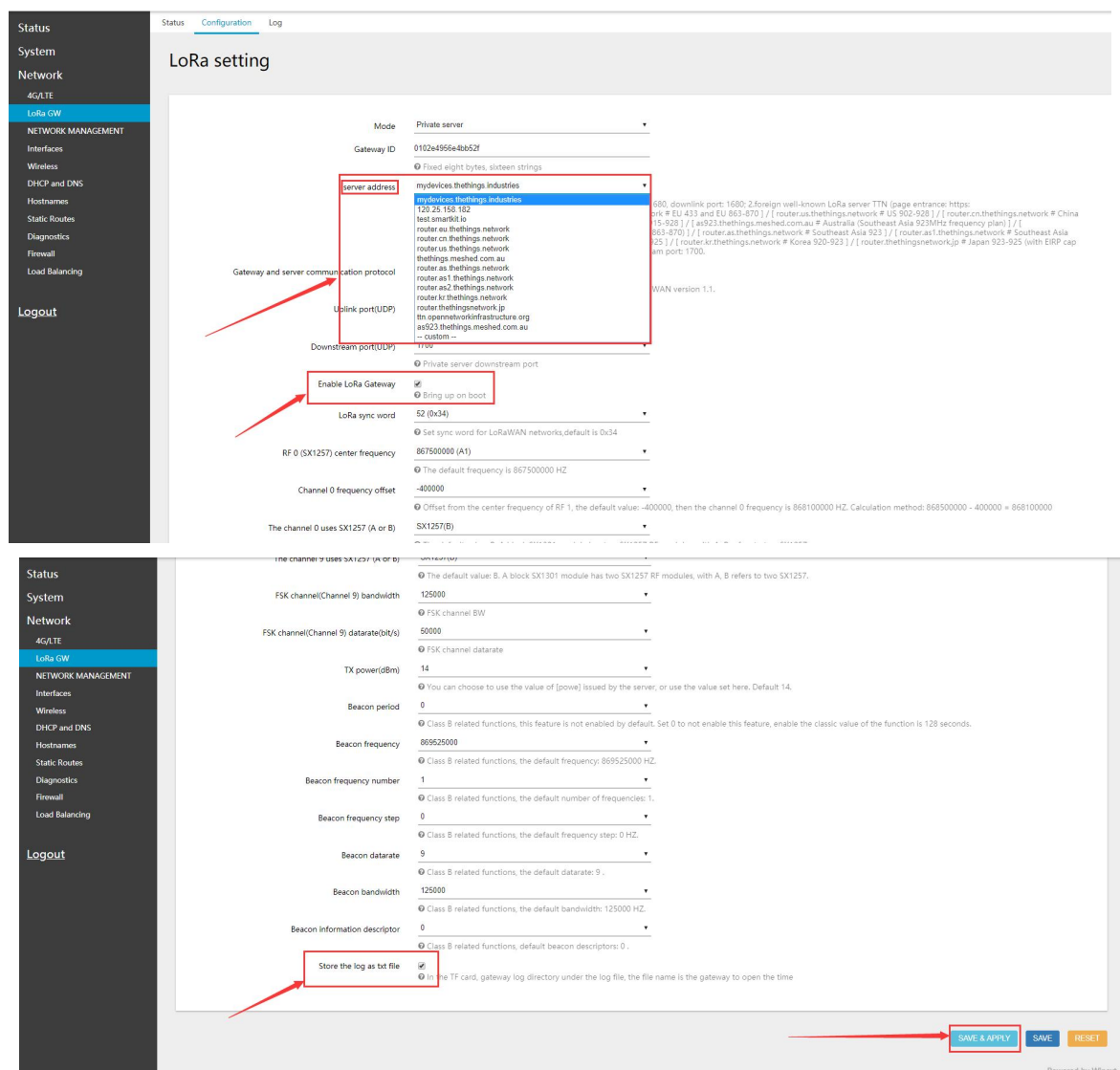
---Server address: choose your LoRa network server address, if there is nothing to choose, pls click “Custom” in the bottom, and input your own LoRa network server address;

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

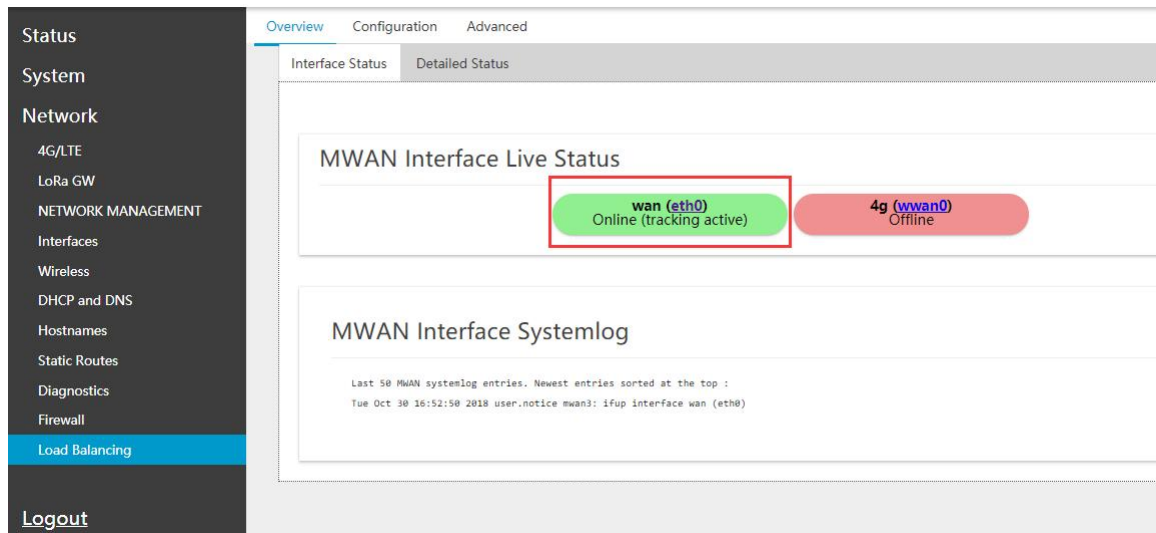
---Store the log as txt file: you should tick to choose it;

Finally, click SAVE&APPLY.

As below:



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



**Status**

**System**

**Network**

4G/LTE

LoRa GW

NETWORK MANAGEMENT

Interfaces

Wireless

DHCP and DNS

Hostnames

Static Routes

Diagnostics

Firewall

Load Balancing

Logout

Overview Configuration Advanced

Interface Status Detailed Status

### MWAN Interface Live Status

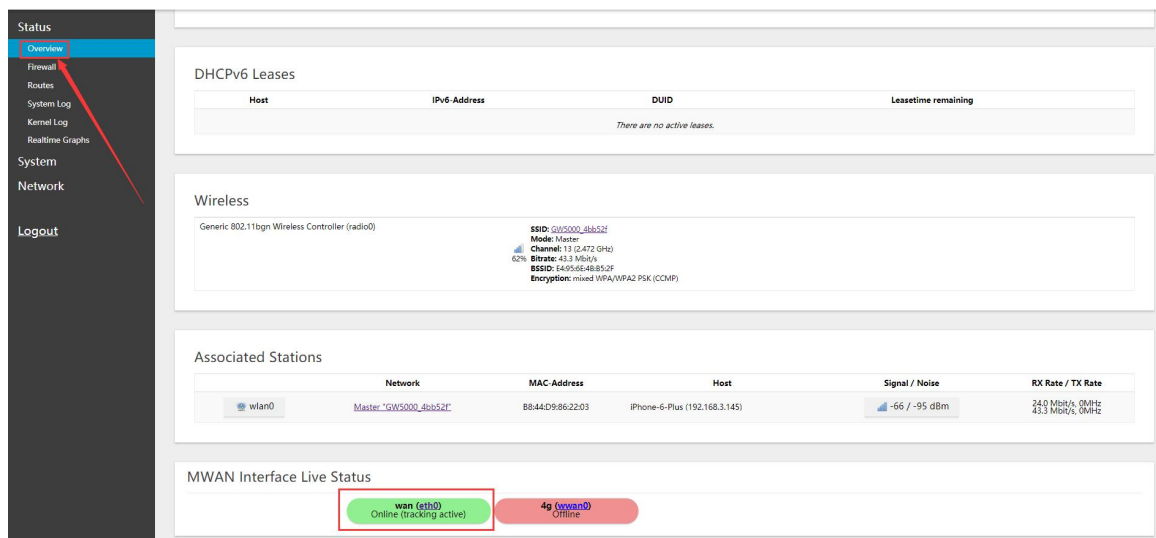
wan (eth0) Online (tracking active)

4g (wwan0) Offline

### MWAN Interface Systemlog

Last 50 MWAN systemlog entries. Newest entries sorted at the top :

Tue Oct 30 16:52:50 2018 user.notice mwan3: ifup interface wan (eth0)



**Status**

**Overview**

Firewall

Routes

System Log

Kernel Log

Realtime Graphs

**System**

**Network**

Logout

### DHCPv6 Leases

| Host                        | IPv6 Address | DUID | Leasetime remaining |
|-----------------------------|--------------|------|---------------------|
| There are no active leases. |              |      |                     |

### Wireless

Generic 802.11bgn Wireless Controller (radio0)

SSID: GW5000\_4b52f  
Mode: Master  
Channel: 13 (2.472 GHz)  
62%  
Bitrate: 43.3 Mbit/s  
ESSID: E4955648B52F  
Encryption: mixed WPA/WPA2 PSK (CCMP)

### Associated Stations

| Network | MAC Address           | Host              | Signal / Noise                | RX Rate / TX Rate |                                        |
|---------|-----------------------|-------------------|-------------------------------|-------------------|----------------------------------------|
| wlan0   | Master "GW5000_4b52f" | B8:44:D9:86:22:03 | iPhone 6-Plus (192.168.3.145) | -56 / -95 dBm     | 24.0 Mbit/s, 0MHz<br>43.3 Mbit/s, 0MHz |

### MWAN Interface Live Status

wan (eth0) Online (tracking active)

4g (wwan0) Offline

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)



**Status**

**System**

**Network**

4G/LTE

LoRa GW

NETWORK MANAGEMENT

Interfaces

Wireless

DHCP and DNS

Hostnames

Static Routes

Diagnostics

TF Clear-operation

CLEAR THE LOG OF THE TF CARD

### GPS Overview

|                                                   |   |
|---------------------------------------------------|---|
| GPS time(UTC)                                     | - |
| GPS latitude                                      | - |
| GPS longitude                                     | - |
| GPS altitude(m)                                   | - |
| The number of satellites with SNR greater than 30 | - |
| The number of satellites with SNR greater than 40 | - |

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

## 2.2 Wireless configuration

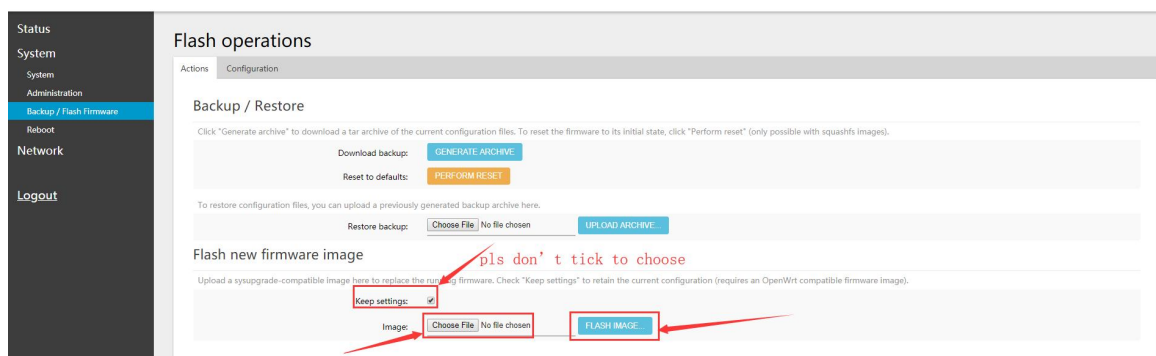
The steps are the similar as that of wired configuration, only displayed by mobilephone/PDA/laptop.

## 2.3 Firmware upgrade of gateway

Enter “System/backup/Flash Firmware/Action”,

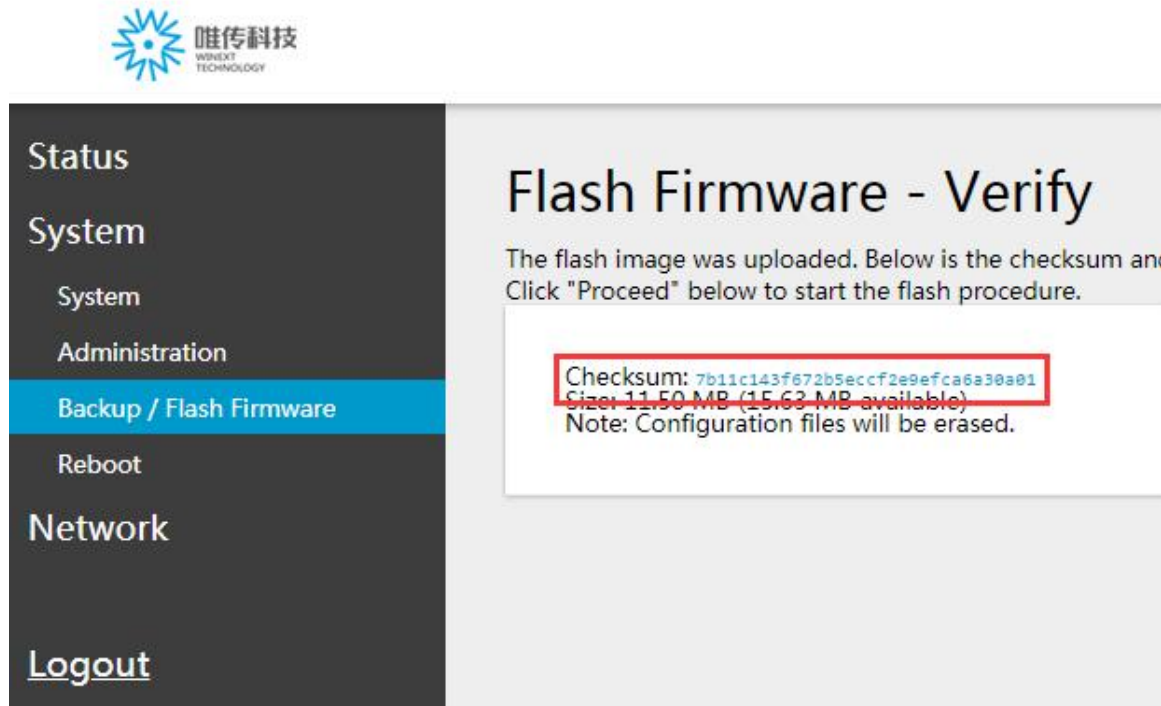
- 1 ) Keep settings: **pls don't tick to choose;**
- 2 ) Choose file: Choose the provided version in .bin format;
- 3 ) Click “Flash image”

As below:

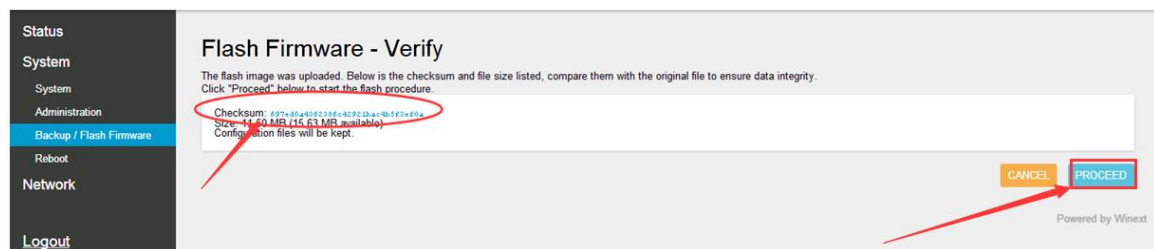


After click “Flash image” , pls wait for a moment until the upload complete, then come to the interface of “Flash Firmware-Verify”, as below:





**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.

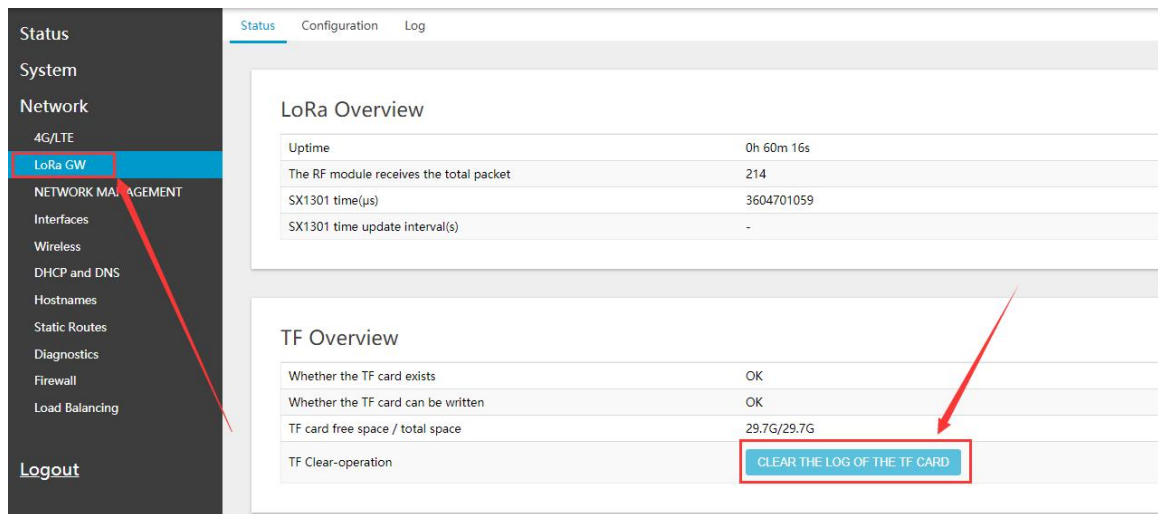
After finishing flash firmware, there is no need to enter the Web page, the gateway will enable by default.

## 14. 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:



The screenshot displays the Winext Gateway web interface. On the left sidebar, the 'LoRa GW' menu item is selected. The main content area is divided into two sections: 'LoRa Overview' and 'TF Overview'. The 'TF Overview' section contains a table with the following data:

| TF Overview                        |                                              |
|------------------------------------|----------------------------------------------|
| Whether the TF card exists         | OK                                           |
| Whether the TF card can be written | OK                                           |
| TF card free space / total space   | 29.7G/29.7G                                  |
| TF Clear-operation                 | <a href="#">CLEAR THE LOG OF THE TF CARD</a> |

A red arrow points to the 'CLEAR THE LOG OF THE TF CARD' button, which is highlighted with a red box.

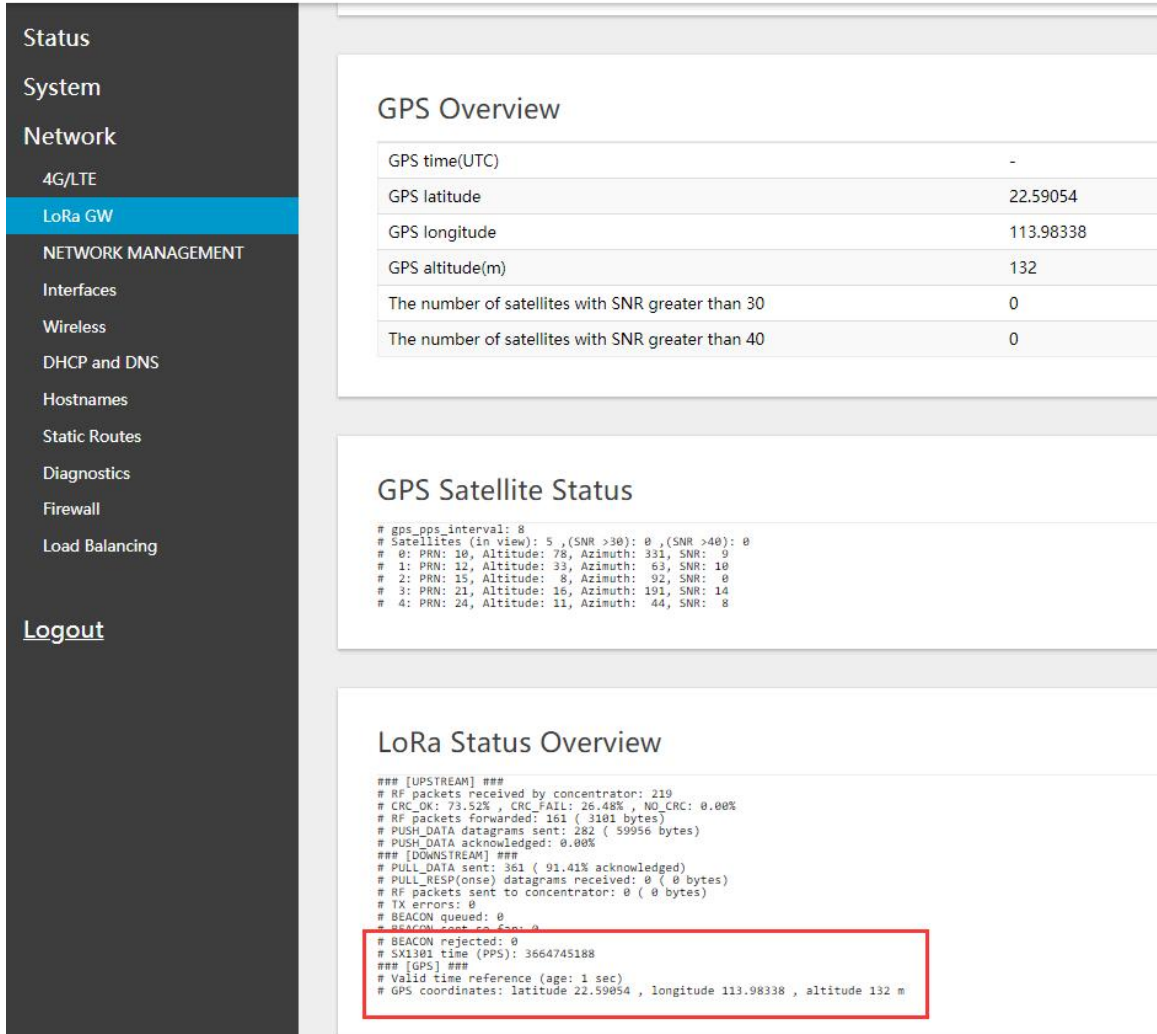
After clear the log of TF card, pls restart the gateway, then it'll work again.

## 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:



The screenshot displays the Winext Technology web interface. On the left is a dark sidebar with navigation links: Status, System, Network, 4G/LTE, LoRa GW (highlighted), NETWORK MANAGEMENT, Interfaces, Wireless, DHCP and DNS, Hostnames, Static Routes, Diagnostics, Firewall, Load Balancing, and Logout. The main content area is divided into three sections:

- GPS Overview:** A table showing GPS data.
 

|                                                   |           |
|---------------------------------------------------|-----------|
| GPS time(UTC)                                     | -         |
| GPS latitude                                      | 22.59054  |
| GPS longitude                                     | 113.98338 |
| GPS altitude(m)                                   | 132       |
| The number of satellites with SNR greater than 30 | 0         |
| The number of satellites with SNR greater than 40 | 0         |
- GPS Satellite Status:** A text block showing satellite details.
 

```
# gps_pps_interval: 8
# Satellites (in view): 5, (SNR >30): 0, (SNR >40): 0
# 0: PRN: 10, Altitude: 78, Azimuth: 331, SNR: 9
# 1: PRN: 12, Altitude: 33, Azimuth: 83, SNR: 10
# 2: PRN: 15, Altitude: 8, Azimuth: 92, SNR: 0
# 3: PRN: 21, Altitude: 16, Azimuth: 191, SNR: 14
# 4: PRN: 24, Altitude: 11, Azimuth: 44, SNR: 8
```
- LoRa Status Overview:** A text block showing LoRa network statistics. A red box highlights the bottom portion of the text:
 

```
### [UPSTREAM] ###
# RF packets received by concentrator: 210
# CRC_OK: 79.52%, CRC_FAIL: 20.48%, NO_CRC: 0.00%
# RF packets forwarded: 161 ( 3101 bytes)
# PUSH_DATA datagrams sent: 282 ( 59956 bytes)
# PUSH_DATA acknowledged: 0.00%
### [DOWNSTREAM] ###
# PULL_DATA sent: 361 ( 91.41% acknowledged)
# PULL_RESP(onse) datagrams received: 0 ( 0 bytes)
# RF packets sent to concentrator: 0 ( 0 bytes)
# TX errors: 0
# BEACON queued: 0
# BEACON sent to GPS: 0
# BEACON rejected: 0
# SKI301 time (PPS): 3664745188
### [GPS] ###
# Valid time reference (age: 1 sec)
# GPS coordinates: latitude 22.59054 , longitude 113.98338 , altitude 132 m
```

If GPS is normal, the time synchronization should be less than 5 seconds, the above picture shows “(age: 1 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)

125KHZ band 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.

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