WINEXT
TECHNOLOGY

GW1000 Indoor Gateway

User Manual

LoRa

www.winext.cn

END-TO-END LORAWAN NETWORK SOLUTION

Disclaimer

1. Ensure installation is in accordance with applicable specifications. Installation shall only be performed by qualified engineering representatives.

2. Please read carefully and install according to this user manual. We are not responsible for any installation related problems or damage to the operation.

3. Keep away from fire source, strong electric field and magnetic field, or it may cause permanent damage.

4. Do not install the equipment on the high vibration equipment. Pay attention to waterproof

5. This device generates, use may interfere with radio communications. There is no guarantee that interference will not occur during a particular installation.

Users may try one or more of the following measures to correct interference:

- Reposition the product.
- Increase the distance between the product and the interfered device.
- Consult a dealer or experienced radio technician for assistance.

Precaution:

1. Before installation, it is necessary to install the LoRaWAN network server supporting GWMP. The forwarder used in the gateway is based on Semtech pico GW_packet_forwarder, and the version is v0.1.0.

2. The online status verification of the product depends on whether the established network is normal.

3. Unauthorized modification of the equipment or provided accessories may damage the equipment and cause warranty failure.

4. The gateway installation shall not be shielded by large metal objects as far as possible, so as not to affect the use effect.

5. Do not install the gateway close to the power transmission, especially the high-voltage transmission lines and pipelines.

6. When installing the gateway, it shall be far away from the place with large current and the current often changes, and there shall be no metal objects within 3M around the gateway.

7. The final interpretation of installation is reserved for Winext.

Content

1. Description

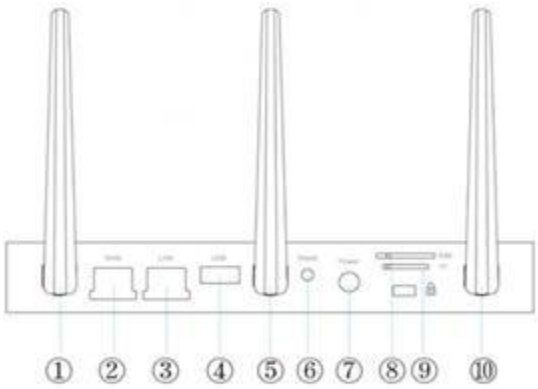
GW1000 is a light indoor gateway, mainly used on small scale LoRa networking applications as a supplement device for signal blind area.
Equipped with SX1308 chip, it complies with LoRaWAN. Receiving data from 8 channels at the same time, it has data packed into Ethernet data protocol packets, transmits data to LoRaWAN network server in real time. Meanwhile, it can accept the single task from the network server, convert Ethernet data into radio frequency data and send them to corresponding end-devices. It provides technical solutions for the bidirectional transmission of the Internet of Things.

Application
Home, office, basement, plant, store, cafes, bars

1.1 Features

- Supports standard LoRaWAN protocol V1.0.X (V1.0.2, 1.0.3, 1.0.4), V1.1;
- Support Class A, Class C;
- 8 uplinks channel, 1 downlink channel, support adaptive data transfer rate
- Supports UDP packet_forwarder protocol, Basics Station CUPS, and LNS protocol;
- Can switch between embedded NS or external NS server as needed;
- Embedded NS supports MQTT and HTTP push parsing of data, Ethernet Modbus-TCP querying of node data;
- Embedded NS MQTT protocol supports data transmission to the platform for nodes even after network interruption;
- Supports WiFi connection to the gateway for viewing gateway status, modifying gateway configuration, and viewing real-time node data;
- Supports firewall protection, SYN-flood defense, and DNS rebinding protection;
- Supports system self-diagnosis, self-healing, and OTA remote upgrades;
- Supports external expansion of TF card for storing gateway communication logs and historical node data;
- 2 RJ45 ports, one for WAN and one for LAN;
- Supports IPV6, uses 4G for network connection, and provides IPV6 public network IP addresses via LAN and WiFi;
- Supports smart switching between WAN and 4G interfaces, prioritizes the use of WAN port, and automatically switches to 4G if the WAN port is abnormal;
- LTE supports three module options, including China, European, and American.

1.2 Port



1.LoRa antenna

2.WAN and LED indicator

3.LAN and LED indicator

4.USB port

5.LTE antenna -Optional

6.Reset butoon

7.DC12V power supply port

8.SIM standard card slot

9.TF card slot

10.WiFi antenna

1.3 Indicator led

Led	Display	Description
Status led	Green, flash	Initializing
	Green, constant on	On normal working
	Red	Device not work
	Yellow	Network fault-cannot connect to the network server or not return ACK to device
WAN port led	Flash	Data transmits from Internet, you can access to network
	Off	Not access to network
LAN port led	Flash	Data sent to the computer connected
	Off	LAN port not activated

1.4 Packing kit

GW1000 Gateway Accesory Kit					
Image	Name	QTY	Image	Name	QTY
	Gateway	1 pc		Network cabe	1 pc
	DC adaptor	1 pc		Screw and expanding screw plug	2 sets
Note: The gateway is equipped with different antennas depending on the vision.					

2. Specifications

2.1 Dimension

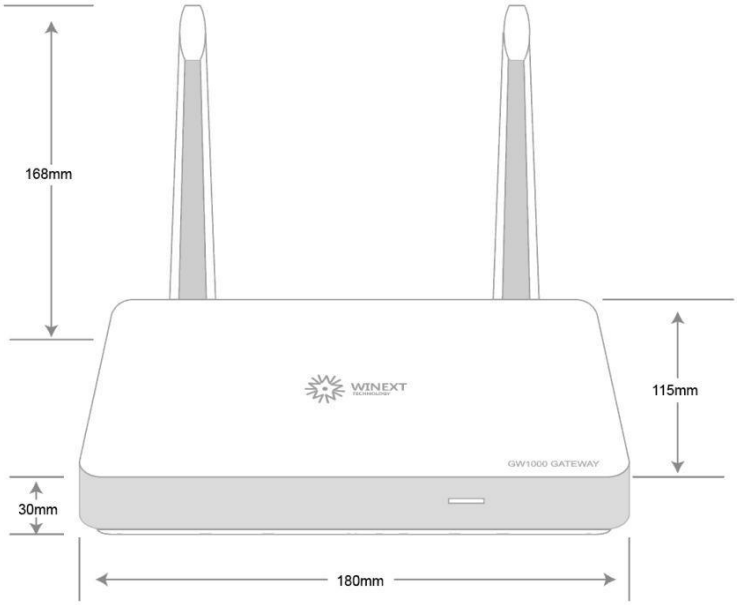


*Figure: Dimension 180mm*115mm*30mm*

2.2 Hardware parameters

Description	Specifications
Master control	Qualcomm 9531 master control chip, 128M memory, 16M Flash
Power supply	DC12V
Frequency Bands	CN470-510/EU863-870/US902-928/AS923/AU915-928/KR920-923
LoRa communication rate	292bps - 5.4kbs, support spread factor SF7-SF12
LoRa Tx power	17dBm Maximum power: 20dBm (at the antenna mouth)
LoRa Rx sensitivity	-141dBm@SF12
LoRa antenna gain	2dBi
LoRa antenna type	Omni-direction
Channels	8 uplinks, 1 downlink
LoRa working mode	Half-duplex
Base station	Network
LTE model	China 4G module supported bands include: LTE-TDD : B38/B39/B40/B41 LTE-FDD:B1/B3/B5/B7/B8 TD-SCDMA: B34/B39 UMTS:B1/8 EVDO: 800MHz CDMA1x: 800MHz GSM:850/900/1800/1900
	European/Korean/Thai/Indian 4G module supported bands include: FDD LTE: B1/B3/B5/B8/B20 TDD LTE: B38/B40/B41 WCDMA: B1/B5/B8 GSM: B3/B8
	North American 4G module supported bands include: FDD LTE:B2/B4/B5/B12/B13/B14/B66/B71B WCDMA: B2/B4/B5
	Latin American/Australian/New Zealand 4G module supported bands include: LTE-FDD:B1/B2/B3/B4/B5/B7/B8/B28 LTE-TDD:B40 WCDMA:B1/B2/B5/B8 GSM/EDGE:B2/B3/B5/B8
	Global 4G module supported bands include: TE-FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28 LTE-TDD: B38/B39/B40/B41 WCDMA: B1/B2/B4/B5/B6/B8/B19 GSM: B2/B3/B5/B8

WiFi	2.4GHz, AP mode, Maximum power: 18dBm
Data backhaul	10/100M Ethernet, 3G/4G
Debug interface	WiFi; LAN; serial port
Operating Temperature	-10℃～50℃
Humidity	5%～95%
Consumption	7W
Dimension	180mm*115mm*30mm

2.3 Software specification

Description	Specification
Core	Linux-4.14.88
Packet forwarding	Supports UDP(GWMP)/MQTT(GWMP)/built-in NS/WSS (based on Basic Station's CUPS and LNS protocols)
External NS	Winext IOT, Tencent IOT, Alibaba IOT,Amazon Platform (Amazon LPWAN), TTN Platform (The Things Network), Open Source Projects (chirpstack, lorawan-stack)
LoRa protocol	LoRaWAN V1.1 GWMP protocol, Class A/C
Built-in NS	Support 100 terminal access, support MQTT/HTTP push decrypted, parsed data
Modbus TCP	Supports up to 5 client access, supports function code 03, reading node temperature, humidity, voltage, and other data
User interface	WEB interface
Language and interface	Chinese/English, logo available or not
3G/4G dial networking	Support QMI-Qualcomm universal dialing
IPV6	4G supports IPv6, LAN and Wi-Fi provide IPv6 relay function
Local time synchronization	Support NTP client, different time zones can be set
WAN Port Protocol	Static, DHCP client, PPPOE
Upgrade and flash	Support upload firmware fresh in WEB and OTA remote upgrade
WiFi Debugging Connection	2.4GHz，802.11bgn, WPA2 PSK encryption, supports STA+AP mode
Firewall	IP tables v1.8.2, support customized rule, equipped with SYN-flood defense
Network load balancing	Support WAN and 4G network connection, WAN network preferred

Gateway ID generate automatically	Gateway ID generated based on WiFi MAC address
Local log management	Support logs stored in TF card, when it full to clear the old one
Failure Self-detection	Supports system failure self-detection, self-repair, and timely reporting to the server
Remote management	Supports remote configuration, remote upgrade, remote restart, remote maintenance

3. Quick configure

3.1 Device connection diagram

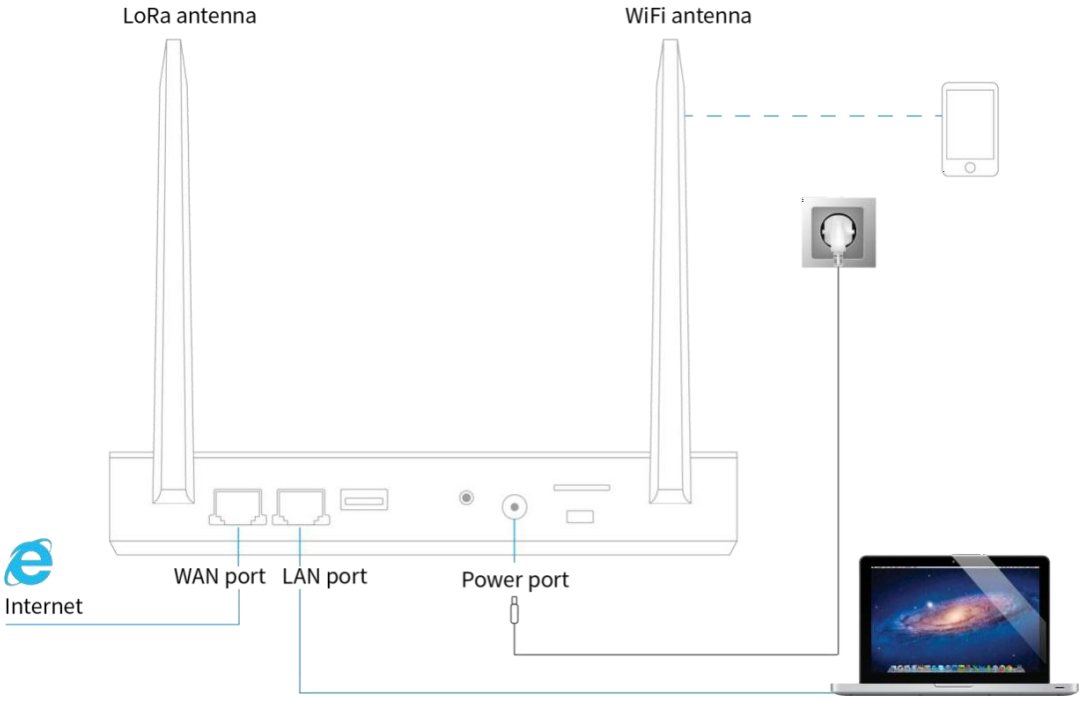


Figure: Connection diagram for Standard version

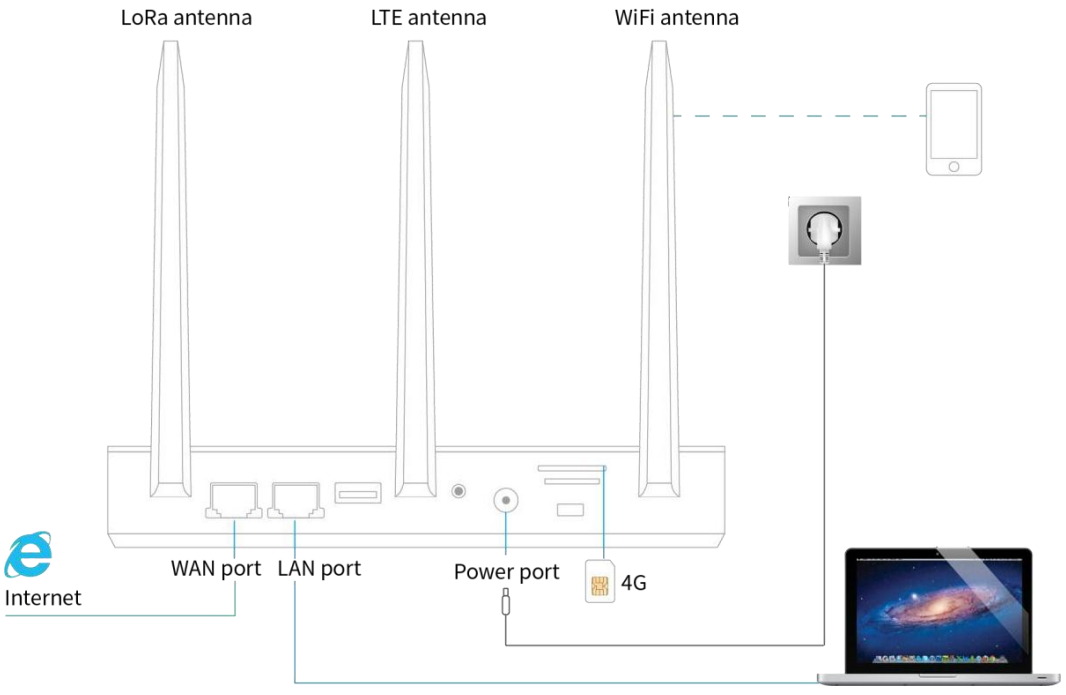


Figure: Connection diagram for LTE version

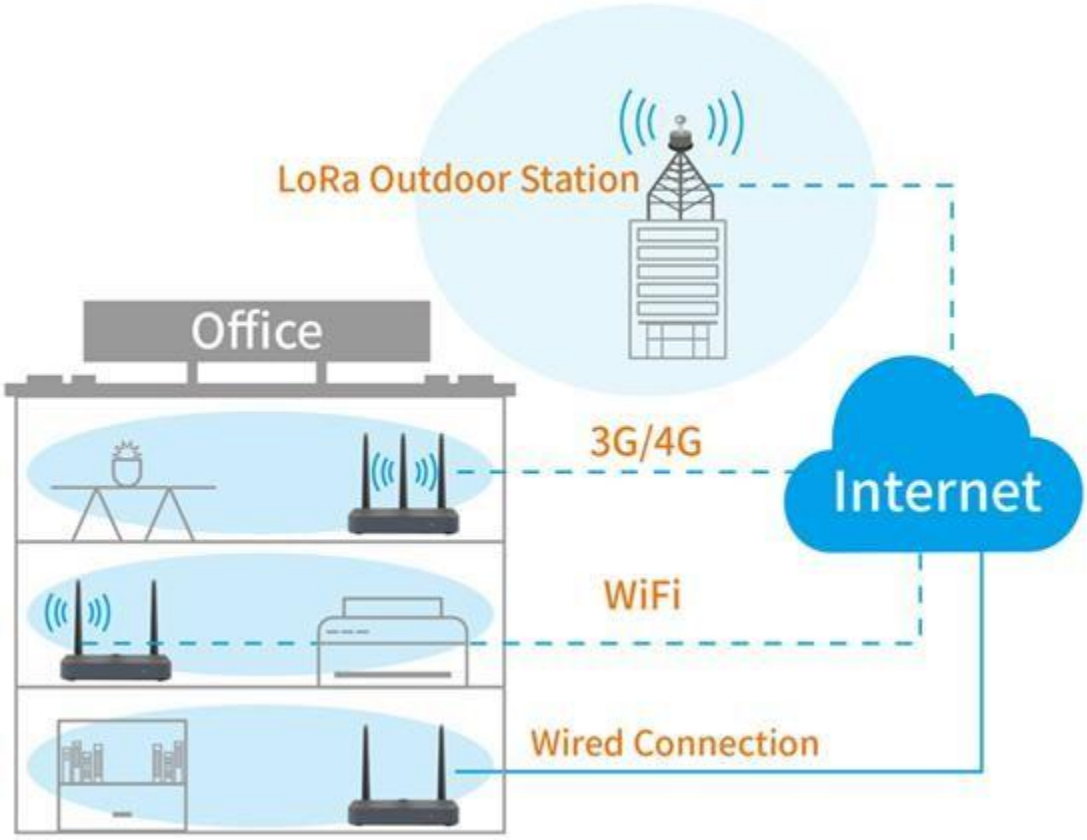


Figure: Network connection

4. Frequency setting

4.1 EU863-870MHz

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

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
		7	4	867.9	867.9			400000
	B1	0	5	868.1	868.1		center frequency:868.5	-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,datarate 50000）				300000

4.2AS923MHz

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

4.2.1 AS920-923MHz default 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, datarate 50000)				-400000
			9	922.1 BW250SF7				-100000
	B1	4	4	922.8	922.8		923.2	-400000
		5	5	923	923			-200000
		6	6	923.2	923.2			0
		7	7	923.4	923.4			200000

4.2.2 AS923-925MHz default 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, datarate				400000

4.3 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
		8		903.0 BW500SF8				-300000
2 (A2B2)	A2	0	8	903.9	923.3	923.3-BW500SF12	904.1	-200000
		1	9	904.1	923.9			0
		2	10	904.3	924.5			200000
		3	11	904.5	925.1			400000
	B2	4	12	904.7	925.7		904.9	-200000
		5	13	904.9	926.3			0
		6	14	905.1	926.9			200000
		7	15	905.3	927.5			400000
		8		904.6 BW500SF8				-300000
3 (A3B3)	A3	0	16	905.5	923.3	923.3-BW500SF12	905.7	-200000
		1	17	905.7	923.9			0
		2	18	905.9	924.5			200000
		3	19	906.1	925.1			400000
	B3	4	20	906.3	925.7		906.5	-200000
		5	21	906.5	926.3			0
		6	22	906.7	926.9			200000
		7	23	906.9	927.5			400000
		8		906.2 BW500SF8				-300000
4 (A4B4)	A4	0	24	907.1	923.3	923.3-BW500SF12	907.3	-200000
		1	25	907.3	923.9			0
		2	26	907.5	924.5			200000
		3	27	907.7	925.1			400000
	B4	4	28	907.9	925.7		908.1	-200000
		5	29	908.1	926.3			0
		6	30	908.3	926.9			200000
		7	31	908.5	927.5			400000
		8		907.8 BW500SF8				-300000
5 (A5B5)	A5	0	32	908.7	923.3	923.3-BW500SF12	908.9	-200000
		1	33	908.9	923.9			0
		2	34	909.1	924.5			200000
		3	35	909.3	925.1			400000
	B5	4	36	909.5	925.7		909.7	-200000
		5	37	909.7	926.3			0
		6	38	909.9	926.9			200000
		7	39	910.1	927.5			400000
		8		909.4 BW500SF8				-300000
6 (A6B6)	A6	0	40	910.3	923.3	923.3-BW500SF12	910.5	-200000
		1	41	910.5	923.9			0
		2	42	910.7	924.5			200000
		3	43	910.9	925.1			400000
	B6	4	44	911.1	925.7		911.3	-200000
		5	45	911.3	926.3			0
		6	46	911.5	926.9			200000
		7	47	911.7	927.5			400000
		8		911.0 BW500SF8				-300000
7 (A7B7)	A7	0	48	911.9	923.3	923.3-BW500SF12	912.1	-200000
		1	49	912.1	923.9			0
		2	50	912.3	924.5			200000
		3	51	912.5	925.1			400000
	B7	4	52	912.7	925.7		912.9	-200000
		5	53	912.9	926.3			0
		6	54	913.1	926.9			200000
		7	55	913.3	927.5			400000
		8		912.6 BW500SF8				-300000
8 (A8B8)	A8	0	56	913.5	923.3	923.3-BW500SF12	913.7	-200000
		1	57	913.7	923.9			0
		2	58	913.9	924.5			200000
		3	59	914.1	925.1			400000
	B8	4	60	914.3	925.7		914.5	-200000
		5	61	914.5	926.3			0
		6	62	914.7	926.9			200000
		7	63	914.9	927.5			400000
		8		914.2 BW500SF8				-300000

4.4AU915-928MHz

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

4.5 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

4.6 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

4.7 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

5. Configuration

5.1 Network Server setting

5.1.1 Login the gateway configuration interface

1) If using **mobilephone**: Open mobile phone WiFi setting and search the hotspot of the gateway. The hotspot name starts with **WIFI-05** and following 6 characters of the gateway ID, such as **WIFI-05_e33223**. The initial password is **gateway2018better**

With **mobilephone** browser, you can input: **192.168.3.1** to come to the web interface of gateway and login Username: **root**; password: **WelcomeTo2018**
Note: It is recommended to use Google browser, Firefox browser in latest version. If you have logged in GW5000A or GW5000E, gateway Web on the browser before, please clear the cache first.

2) If using **laptop**: Connect the gateway LAN port to the laptop with a cable. Set the laptop with IP address to acquire automatically, then open the Google browser input **192.168.3.1** to come to the gateway web interface, and input the login password: **WelcomeTo2018**

Note: It is recommended to use the latest version of Google, Firefox. If you have logged in Web of GW5000A gateway or GW5000E gateway on the browser before, please clear the cache first.

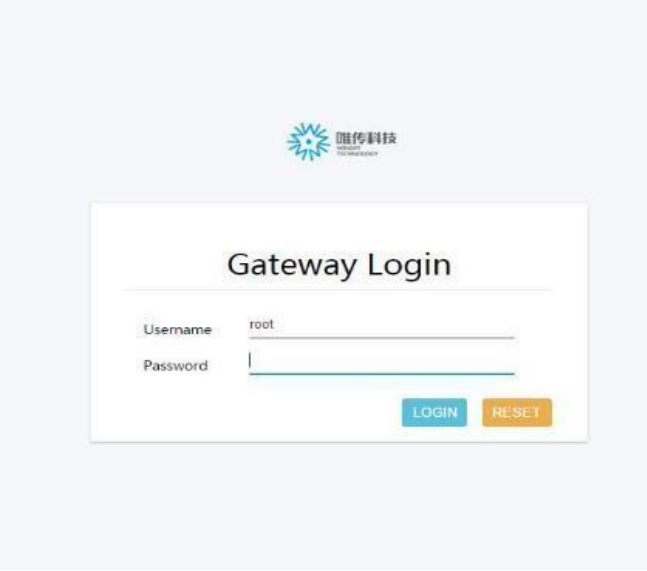


Figure: Login interface

We have defined different channel plan combinations.

We've test the gateway on Winext Network Server (**lora.smartkit.io**). It only needs to modify the frequency band, and the gateway setting.

5.1.2 Network Server address setting

1. Login the GW1000 gateway WEB configuration interface, select **Network→LoRa GW→Configuration** and come to the **LoRa setting** interface.

2. Click on to select your LoRa Network Server address. You can also choose **custom** to enter the address manually. The address can be IP or domain name.

We take our Network Server (**lora.smartkit. io**) as an example, as below:

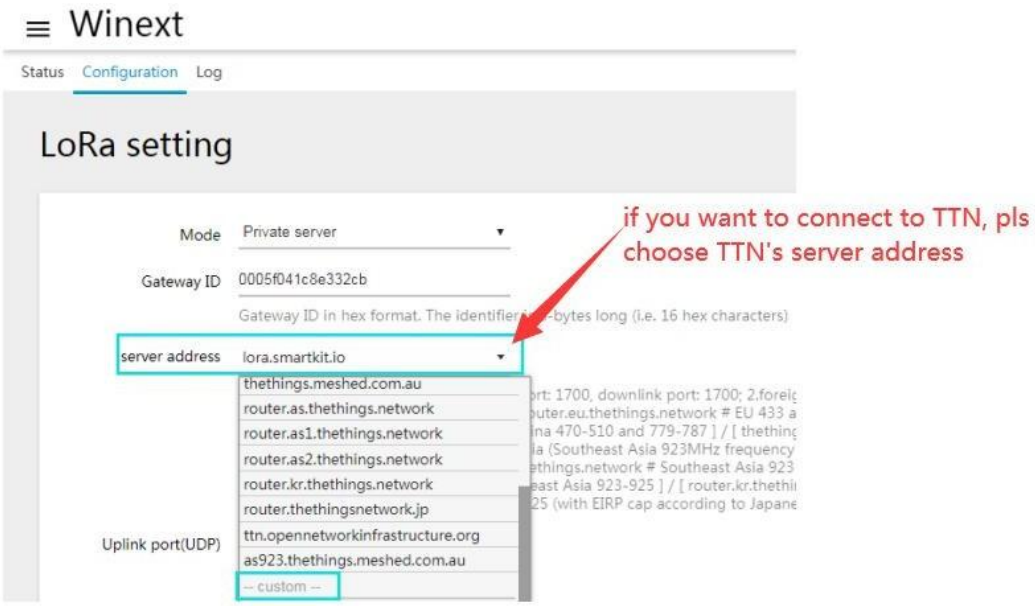


Figure: LoRa setting interface

5.1.3 Set uplink port and downlink port

1. The uplink port and downlink port are subject to the UDP port of the Network Server. Click **custom** to fill in the UDP port number manually.

3. Gateway and Network Server communication protocol: UDP

Figure: Uplink port and downlink port

5.2 Set WAN setting for uplink port and downlink port

5.2.1 Check gateway network connection

1. Check the network connection status. If the LoRaWAN server is deployed on the public network, make sure the gateway connect to the external network via WAN, WiFi (wireless) or 4G. Enter **Status→Overview**, it shows that WAN and 4G are Online, the time lasts more than 15 seconds, both are connected, connection via WAN by default. 4G connection is back up.

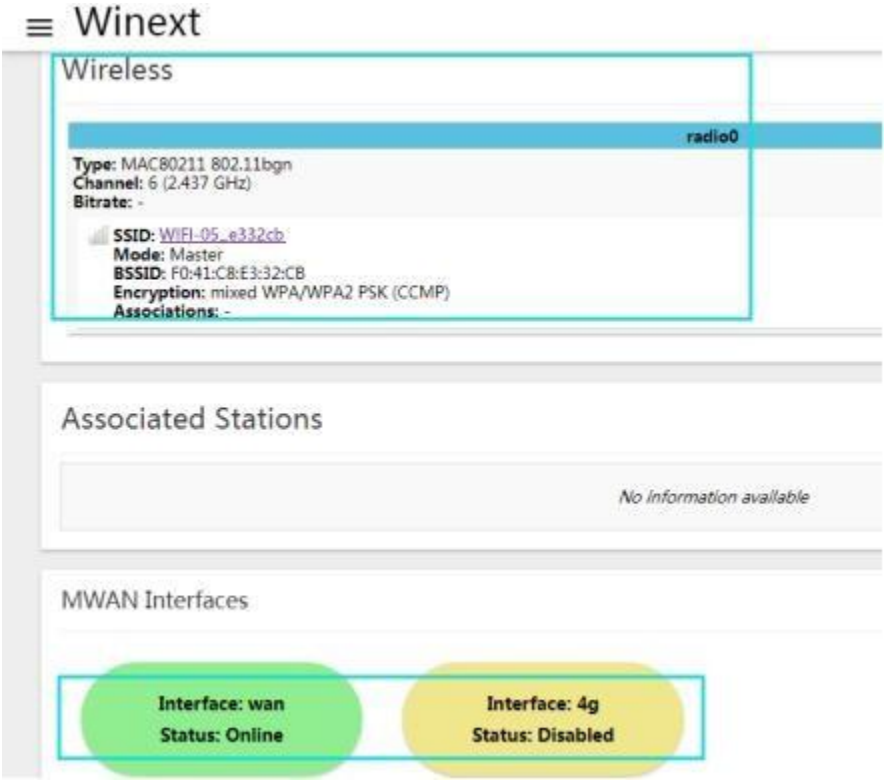


Figure: Wireless connection

As shown in the figure above, the online mode is WiFi (wireless) mode. The display of WAN and 4G has been disabled (disabled means not connected. Connecting external network cable to the WAN port, it will show WAN online. With the 4G SIM card inserted, it will show 4G online).

WiFi is accessible, it is recommended not to connect WAN and 4G instead. It is recommended to join network with WAN port first as wired connection more reliable.

2. If the LoRaWAN Network Server is deployed on the local area network, the WAN network is required to ping the server host, no need to pay attention to if it is **Online** or **Offline**. Diagnostic methods as blow:

Figure: Check WAN network connection

5.2.2 Join network setting via WAN port

1. Connect the gateway WAN port with the LAN port of the router of the external network with network cable, so that the gateway can be connected to the external network. (DHCP client is enabled in the gateway WAN by default, and the IP address is to be assigned to the router). Here is the figure below:

2. If the external network is the static address to be assigned, it shall be modified as follows:

a. Click **EDIT**

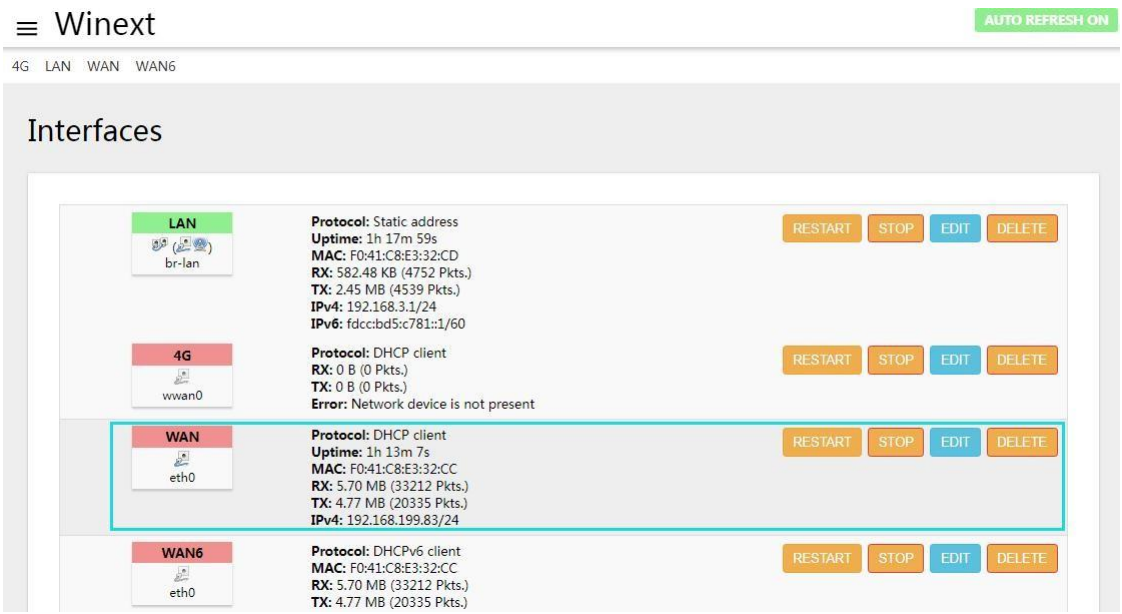


Figure: WAN Interface-1

b. Select **static address** and click **SWITCH PROTOCOL**

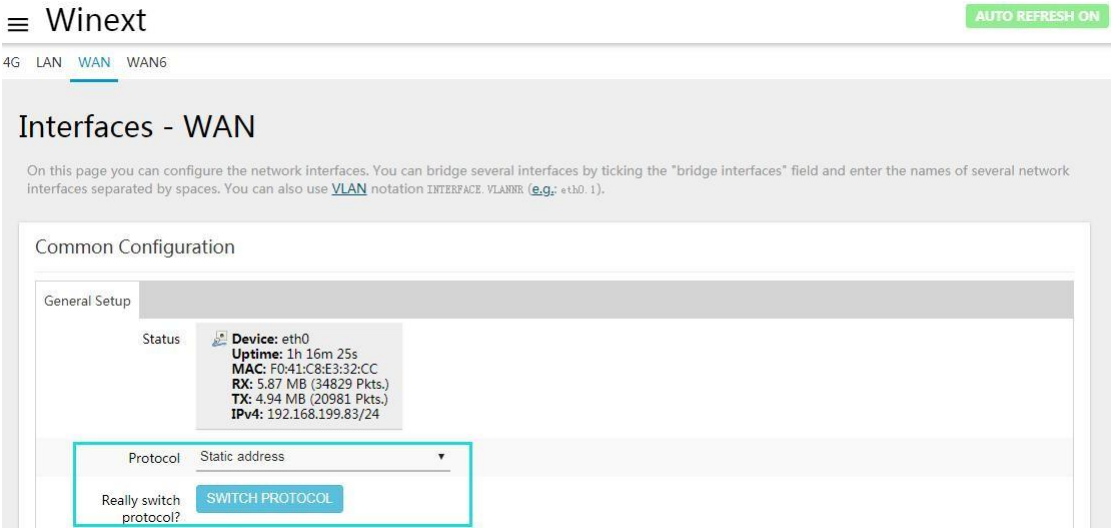


Figure: WAN Interface-2

a. Fill in **IP address, netmask, gateway address**

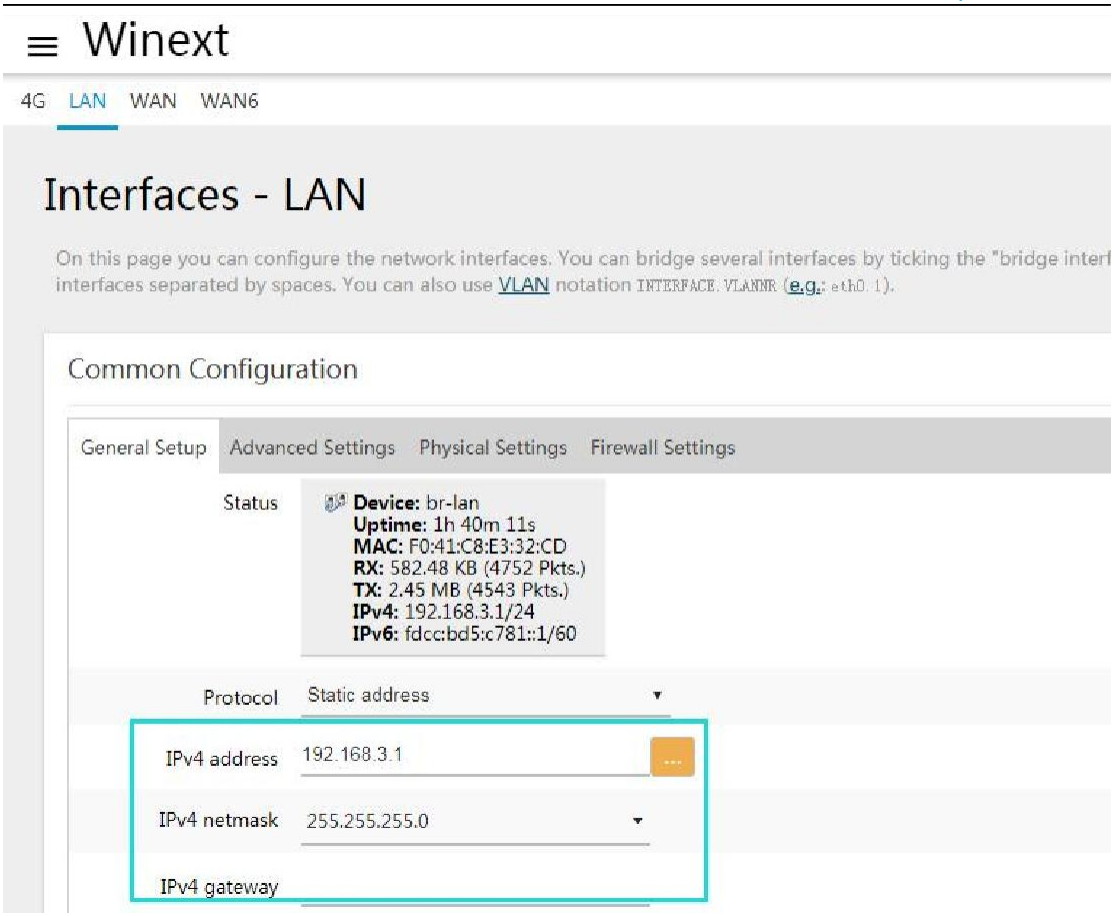


Figure: General setup

d. Set **Use gateway hop** to **10** in the **Advanced Settings interface**

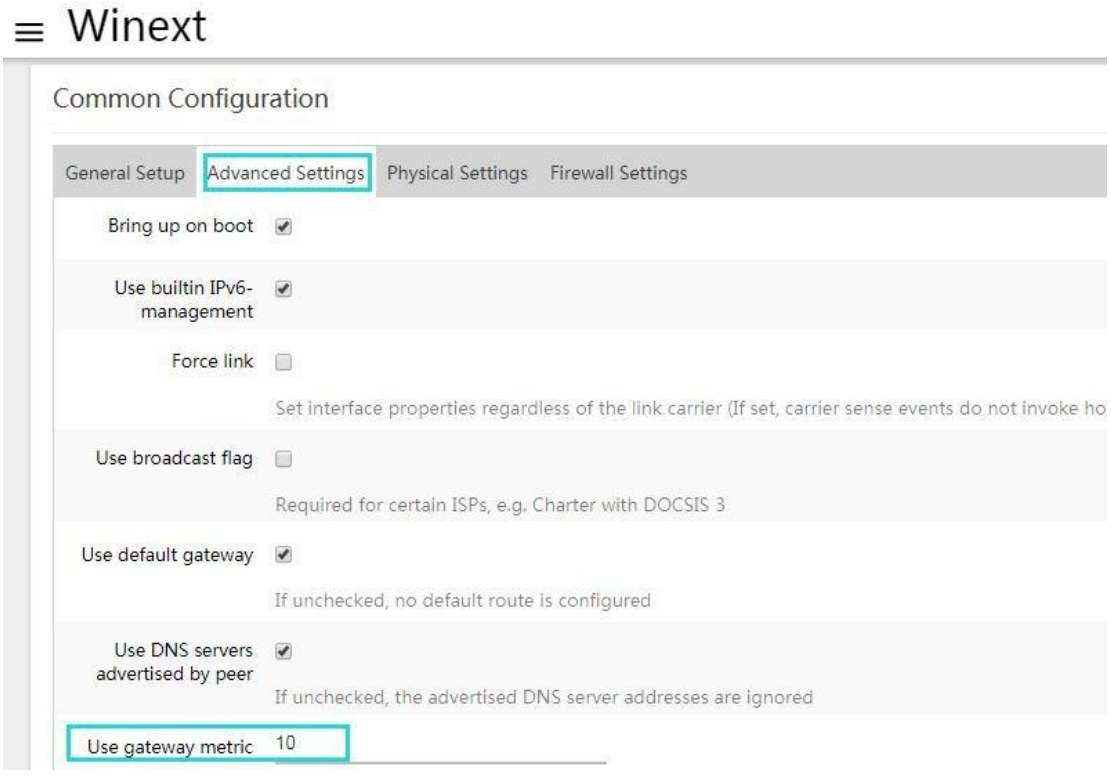


Figure: Advanced Settings

e. Click **SAVE & APPLY**

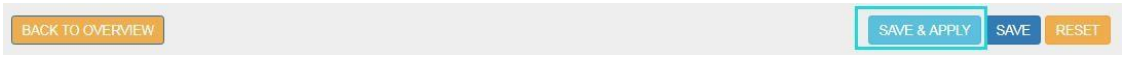


Figure: Save and apply

3. Check the network status via gateway WAN port: **Status → Overview → MWAN Interfaces**

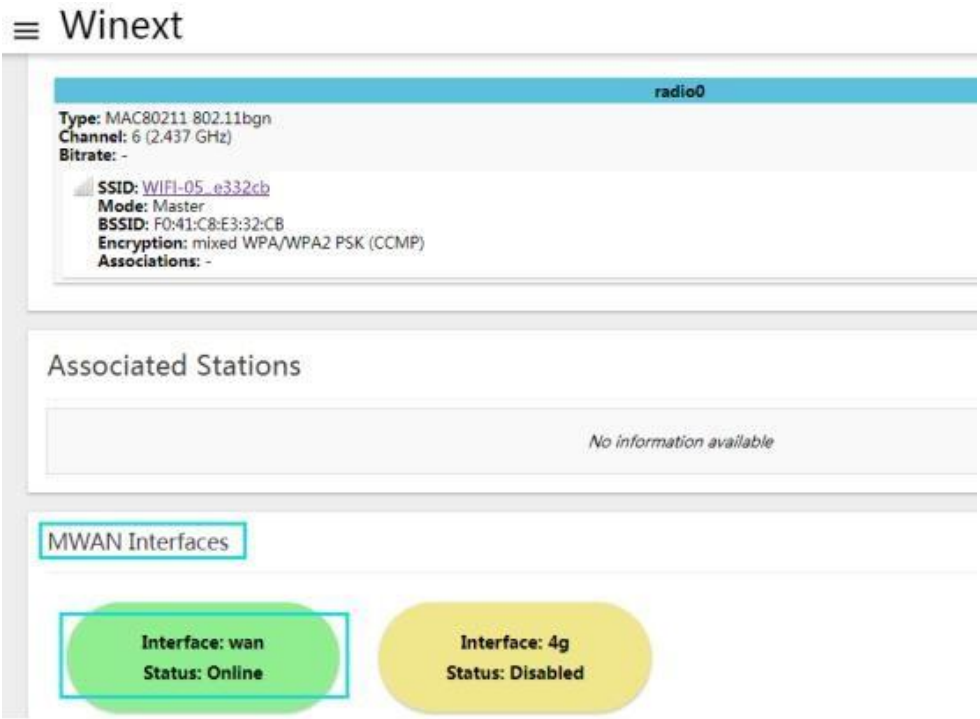


Figure: MWAN interfaces

5.2.3 Connect the network configuration via 4G

Insert the 4G card into the device 4G card slot (standard card). With card inserted, the gateway will automatically join the 4G network and enter the **Network → 4G/LTE**.

If 4G card not inserted, the 4G network status is shown as follows: **Overview → Network → 4G/LTE**

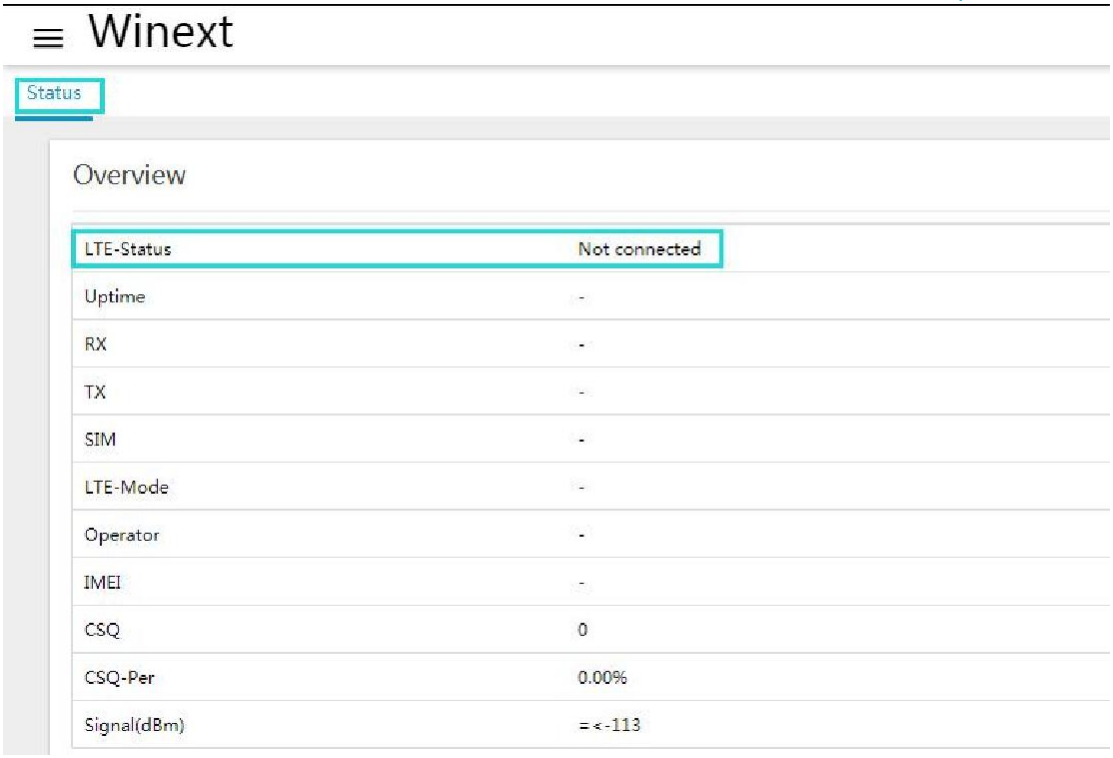
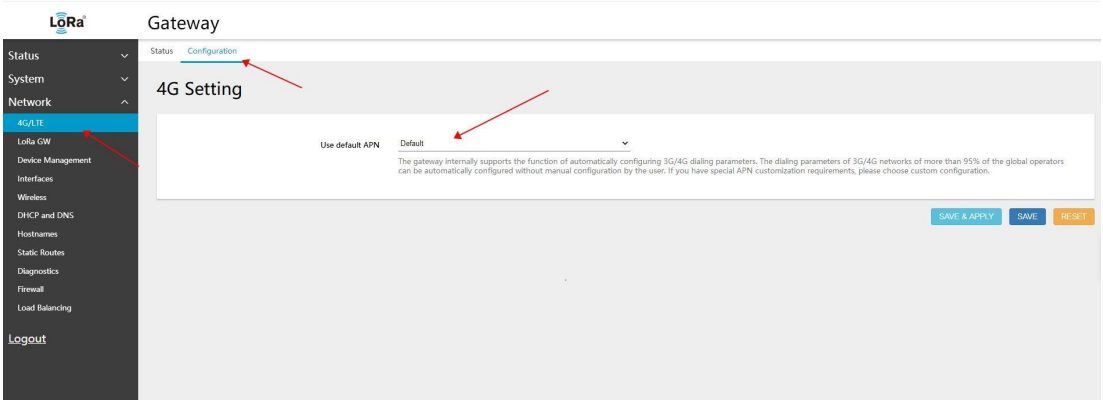


Figure: 4G SIM card connection status

4G dialing adopts QMI dialing, and the protocol is set as DHCP. The 4G parameters 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/ China Unicom/ China Telecom, most operators in southeast Asia and most operators in Europe do not need to set up APN); If you need to set, pls kindly see as below:



The gateway has high requirements for the network, which requires stable network and low delay. If there is no wired network and 4G network is used, the gateway shall be deployed and the location with better 4G signal shall be selected.

5.2.4 Connect the network configuration via WiFi

Note:

a. For WiFi connection, the device can be configured in STA+AP mode, but only to be done via wired cable connection (at LAN port or WAN port, it is recommended to join network via LAN port). Setting WiFi parameters through WiFi connection, it is likely that the WiFi will be turned off when it comes into effect, and then turned on, causing the loss of parameters

b. After WiFi configuration done, the router is connected and the GW1000 will send out hotspot SSID. If the device fails to connect to the router, the hotspot will disappear. STA and AP share the same channel. If the router the GW1000 was connected through WiFi is turned off or the password is changed, the GW1000 will not be connected to the router and the hotspot will disappear. In this situation, it needs to use the network cable to connect to the LAN port, and change the WiFi Settings of the GW1000.

c. When WiFi is connected, it is recommended not to connect WAN and 4G. It is recommended to connect via WAN port, and the wired connection will be more reliable.

Set the GW1000 wireless parameters to connect WiFi

1. The IP of the computer is set as acquiring automatic. It is recommended to use Google to log in **192.168.3.1** to enter gateway configuration interface, enter the gateway wireless configuration interface.

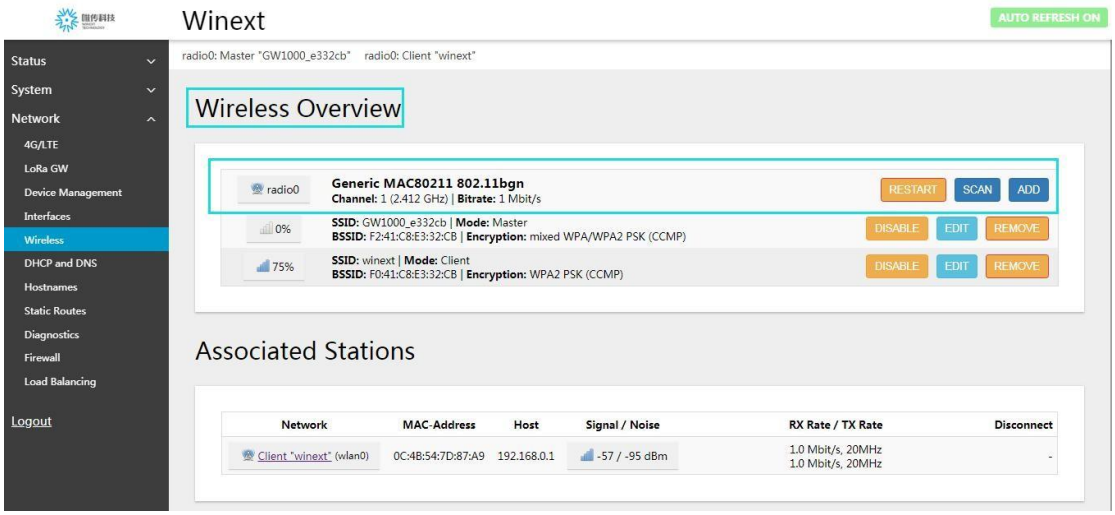


Figure: Wireless overview

2. Click **SCAN**

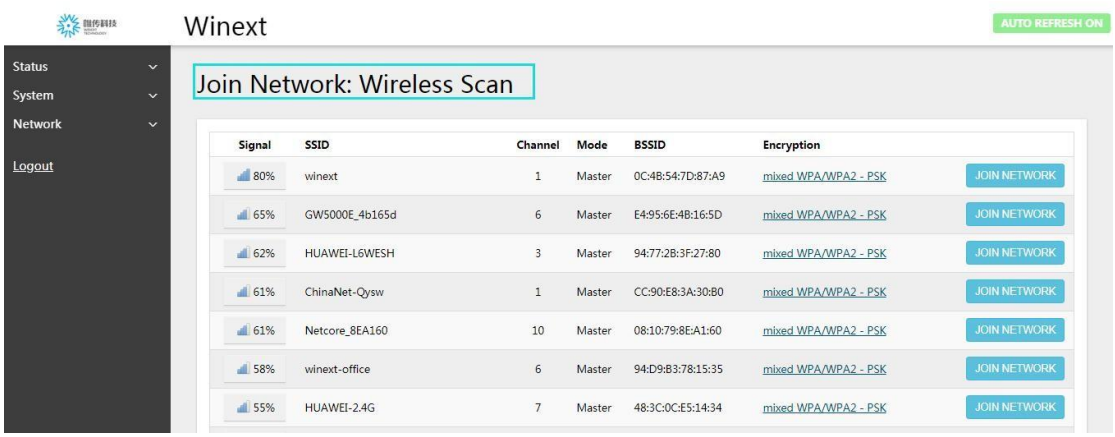


Figure: Wireless scan

3. Scan out the nearby WiFi network, select the WiFi available, and click **JOIN NETWORK**.

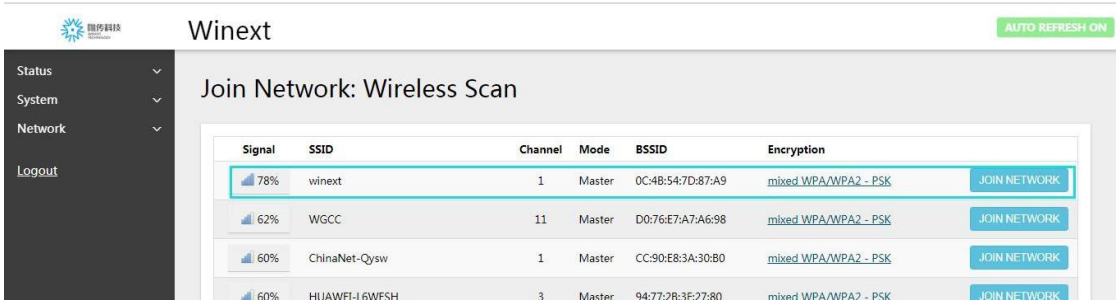


Figure: Join network

4. Input the WiFi password, **reset wireless configuration** without check, and click **SUBMIT**.

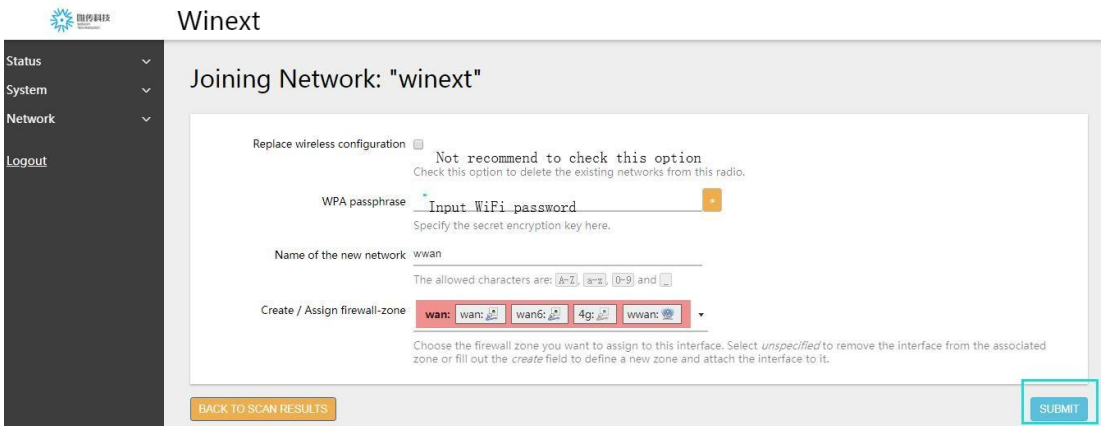


Figure: Submit wireless configuration

5. Click **Save& Apply**.

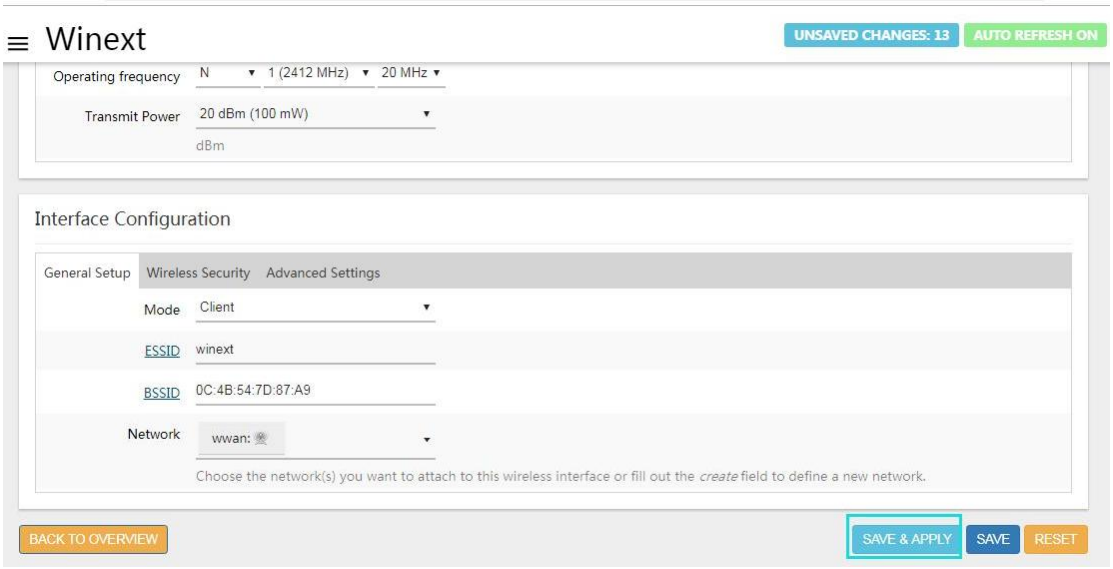


Figure: Save & apply wireless configuration

6. After WiFi connection done, the signal strength can be seen.

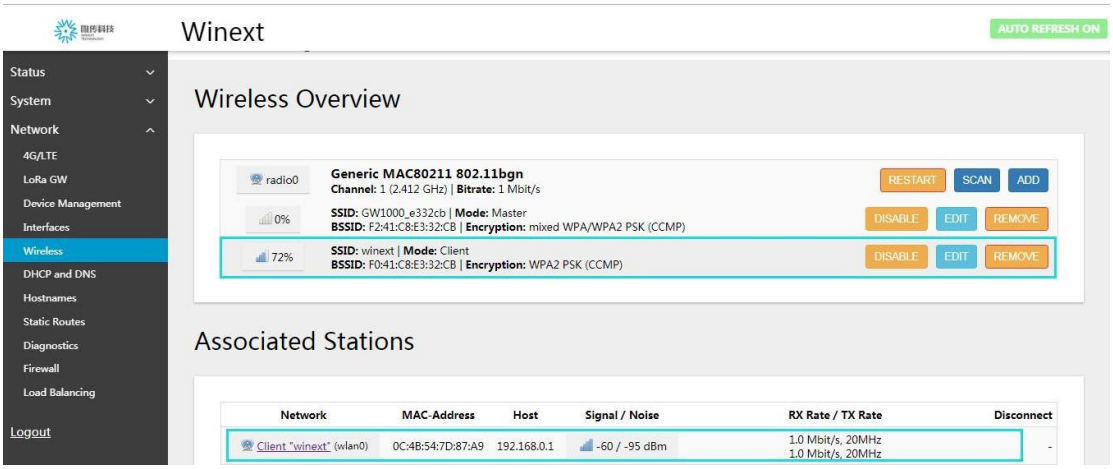


Figure: Check signal strength

7. At the interface page, check the IP assigned by the gateway

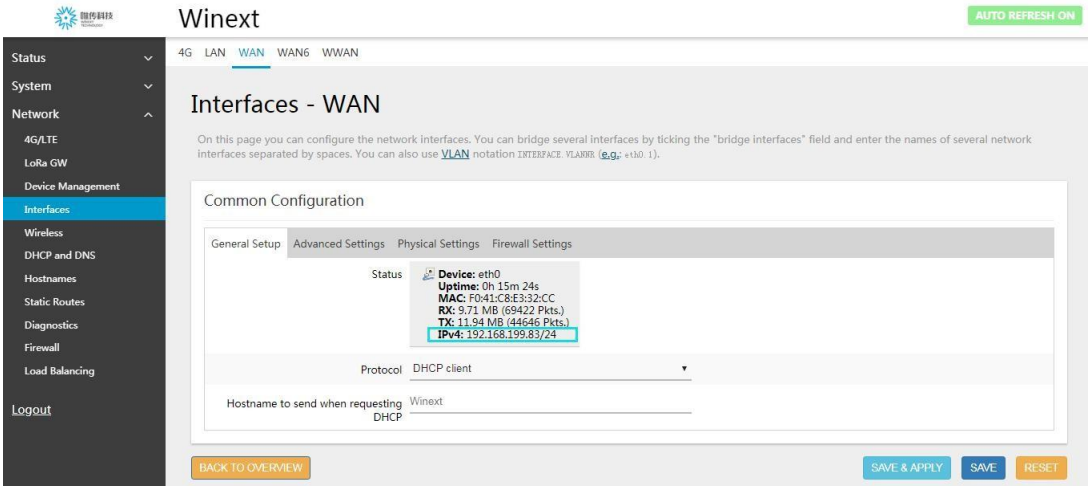


Figure: Check IP

8. At the diagnostics page, use the ping server (lora.smartkit.io) address to confirm that the gateway can connect the Network server.

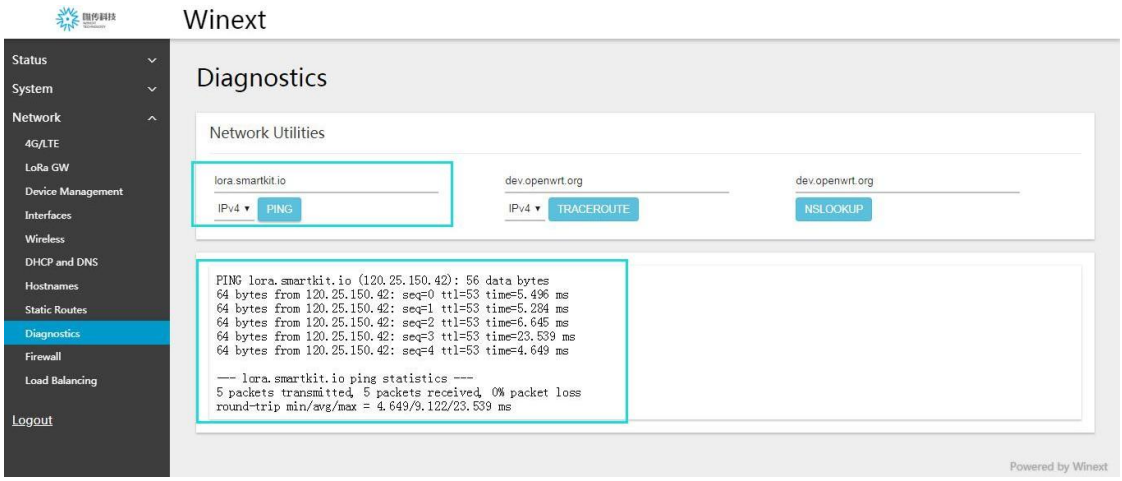


Figure: Check Network Server connection

5.3 Firmware upgrade of gateway

Enter **System/backup/Flash Firmware/Action**

1. Keep settings: please don't tick to select

2. Select file: Select the provided version in .bin format

3. Click **Flash image** as below

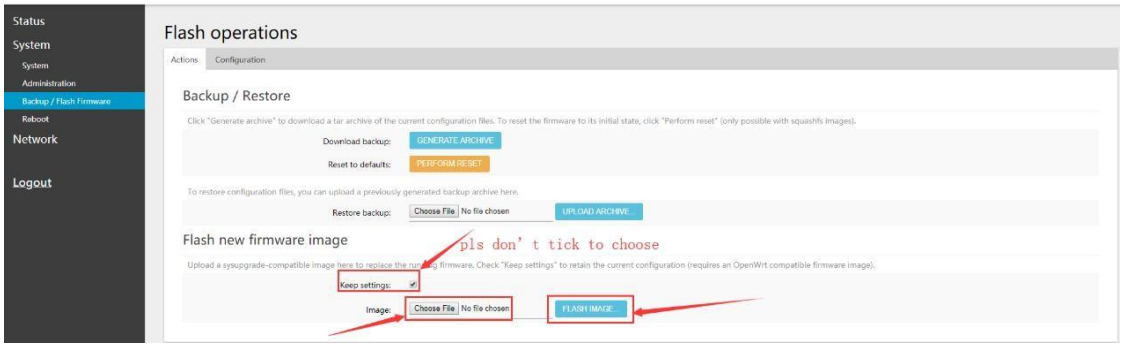


Figure: Flash operation

After click on **Flash image**, please wait for a moment until the upload completed. Then it comes to the interface of **Flash Firmware-Verify**, as below:

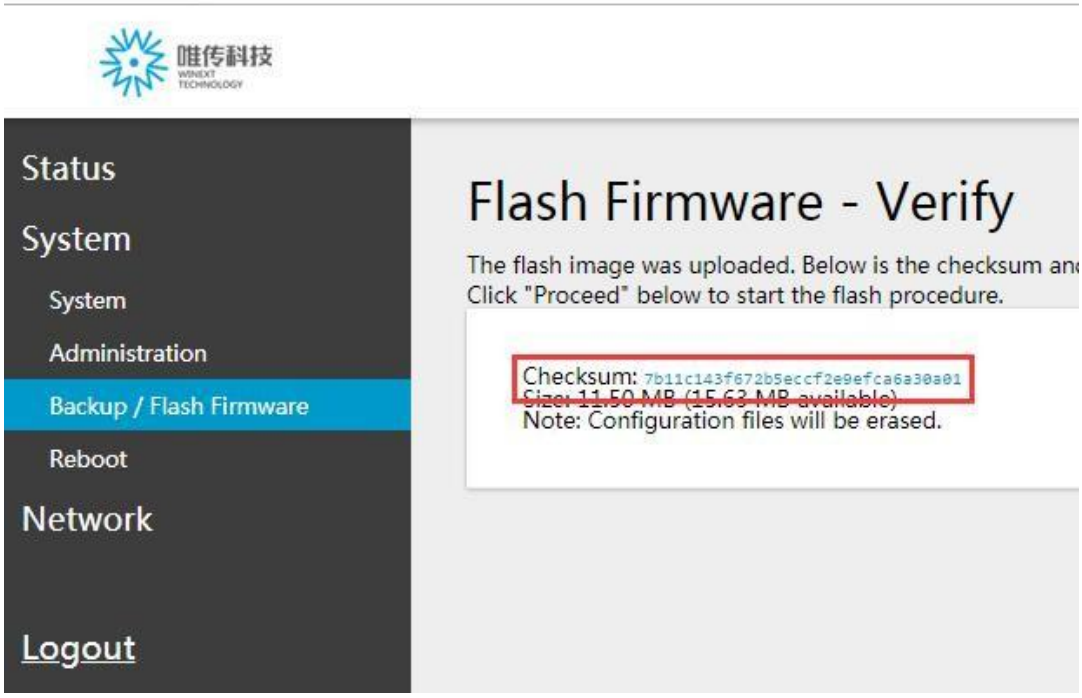


Figure: Flash firmware verify

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, please 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:

Figure: Check flash firmware

Note: After click **PROCEED** button, it's flashing the firmware, please 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.

6. FAQ

6.1 Troubleshooting

- Check if the gateway is powered normally
- Check if the gateway is running. If its system light is constant on, it indicates the gateway is working. Over long distance (e.g. the visual range is less than 50 meters), if the WiFi hotspot can be searched, it indicates the gateway is working.
- Check if the gateway is connected to network. If LoRaWAN server is deployed on the public network, it will show as either WAN Online or 4G Online. If LoRaWAN server is deployed on LAN, connected to network via WAN port with cable, you can ping on the gateway side, if server host can be pinged, it indicates the gateway is connected to network.

If the downstream data can't be received by node, you can check with several methods as below**:**

a. Check on the network server what's the TX ACK returned from gateway after sending **json down** data. If the error code is empty, it means the gateway can send that RF packet, if it's not empty, please refer to the error message.

b. Check network delay between the gateway and server on the gateway side. It can ping the server and the network delay should be less than 100ms. If the delay is too high, the receiving window of Class A cannot be sent.

c. See the gateway log to check first if **Json down** is received and check if **Send_done** is received. If they both are available, it means the gateway has sent RF data.

d. The node should check whether the frequency, rate and I/Q inversion are consistent with those issued by the server.

Please send the compressed and packaged log file of the gateway to Winext technicians to query faults if possible.

6.2 4G network connection

Enter: **Network**- **4G/LTE**

For gateway deployment, the network should be stable. If there is no wired network, we can also use 4G network, the device should be deployed at a position with strong 4G signal.

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.

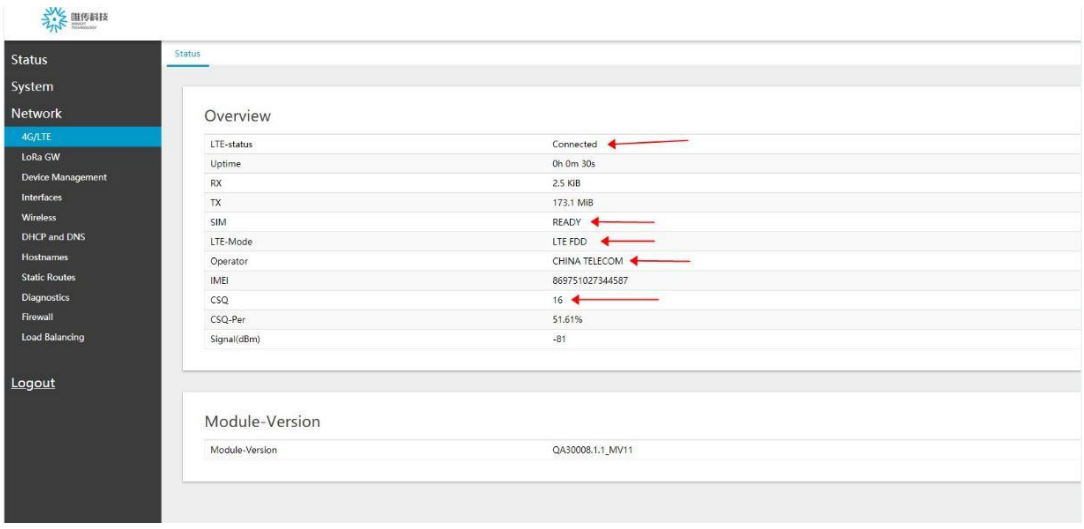


Figure: 4G/ LTE status

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 know 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 forces 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 forces 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
China Mobile	LTE TDD FDD LTE	TDSCDMA or other WCDMA or other
China Unicom	FDD LTE	EVDO or other
China Telecom		

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.