HEYUAN
INTELLIGENCE

LoRaWAN Gateway
IoT-LG-801
User Manual

Heyuan Intelligence Technology Co., Ltd

IMPORTANT DECLARATIONS

1. This document is an instruction manual. Its content will change as product is upgraded without notice. Please contact with Heyuan Intelligence Technology Co., Ltd to get the latest product specifications if it is needed.

2. Heyuan shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

3. Please read this manual carefully before the product is operated, and once you start, you'll be considered to have read this manual and accept all our terms.

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Contents

Chapter 1 Product Introduction

IoT-LG-801 is a new intelligent LoRaWAN gateway developed by Heyuan. It can realize data transmission function, facilitate remote, wireless and networked communication, easily realize interconnection with the platform, greatly reduce the complex development process of wireless products, enable your products to enter the market quickly at a lower cost, and can be widely used in industrial Internet of Things applications.

Product Picture

Chapter 2 Features and Function

2.1 Function Introduction

- **Power supply: DC 9 ~ 28V**
- **Supporting WIFI, Ethernet**
  - **Ready state**: When this method can obtain an IP, the network card is considered ready.
  - **Priority**: WIFI STA > Ethernet
  - **Network card selection logic**: The device will always select the ready network card with the highest priority for communication.

➢ **Led Indicator**

- **RF-LED**: LoRaWAN module is in receiving mode; it is always on when receiving and always off when transmitting.
- **SYS-LED**:
  - System started, LoRaWAN thread not started: On for 0.5 seconds, off for 0.5 seconds.
  - System started, LoRaWAN thread started: Always on.
- **WIFI-LED**:
  - WIFI STA not enabled: Always off.
  - WIFI STA searching for network: On for 0.5 seconds, off for 0.5 seconds.
  - WIFI STA connected: Always on.
- **LINK-LED**: Network port running normally; this light flashes.
- **SPD-LED**: Network port running normally; this light is always on.

2.2 Technical Parameter

	Parameters	Description
Power Supply	Power Supply	DC9-28V
	Standby Power	0.72W(12V)
Communication Port	Ethernet / WIFI(2.4G)	
LoRa Frequency	CN470MHz, EU868MHz, AU915MHz, AS915MHz,AS923MHz, IN865MHz	
Functions	NS connection	UDP Packet Forward
	Management Port	MQTT Native/Things Board
	Configuration	WEB 、MQTT remote configuration
	Upgrade	WEB, OTA

Chapter 3 Configuration

3.1 AP parameters and access address

The device enters AP mode upon power-on. The AP mode configuration is as follows:

```
# AP mode WIFI configuration
SSID: LoRaGW-xxxxxx
password: lora-gwwifi
xxxxxx (SN's last 6 digits)
IP address: 192.168.4.1
```

3.2 Parameter Settings

3.2.1 Frequency Point Configuration

The gateway has 8 channels, which are controlled by two radio chips (radio0 and radio1). The channel frequency settings are configured through radio0 and radio1. The frequency mapping of these 8 channels to radio0 and radio1 may vary by region. For details, see below

- CN470

CN470(the radio0 and radio1 with 800KHZ difference， default radio=470600000Hz,radio1=471400000Hz)
freq0 = RADIO0-300KHz,default 470.3MHz
freq1 = RADIO0-100KHz,default 470.5MHz
freq2 = RADIO0+100KHz,default 470.7MHz
freq3 = RADIO0+300KHz,default 470.9MHz
freq4 = RADIO1-300KHz,default 471.1MHz
freq5 = RADIO1-100KHz,default 471.3MHz
freq6 = RADIO1+100KHzdefault 471.5MHz
freq7 = RADIO1+300KHz,default 471.7MHz

- IN865

IN865(default radio=865200000Hz,radio1=866385000Hz)

- EU868

EU868(default radio=867500000Hz,radio1=868500000Hz)
freq0 = RADIO1-400KHz　default 868.1MHz
freq1 = RADIO1-200KHz　default 868.3MHz
freq2 = RADIO1 default 868.5MHz
freq3 = RADIO0-400KHz　default 867.1MHz
freq4 = RADIO0-200KHz　default 867.3MHz
freq5 = RADIO0 default 867.5MHz
freq6 = RADIO0+200KHz　default 867.7MHz
freq7 = RADIO0+400KHz　default 867.9MHz

- US915

US915(default radio=904300000Hz,radio1=905000000Hz) //US915_1
freq0 = RADIO0-400KHz　default 903.9MHz
freq1 = RADIO0-200KHz　default 904.1MHz
freq2 = RADIO0 default 904.3MHz
freq3 = RADIO0+200KHz　default 904.5MHz
freq4 = RADIO1-300KHz　default 904.7MHz
freq5 = RADIO1-100KHz　default 904.9MHz
freq6 = RADIO1+100KHz　default 905.1MHz
freq7 = RADIO1+300KHz　default 905.3MHz
chan_LoRa_Std = radio0+300Khz,default 904.6MHz

- AU915

AU915(default radio=915600000Hz,radio1=916300000Hz) //AU915_0

freq0 = RADIO0-400KHz default 915.2MHz
freq1 = RADIO0-200KHz default 915.4MHz
freq2 = RADIO0default 915.6MHz
freq3 = RADIO0+200KHz default 915.8MHz
freq4 = RADIO1-300KHz default 916.0MHz
freq5 = RADIO1-100KHz default 916.2MHz
freq6 = RADIO1+100KHz default 916.4MHz
freq7 = RADIO1+300KHz default 916.6MHz

chan_LoRa_Std = radio0+300Khz,default 915.9MHz

- AS923

AS923(default radio=922300000Hz,radio1=923100000Hz) //AS923

freq0 = RADIO0-300KHz default 922.0MHz
freq1 = RADIO0-100KHz default 922.3MHz
freq2 = RADIO0+100KHZ default 922.4MHz
freq3 = RADIO0+300KHz default 922.6MHz
freq4 = RADIO1-300KHz default 922.8MHz
freq5 = RADIO1-100KHz default 923.0MHz
freq6 = RADIO1+100KHz default 923.2MHz
freq7 = RADIO1+300KHz default 923.4MHz

chan_LoRa_Std = radio0+300Khz,default 922.6MHz

3.2.2 Common Frequency Points and Radio Mapping

Common Frequency Points	Frequency Range（MHz）	Radio0(Hz)	Radio1(Hz)
CN470_0	470.3-471.7	470600000	471400000
CN470_10	486.3-487.7	486600000	487400000
EU868	868.1,868.3,868.5,867.1, 867.3,867.5,867.7,867.9	867500000	868500000
EU433	433.175,433.375,433.575,433.775 433.975,434.175,434.375,434.575	433475000	434275000
US915_0	902.3-903.7	902700000	903400000
US915_1	903.9-905.3	904300000	905000000
AU915_0	915.2-916.6	915600000	916300000
AS923	922.0-923.4	922300000	923100000
IN865	865.0625, 865.2325, 865.4025, 865.985, 866.185, 866.385, 866.585, 866.785	865200000	866385000

3.2.3 LoRaWAN NS for Test

Domain Name:lora.ansitw.com IP：106.52.124.231

WEB address： 106.52.124.231:8080

Packet forwarding address：

- CN470_0:106.52.124.231:1700
- CN470_10:106.52.124.231:1704
- EU868:106.52.124.231:1701
- US915_0:106.52.124.231:1702
- US915_1:106.52.124.231:1703
- AU915:106.52.124.231:1705
- AS923:106.52.124.231:1706
- IN865:106.52.124.231:1707

Test Account：

WEB address：106.52.124.231:8080

Test Account：test@loragw.com

Password：test123456

Note:

1.The account is for testing only

2.Since the test account is publicly accessible and may be used by multiple users, please do not delete data from devices other than your own during use

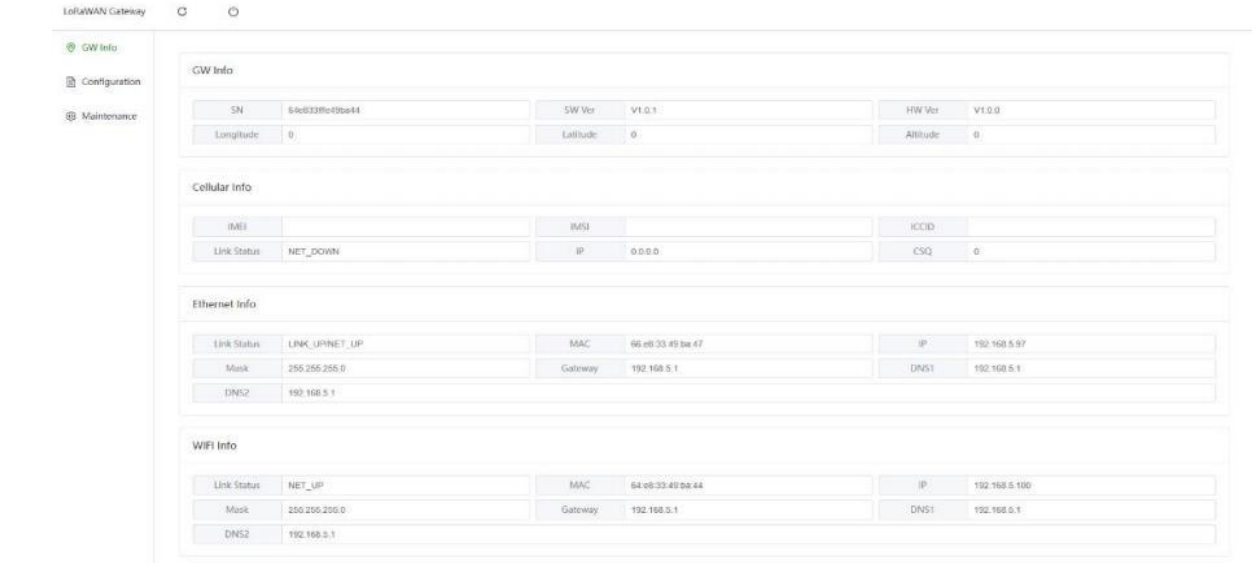
3.Please do not run important business data on the test NS, as it is not secure.

3.3 WEB Configuration

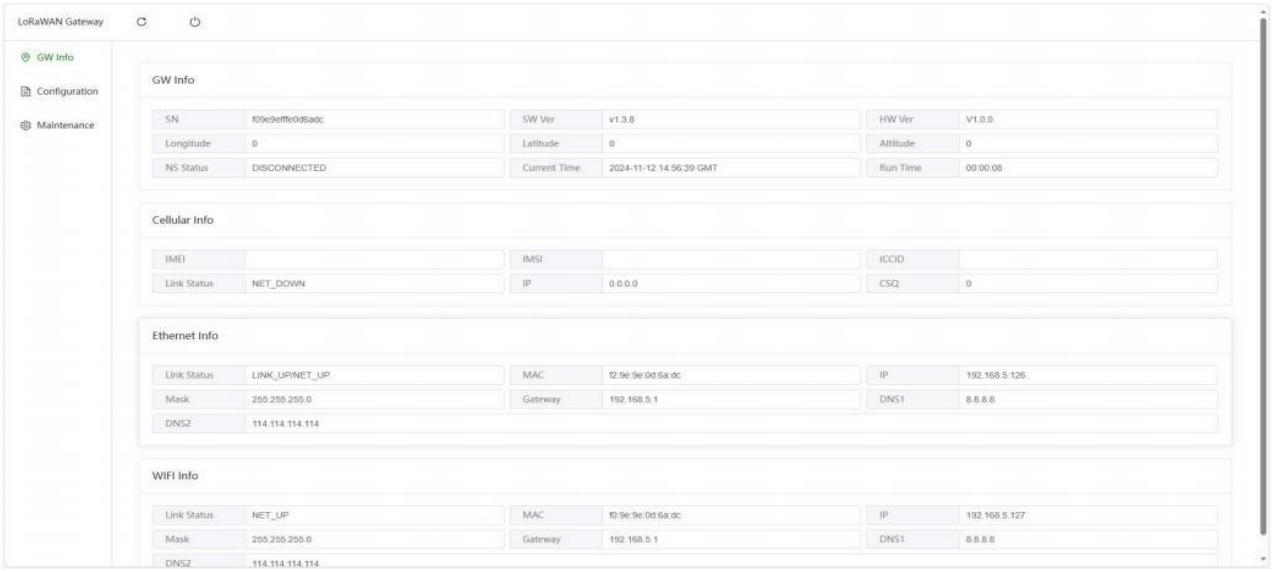
If connecting to the gateway via AP mode, the WEB access address is http://192.168.4.1; otherwise, it is the IP assigned to the device.

3.3.1 General Overview

- **Menu bar**: Refresh and restart the gateway.
- **GW Info**: Gateway information page.
- **Configuration**: Gateway configuration page for viewing and modifying settings. Any configuration changes require a restart to take effect.
- **Maintenance**: Maintenance page for device upgrade and factory reset.

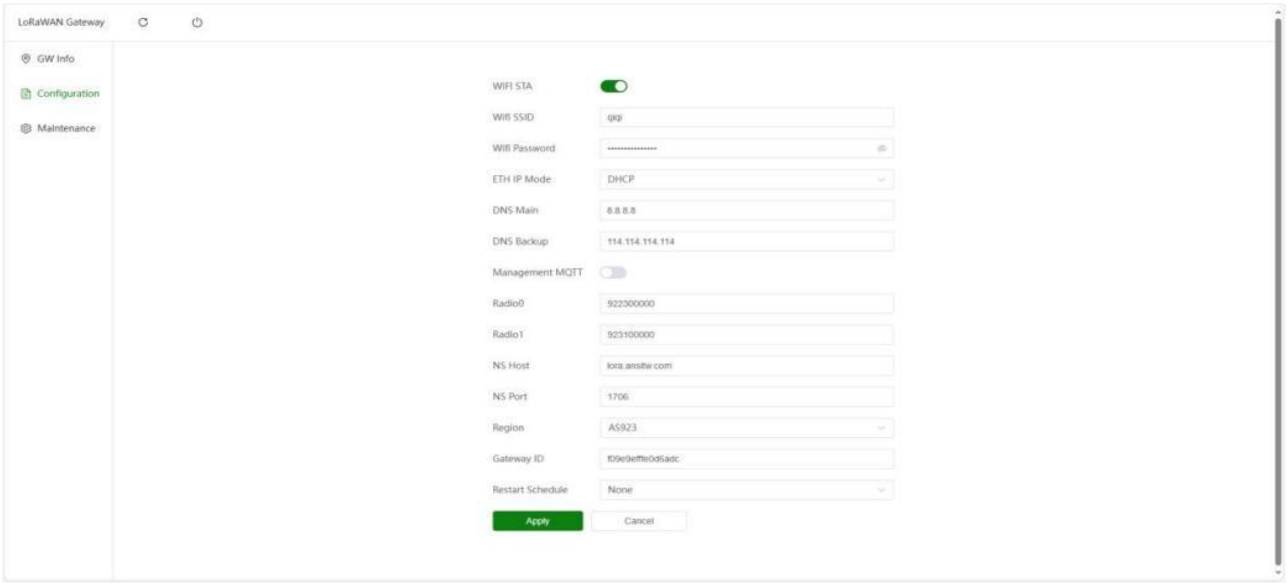


3.3.2 Gateway Information

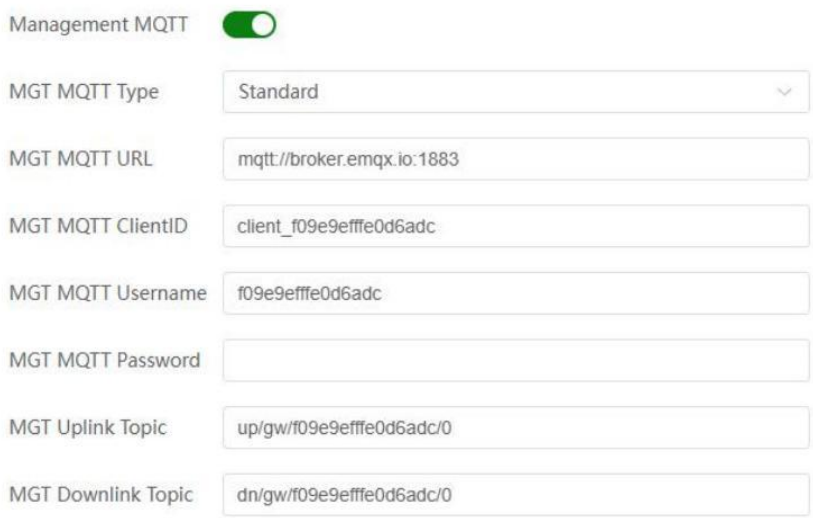


- The gateway's SN is generated based on the MAC address, which is unique to IEEE and therefore generally globally unique.
- The default Gateway ID (GWEUI) of the gateway is the same as the SN, and the Gateway ID can also be modified in the configuration page.
- WIFI Info displays the connection status of WIFI STA, which is not displayed by default and will be displayed after the WIFI STA function is enabled.
- IMEI is the unique ID of the cellular module, and ICCID is the SIM card number (not the phone number).

3.3.3 Configuration



- **WIFI STA**: Supports WIFI access point mode for network connection.
  Management MQTT: Used to configure MQTT parameters for the management channel.

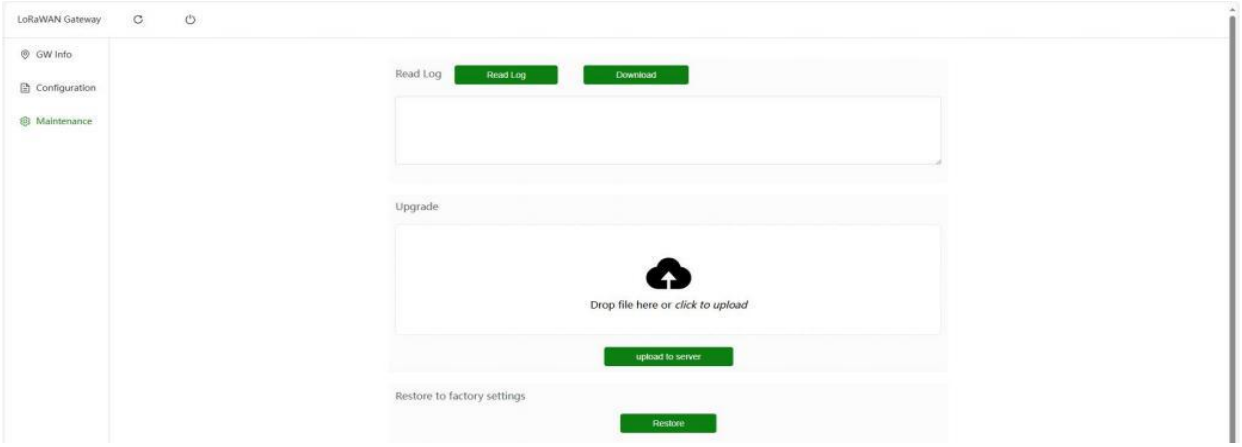


  - Once enabled, gateway heartbeat packets will be received periodically (every 60 seconds) to maintain the gateway online status and synchronize gateway configurations simultaneously.
  - Supports standard MQTT and ThingsBoard.
  - Username, Password, and ClientID can be configured.
  - MQTTS is not currently supported for the management channel.
- **Frequency Configuration**: Requires setting the Region, Radio0, and Radio1.
- **NS Direction**: Configured by modifying NS Host and NS Port, with the default pointing to the test NS.
  - Currently only supports UDP Packet Forward.
  - Major NS platforms such as Chirpstack, TTN, and Tencent Cloud all support UDP Packet Forward.

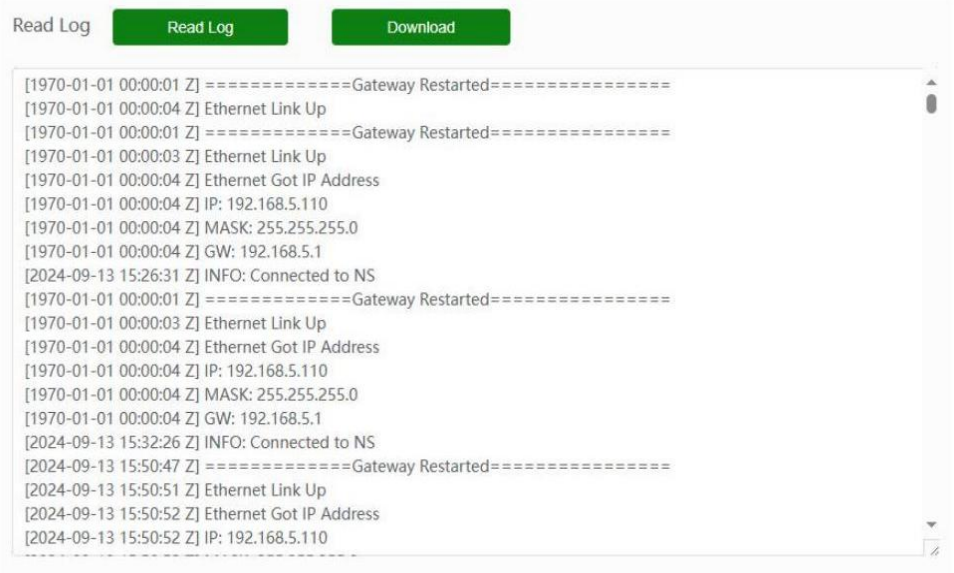
- **Restart Schedule**: Supports configuring a restart plan, allowing fixed-interval restarts or scheduled-time restarts.

Note: All modifications on the above page need to be applied by clicking "Apply" first and then restarted to take effect.

3.3.4 Maintenance



Read Log: The device saves simple logs, including restarts, network status changes, and NS connection status changes, which can be read from the device's stored LOG.



Upgrade: Drag the file or select the file to perform the upgrade.

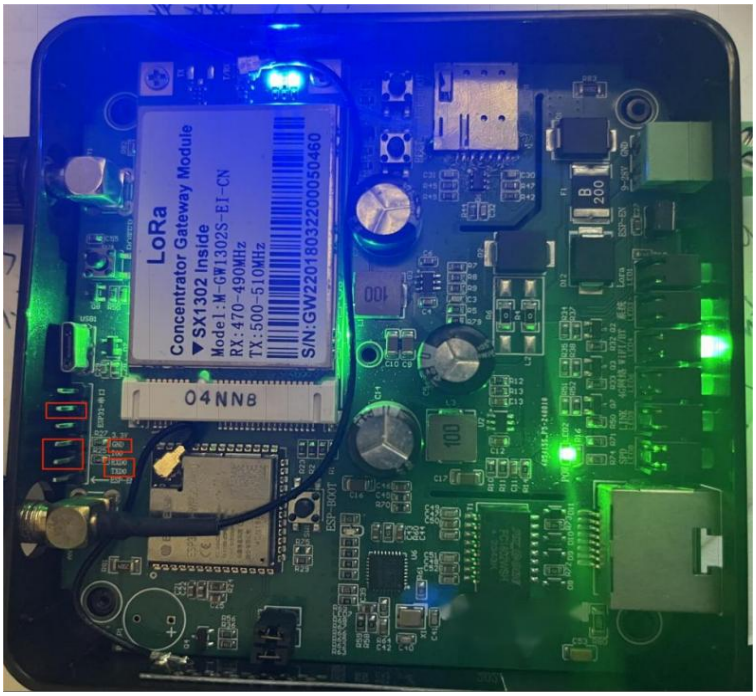
Restore to factory settings

3.4 Command Line Configuration

The device supports configuration via the command line, and in case of abnormalities, logs can be viewed through the serial port for troubleshooting.

3.4.1 Serial Port Connection

As shown in the figure, connect the TTL interface. The silk screen on the board corresponds to the pin header order one-to-one. Note that TX and RX should be cross-connected (i.e., TX->RX, RX->TX). If the pin header is not soldered on the board, it needs to be soldered manually. After the serial port is connected, the device will automatically output logs.



3.4.2 Command Introduction

The device supports command-line configuration. Please use putty or XSHELL, and set the serial port configuration to 115200,8,N,1.

Note: Any parameter modification requires a restart to take effect, which means you need to enter the reboot command.

- help, view all commands

```
255MG-801> help
pkt_fwd     [-h] [--restore] [--host=<UDP Host>] [--port=<UDP Port>] [--gwid=<gateway id>]
  ESP32 packet forwarder based on sx1302_hal
    --restore      clean NVS config
   -h, --help      print help
  --host=<UDP Host>      UDP Host
  --port=<UDP Port>      UDP Port
  --gwid=<gateway id>      Gateway Id
```

```
ifconfig
  printf network status
reboot
  reboot the system
wifi
  set wifi parameters
help    [<string>]
  Print the summary of all registered commands if no arguments are given,
  otherwise print summary of given command.
      <string>    Name of command
```

It can be set via the device's pkt_fwd command.

- **pkt_fwd**: Used to configure information related to the device's pkt_fwd, and can be used to set the NS address and port.
- **ifconfig**: Used to view information of all network cards.

```
255MG-801>
255MG-801> ifconfig
==========ifconfig===========
--------if:ppp prio:20--------
link:       NET_UP
ip:          10.145.122.176
mask:        255.255.255.255
gw:          10.64.64.64
dns1:        218.85.157.99
dns2:        218.85.157.99
IMEI:        860761079936981
IMSI:        460115210945489
ICCID:     89860322245923849833
CSQ/BER:     23/0
--------if:eth prio:50--------
link:       LINK_DOWN/NET_DOWN
MAC:         66:e8:33:49:ba:47
ip:          0.0.0.0
mask:        0.0.0.0
gw:          0.0.0.0
dns1:        218.85.157.99
dns2:        218.85.157.99
--------if:ap prio:10--------
MAC:         64:e8:33:49:ba:45
ip:          192.168.4.1
ssid:       esp32
pswd:        esp32wifi
==========ifconfig end===========
255MG-801>
```

- **wifi**: Can be used to view and set the wifi ssid and password.
    - **Read wifi configuration**

```
255MG-801> wifi
wifi_ssid:jiji
```

    - **Configure wifi connection:** The format is wifi {ssid} {password}

```
255MG-801> wifi 255mesh 255mesh123456
set wifi_ssid: Done
set wifi_pswd: Done
set ns_host: Done
set ns_port: Done
set gw_id: Done
set wifi_mode: Done
set freq_region: Done
set freq_radio0: Done
set freq_radio1: Done
set mgt_enable: Done
set mgt_url: Done
set mgt_type: Done
set mgt_clientid: Done
set mgt_username: Done
set mgt_tsbd_tele: Done
set mgt_tsbd_req: Done
set mgt_tsbd_resp: Done
set mgt_uptopic: Done
set mgt_dntopic: Done
set cfg_inited: Done
set eth_cfg: Done
set restart_plan: Done
set dns_cfg: Done
Save config to NVS... Done

255MG-801> wifi
wifi_ssid:255mesh
wifi_pswd:255mesh123456
255MG-801>
```

- **reboot**: Used to restart the device. Any parameter modifications require a restart to take effect.

Chapter 4 Verification Test Method

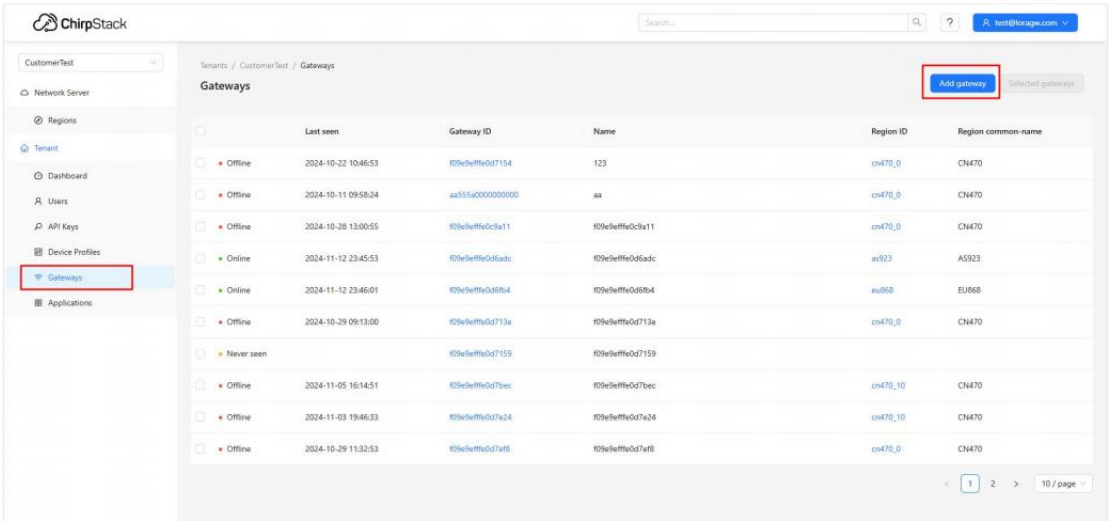
1. Power on the device.
2. Connect to the device's WIFI hotspot (ssid: LoRaGW-xxxxxx, password: loragwwifi), and enter (http://192.168.4.1) in the browser to access the device's configuration page.
3. Test the Ethernet: Connect the device to the router. If the device can obtain an IP address via DHCP, the Ethernet function is normal.
4. After the device is connected to the network, the SX1302 module starts. Enter the device's GWID (GWID is SN by default) into the NS server. If the gateway is online on the NS server, the SX1302 function is normal.
5. At this point, all hardware functions have been verified and the test is passed.

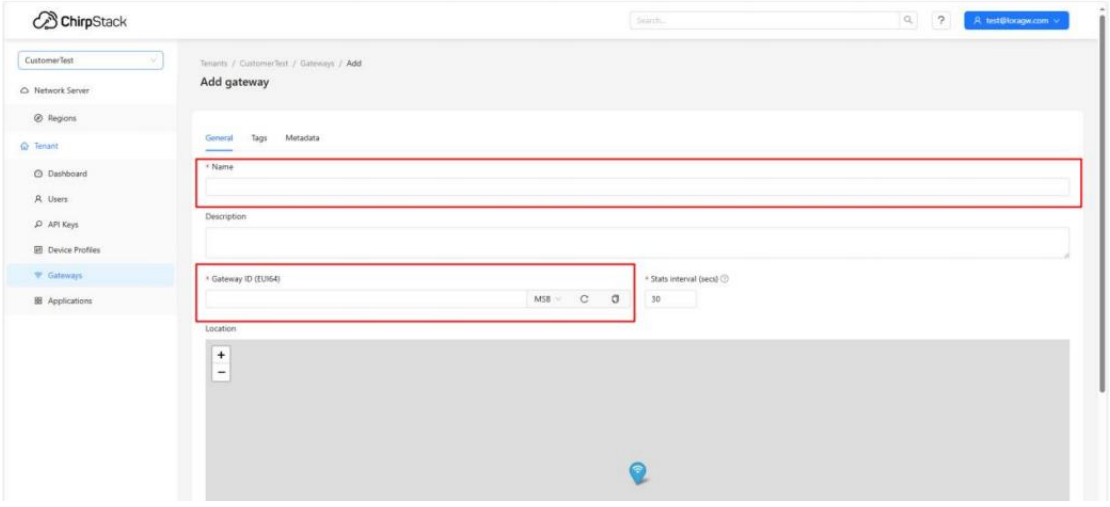
Chapter 5 NS Connection

The gateway uses the UDP Packet-forward protocol to connect to the NS. This protocol is designed by Semtech and is widely used between LoRaWAN Gateways and NS.

5.1 ChirpStack Connection

5.1.1 Add a new Gateway



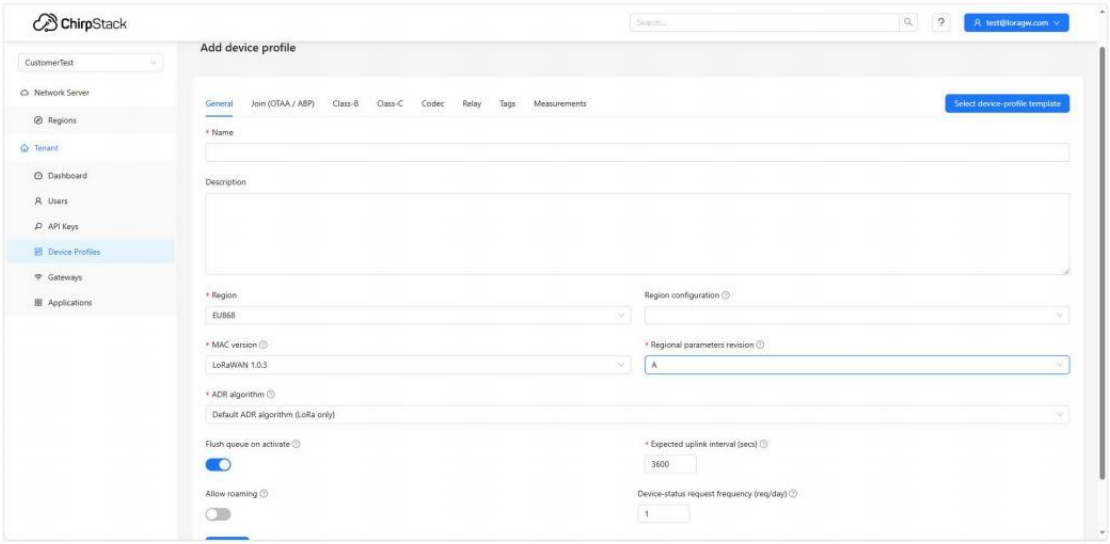


1. Name can be any string, or the same as Gateway ID.
2. For Gateway ID, just copy the Gateway ID of the gateway and fill it in.
3. After filling in, scroll the page and click Submit below to submit.

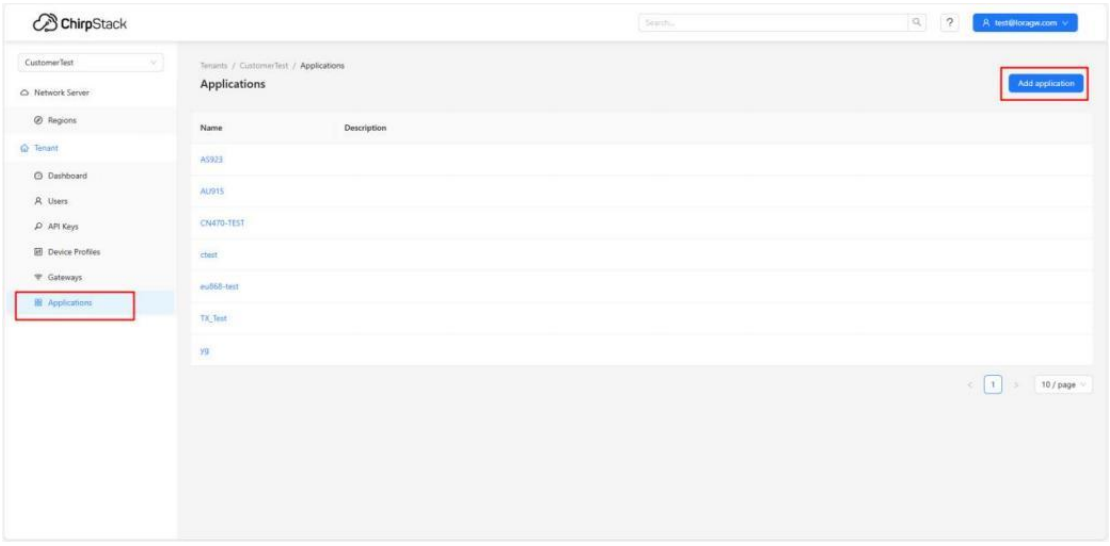
5.1.2 Add Devices

➢ **Creat devices profiles**

Just select the appropriate frequency band, network access method, and Class according to the device's situation.



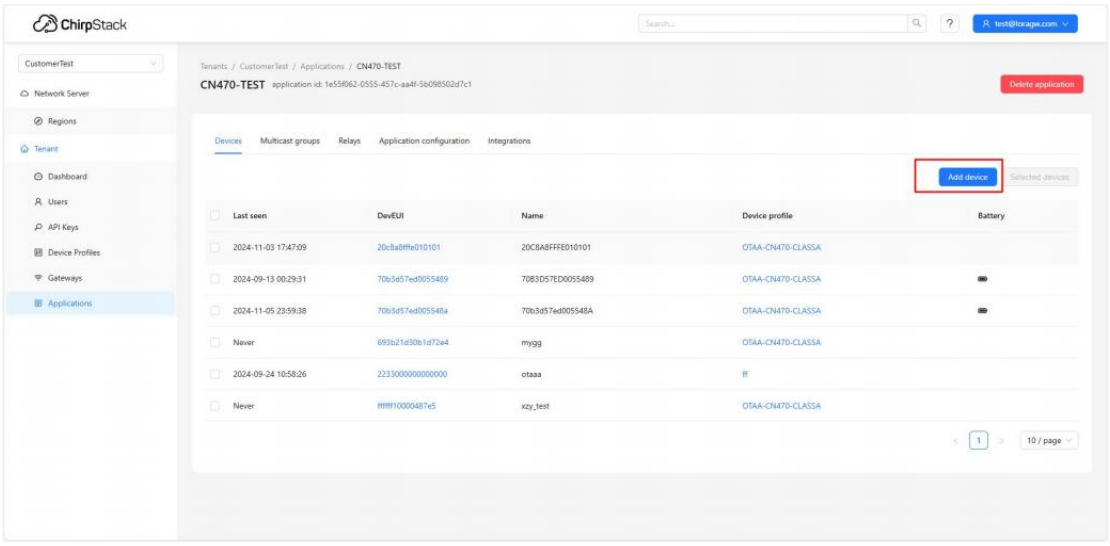
➢ **Application**

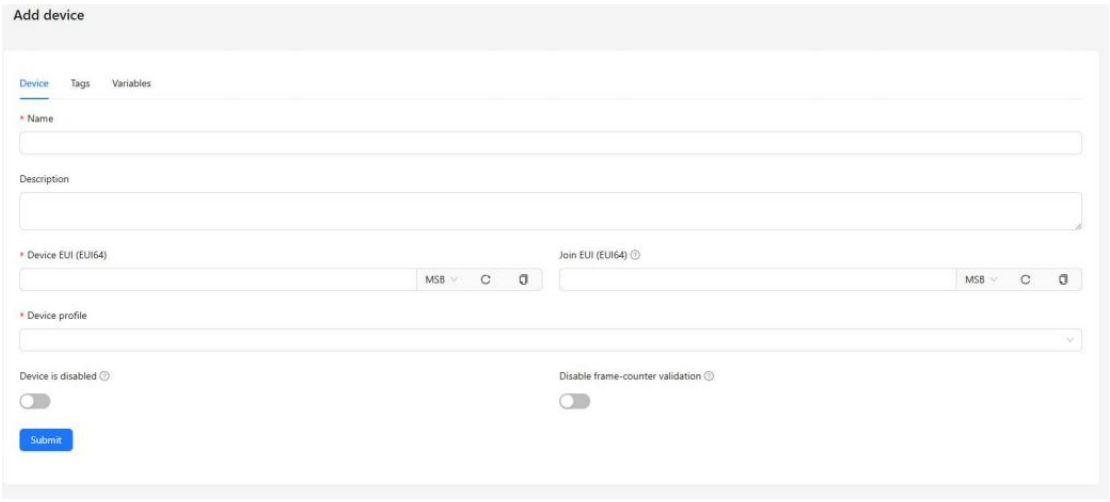


➢ **Add Devices**

Add Devices

➢





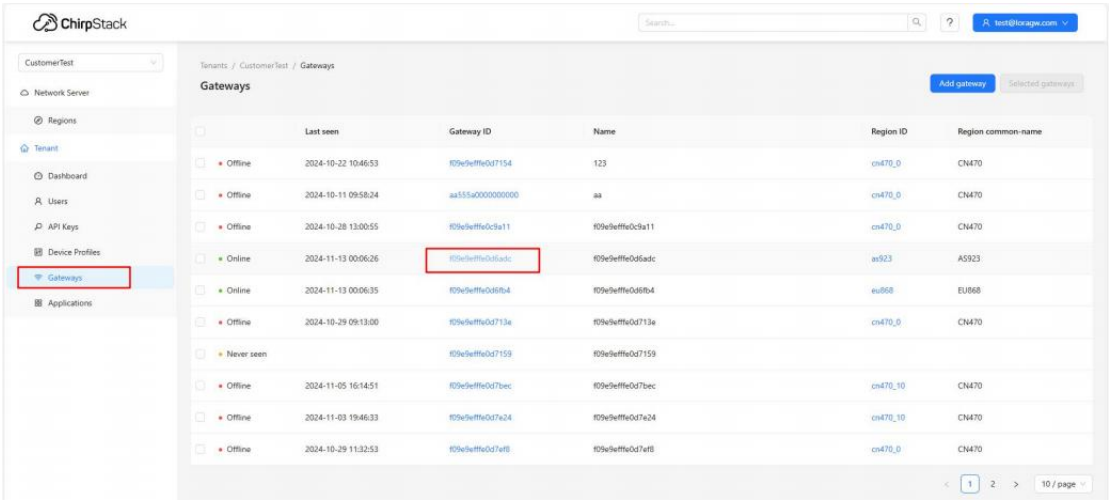
➢

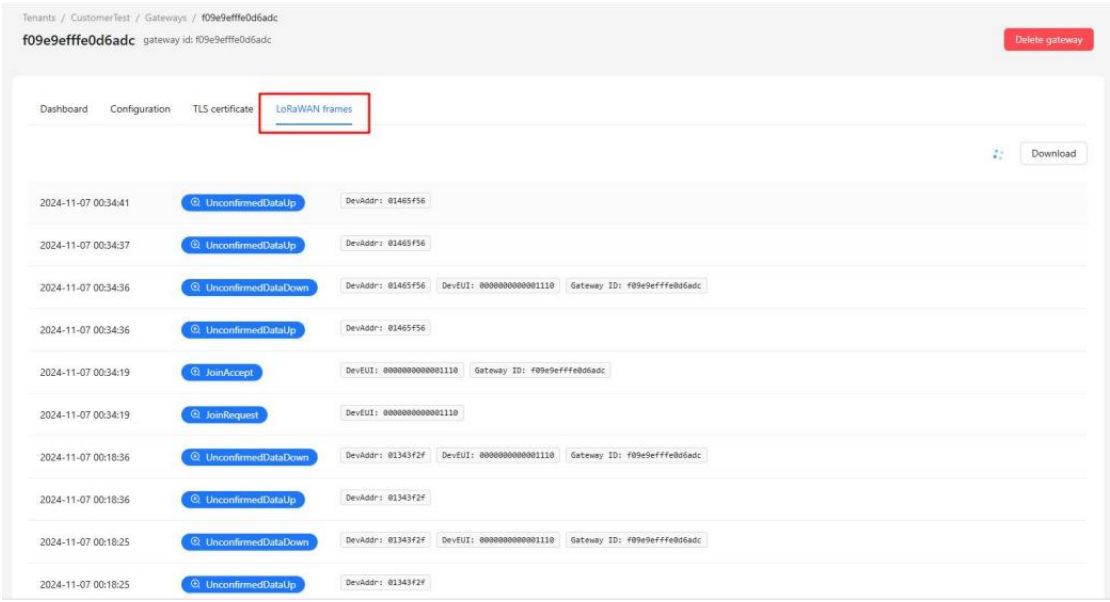
Note: 1.When adding a device, a key is required. Different keys need to be entered for OTAA and ABP.
2.The APPEUI (JoinEUI) of OTAA is in plaintext, so it does not need to be entered.

➢ Check Data

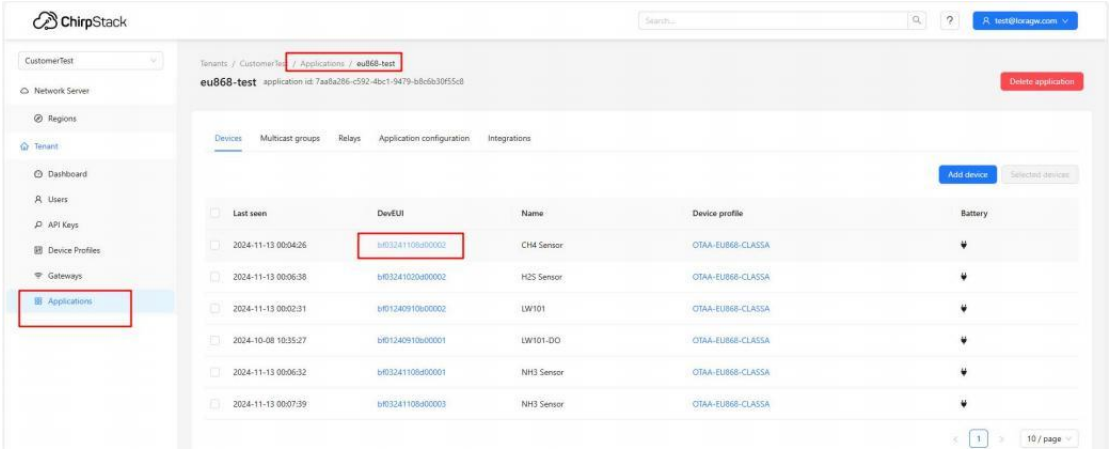
● Gateway Data

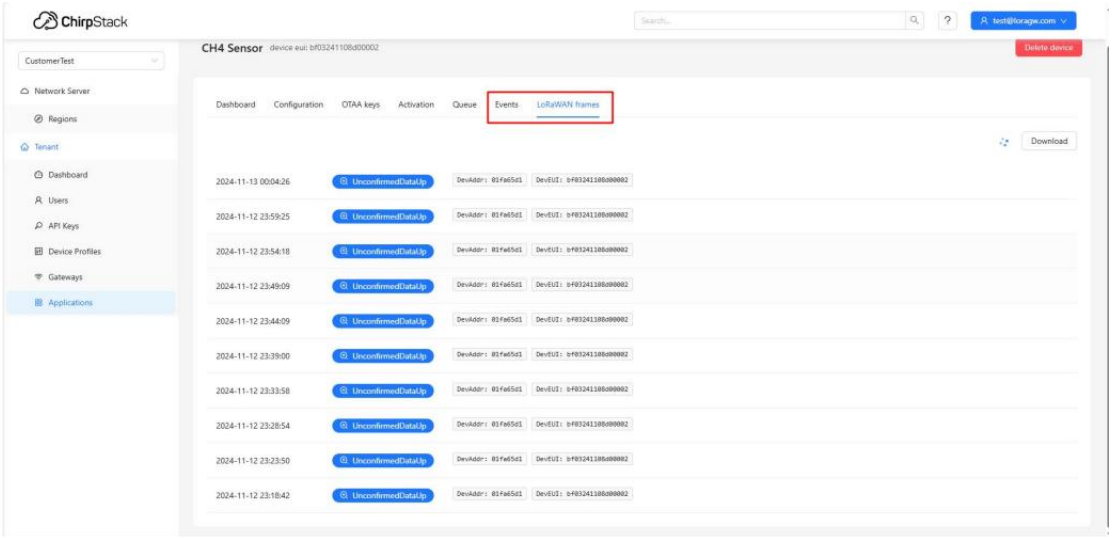
The data viewed here is the original data sent and received by the gateway, so it is encrypted.

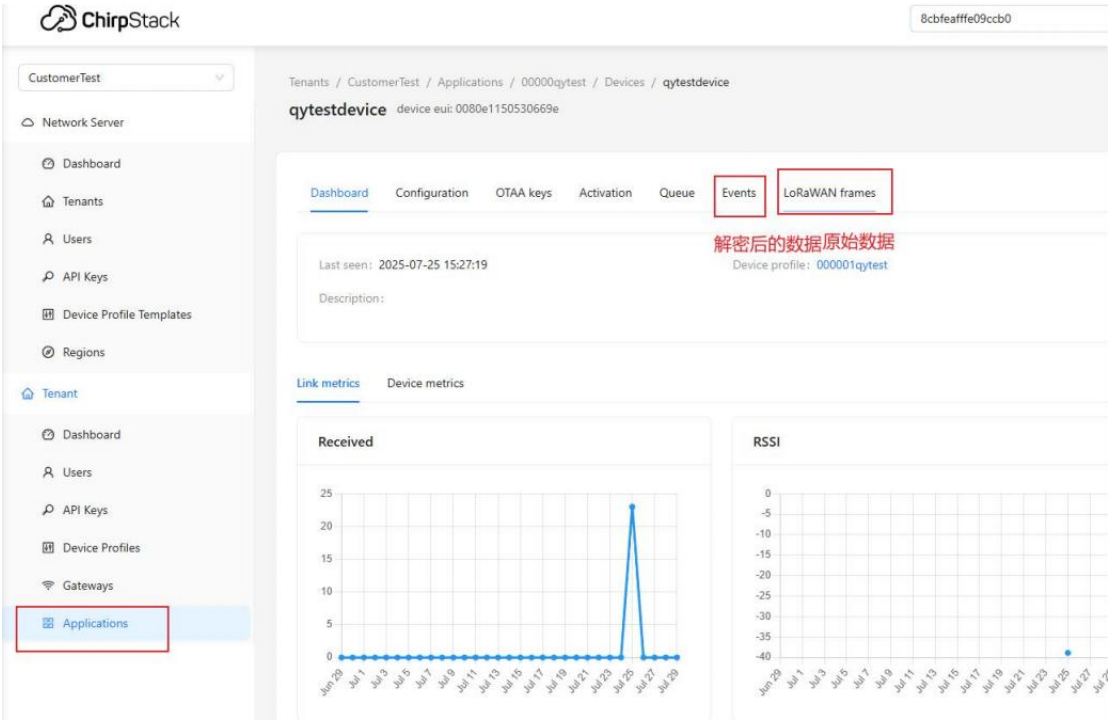




● Node data





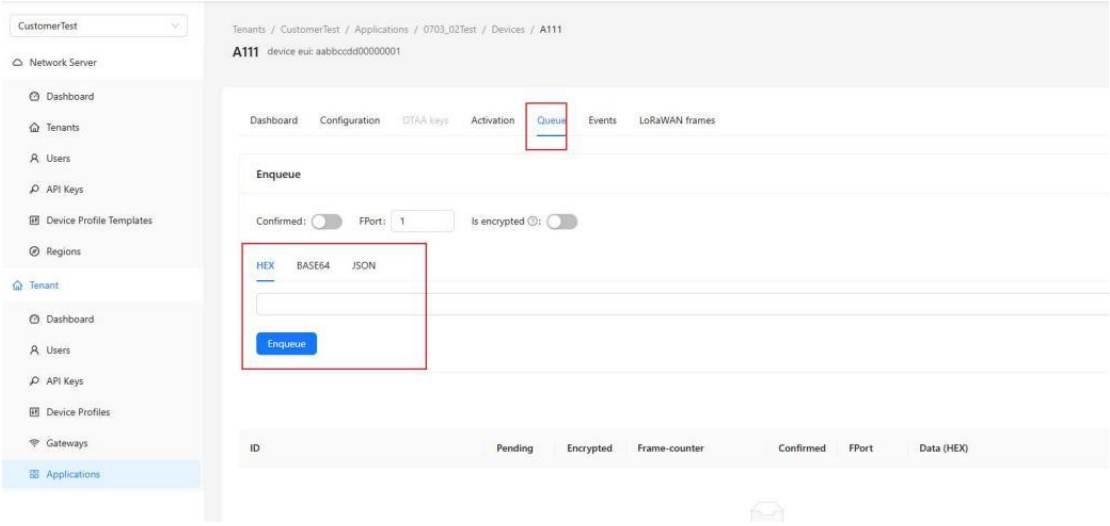


Both uplink and downlink data of the device can be viewed in Events and LoRaWAN frames. The data in LoRaWAN frames is more original, showing every data transmission and reception, including ADR and other Mac Commands.

Note:

Since ChirpStack will issue ADR to adjust the node's ChannelMask based on the frequency of the connected gateway after the node joins the network, if the gateway's frequency does not match the frequency represented by the actual port, the node will be modified to an unreachable frequency, resulting in communication errors.

➢ **Data Downlink**



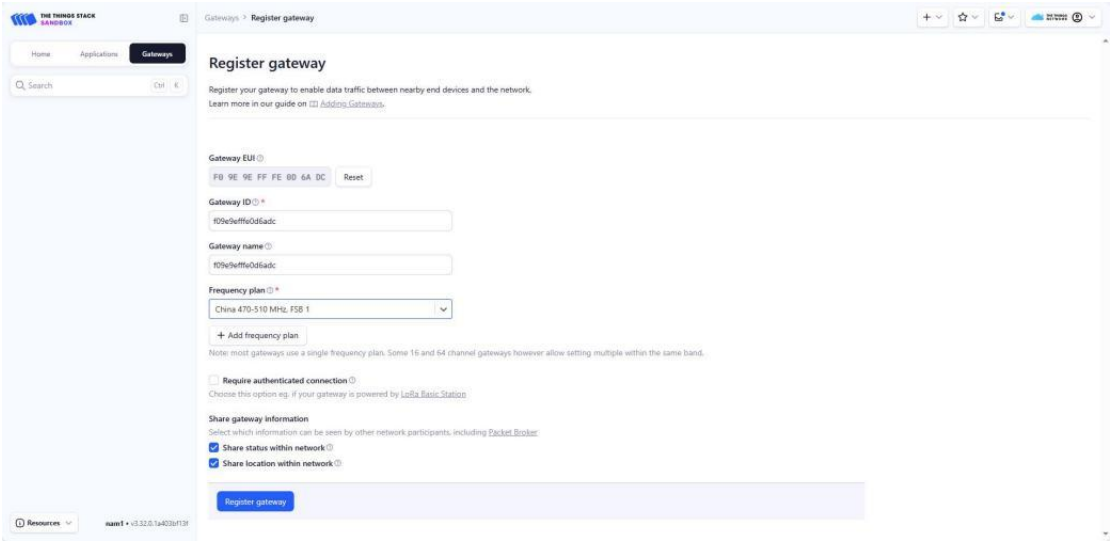
Fill in the data at the position shown in the figure and click "enqueue". The NS will enqueue the downlink data and then send it according to the time of issuance.

Depending on the CLASS type of the node:

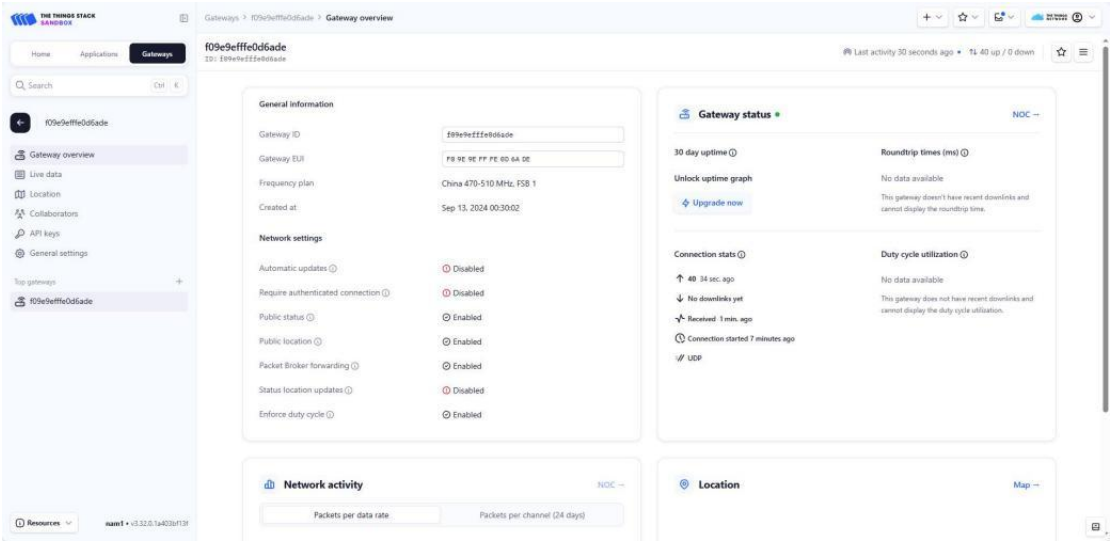
- For Class A devices, the NS will send the data when the device has uplink data.
- For Class C devices, the NS will send data directly in RX2, which will be sent immediately.
- FPort: Similar to the Port of TCP/IP, NS and terminals can distinguish different data types through Port.
- Confirmed: Whether the data packet is in confirmation mode.

5.2 TTN Connection

5.2.1 Register Gateway



5.2.2 Gateway Overview



Chapter 6 Gateway Channel Configuration

6.1 Standard MQTT Channel

The configuration channel performs data interaction via MQTT, where the channel from the device to the server is called the uplink channel, and the channel from the server to the device is called the downlink channel.

Among them:

- Uplink Topic: up/gw/{SN}/0
- Downlink Topic: dn/gw/{SN}/0

For example, if the gateway's SN is 64e833fffe5909d8, the uplink and downlink channels are as follows:

- Uplink Topic: up/gw/64e833fffe5909d8/0
- Downlink Topic: dn/gw/64e833fffe5909d8/0

The gateway periodically sends periodic heartbeat packets through the uplink channel, and the server can also send data to the gateway through the downlink channel.

6.1.1 Periodic packet

```
{
    "pkt": "periodUplink",
    "GWInfo": {
        "SN":    "64e833fffe5909d8",
        "SoftwareVersion": "V1.0.1",
        "HardwareVersion": "V1.0.0"
       },
```

```
"Staus": {
    "GPSValid": true,
    "Latitude": 24.000000,
    "Longitude": 120.000000,
    "Altitude": 0.000000,
    "Cellular": {},
    "Ethernet": {},
    "WIFI": {
        "Link": "NET_UP",
        "IPMode": "DHCP",
        "MAC": "64:e8:33:59:09:d8",
        "IP": "192.169.4.12",
        "Mask": "255.255.255.0",
        "GW": "192.169.4.1",
        "DNS1": "192.169.4.1",
        "DNS2": "192.169.4.1"
```


6.1.2 Modify Gateway Configuration

Just modify the content in Configuration and send it down.


```
{
    "pkt": "downlink",
    "Configuration": {
        "STA": {
            "Enable": false,
            "SSID": "",
            "Password": ""
        },
        "Management": {
            "MQTT": {
                "Enable": true,
                "URL": "mqtt://broker.emqx.io",
                "ClientID": "64e833fffe5909d8",
                "UplinkTopic": "up/gw/64e833fffe5909d8/0",
                "DownlinkTopic": "dn/gw/64e833fffe5909d8/0"
            }
        },
        "LoRaWAN": {
            "Region": "cn470",
```

```
                "Radio0": "470600000",
                "Radio1": "enable",
                "NsHost": "lora.ansitw.com",
                "NsPort": "1700",
                "GatewayID":"64e833fffe5909d8"
            }
        }
}
```

6.1.3 Reboot

```
{
        "pkt": "downlink",
        "cmd": {
                "reboot":
        true }
}
```

Response:

```
{
        "pkt": "downlinkRespone",
         “result” :"success"
}
```

6.1.4 Upgrade

```
{
        "pkt": "downlink",
        "cmd": {
                "upgrade":
        "http://192.169.4.53/esp32_sx1302.bin" }
}
```

Response:

```
{
       "pkt": "downlinkRespone",
         “result” :"success"
}
```

6.1.3 Reboot

```
{
        "pkt": "downlink",
        "cmd": {
                "reboot":
        true }
}
```

Response:

```
{
      "pkt":  "downlinkRespone",
       "result"  :"success"
}
```

6.1.4 Upgrade

```
{
      "pkt":  "downlink",
      "cmd": {
            "upgrade":
      "http://192.169.4.53/esp32_sx1302.bin" }
}
```

Response: (Upgrade command received)

```
{
     "pkt":  "downlinkRespone",
      "result"  :"success"
```

6.2 ThingsBoard MQTT Channel

There are two links:

1. Gateway actively sends data
   telemetry_uplink
   ◆The device sends heartbeat packets at regular intervals;
   ◆The device sends configuration information when it is powered on and when the configuration information is changed
2. Cloud platform sends commands to the gateway
   ◆ request_downlink: The cloud platform sends commands to the gateway
   ◆ response_uplink: The gateway replies data to the cloud platform

Among them:

- telemetry_uplink_topic: v1/devices/me/telemetry
- request_downlink_topic: v1/devices/me/rpc/request/${request_id}
- response_uplink_topic: v1/devices/me/rpc/response/${request_id}

For example, if the request_id of the current message of the gateway is 10001, then the uplink and downlink channels are respectively:

- telemetry_uplink_topic: v1/devices/me/telemetry
- request_downlink: v1/devices/me/rpc/request/10001
- response_uplink: v1/devices/me/rpc/response/10001

6.2.1 Gateway Information Packet

1. Sent when the device is powered on or when the configuration is modified
2. Sent by the device every 1 hour

```
{
    "ts":1451649600512,
    "values":
    {
        "pkt":"gw_info",
        "SN":"64e833fffe5909d8",                    //Device SN
        "swver":"V1.0.1",                   //Software Version
        "hwver":"V1.0.0",                   //Hardware Version
        "longitude":  "24.56789",           //Longitude
        "latitude":  "118.56789",           //Latitude
        "altitude":  "78.965",              //Altitude

"stat_cell_link":"",        //"stat" is the abbreviation of "status", and all items starting with "stat" are read-only. "cell" is the abbreviation of "cellular", which refers to the cellular link status. "NET_UP" indicates a successful connection, and "NET_DOWN" indicates a connection failure.
        "stat_cell_ip":  "",                //IP obtained by cellular
        "stat_cell_IMEI":  "",              //IMEI of cellular module
        "stat_cell_IMSI":  "",              //SIM card info
        "stat_cell_ICCID":  "",             //SIM card info
        "stat_cell_CSQ":  "",               //Cellular Signal Strength
        "stat_eth_link":  "",               //Ethernet link status, in the format of LINK_UP/NET_UP, where LINK_UP indicates the network cable is plugged in, LINK_DOWN indicates the network cable is not plugged in, NET_UP indicates a successful connection, and NET_DOWN indicates a connection failure.
        "stat_eth_mac":  "",                // Ethernet MAC Address
        "stat_eth_ip":  "",                 // Ethernet   IP
        "stat_eth_mask":  "",               // Ethernet Subnet Mask
        "stat_eth_gw":  "",                 //Ethernet Gateway
        "stat_eth_dns1":  "",               //Ethernet   DNS1
        "stat_eth_dns2":  "",               //Ethernet   DNS2
        "stat_sta_link":  "",               //STA is the abbreviation of Wi-Fi Station, which refers to a device accessing a Wi-Fi AP in station mode. This is the Wi-Fi link status, where NET_UP indicates a successful connection and NET_DOWN indicates a failed connection.
        "stat_sta_mac":  "",                //WIFI MAC Address
        "stat_sta_ip":  "",                 //WIFI IP
        "stat_sta_mask":  "",               //WIFI   Subnet Mask
        "stat_sta_gw":  "",                 //WIFI Gateway
        "stat_sta_dns1":  "",               //WIFI DNS1
        "stat_sta_dns2":  "",               //WIFI DNS2
        "conf_sta_enable":"",               //conf :cofiguration，sta : wifi station，sta_enable indicates whether to enable Wi-Fi Station, where true means enabled and false means disabled.
        "conf_sta_ssid":"",                 //The SSID of the configured Wi-Fi to access
        "conf_sta_password":"",             //The password of the configured Wi-Fi to access
```

```
        "conf_lorawan_nshost":"",       //The configured LoRaWAN NS host
        "conf_lorawan_nsport":"",       //The configured LoRaWAN NS port
        "conf_lorawan_gatewayid":""             //The configured LoRaWAN gatewayid }
}
```

6.2.2 Heartbeat

```
{
    "ts":1451649600512,
    "values":{
        "pkt":"heartbeat",
        "SN":"64e833fffe5909d8" }
}
```

6.2.3 Modify Gateway Configuration

Just modify the content in Configuration and send it down.

```
{
    "method": "modify_configuration",    //gateway_reboot   is command keywords
    "params":    {
        "sta_enable": true,
        "sta_ssid": "",
        "sta_password": "",
        "mang_mqtt_url": "mqtt://thingsboard.com:6883",
        "mang_mqtt_clientid": "64e833fffe5909d8",
        "mang_mqtt_username": "",
        "mang_mqtt_password": "",
        "mang_mqtt_telemetry_topic": "v1/devices/me/telemetry",
        "mang_mqtt_request_topic": "v1/devices/me/rpc/request",                //   This path is only partial; when actually sending, a request_id needs to be concatenated
        "mang_mqtt_respone_topic": "v1/devices/me/rpc/response",               //   This path is only partial; when actually sending, a request_id needs to be concatenated
        "lorawan_region": "cn470",
        "lorawan_radio0": "470600000",
        "lorawan_radio1": "471400000",
        "lorawan_nshost": "lora.ansitw.com",
        "lorawan_nsport": "1700",
        "lorawan_gatewayid": "471400000" }
}
```

Response:

```
{
    "result": "success",

"resp": {                                   // The returned result is placed in this structure.
        "method":
    "modify_configuration" }
}
```

6.2.4 Query Gateway Status and Configuration

```
{
    "method": "query_gw_info",    //gateway_reboot   is command keywords
    "params":    {          }
}
```

Response:

```
{
    "result": "success",
    "resp":   {
            "method": "query_gw_info",
            "pkt":"gw_info",
            "SN":"64e833fffe5909d8",                    //Device SN
            "swver":"V1.0.1",                  //Software Version
            "hwver":"V1.0.0",                  //Hardware Version
            "longitude": "24.56789",           //Longitude
            "latitude": "118.56789",           //Latitude
            "altitude": "78.965",              //Altitude

"stat_cell_link":"",          //"stat" is the abbreviation of "status", and all items starting with "stat" are read-only. "cell" is the abbreviation of "cellular", which refers to the cellular link status. "NET_UP" indicates a successful connection, and "NET_DOWN" indicates a connection failure.
            "stat_cell_ip": "",                 //IP obtained by cellular
            "stat_cell_IMEI": "",              //IMEI of cellular module
            "stat_cell_IMSI": "",              //SIM card info
            "stat_cell_ICCID": "",             //SIM card info
            "stat_cell_CSQ": "",               //Cellular Signal Strength
            "stat_eth_link": "",               //Ethernet link status, in the format of LINK_UP/NET_UP, where LINK_UP indicates the network cable is plugged in, LINK_DOWN indicates the network cable is not plugged in, NET_UP indicates a successful connection, and NET_DOWN indicates a connection failure.
```

"stat_cell_ip": "", //IP obtained by cellular

"stat_cell_IMEI": "", //IMEI of cellular module

"stat_cell_IMSI": "", //SIM card info

"stat_cell_ICCID": "", //SIM card info

"stat_cell_CSQ": "", //Cellular Signal Strength

"stat_eth_link": "", //Ethernet link status, in the format of LINK_UP/NET_UP, where LINK_UP indicates the network cable is plugged in, LINK_DOWN indicates the network cable is not plugged in, NET_UP indicates a successful connection, and NET_DOWN indicates a connection failure.

"stat_eth_mac": "", // Ethernet MAC Address

"stat_eth_ip": "", // Ethernet IP

"stat_eth_mask": "", // Ethernet Subnet Mask

"stat_eth_gw": "", //Ethernet Gateway

"stat_eth_dns1": "", //Ethernet DNS1

"stat_eth_dns2": "", //Ethernet DNS2

"stat_sta_link": "", //STA is the abbreviation of Wi-Fi Station, which refers to a device accessing a Wi-Fi AP in station mode. This is the Wi-Fi link status, where NET_UP indicates a successful connection and NET_DOWN indicates a failed connection.

"stat_sta_mac": "", //WIFI MAC Address

"stat_sta_ip": "", //WIFI IP

"stat_sta_mask": "", //WIFI Subnet Mask

"stat_sta_gw": "", //WIFI Gateway

"stat_sta_dns1": "", //WIFI DNS1

"stat_sta_dns2": "", //WIFI DNS2

"conf_sta_enable":"", //conf :cofiguration，sta : wifi station，sta_enable indicates whether to enable Wi-Fi Station, where true means enabled and false means disabled.

"conf_sta_ssid":"", //The SSID of the configured Wi-Fi to access

"conf_sta_password":"", //The password of the configured Wi-Fi to access

"conf_lorawan_region": "", //The configured LoRaWAN region

"conf_lorawan_radio0":"", //The configured LoRaWAN radio0

"conf_lorawan_radio1":"", //The configured LoRaWAN radio1

"conf_lorawan_nshost":"", //The configured LoRaWAN NS host

"conf_lorawan_nsport":"", //The configured LoRaWAN NS port

"conf_lorawan_gatewayid":"" //The configured LoRaWAN gatewayid

"mang_mqtt_url": "mqtt://thingsboard.com:6883", //"mang" is the abbreviation of "management". This item is the MQTT URL of the management channel, with the format "mqtt://host:port".

"mang_mqtt_clientid": "64e833fffe5909d8",// MQTT clientID

"mang_mqtt_username": "", // MQTT username

"mang_mqtt_password": "", // MQTT password

```
            "mang_mqtt_telemetry_topic": "v1/devices/me/telemetry",   // This item is the telemetry topic of ThingsBoard
            "mang_mqtt_request_topic": "v1/devices/me/rpc/request",    //This item is the RPC request topic of ThingsBoard
            "mang_mqtt_respone_topic": "v1/devices/me/rpc/response", //This item is the RPC response topic of ThingsBoard,
which will be concatenated with the request_id
        }
}
```

6.2.5 Reboot

```
{
        "method": "gw_reboot",    //gateway_reboot is command keywords
        "params":     { }
}
```

Response

```
{
     "result": "success",
"resp": {                                    // If there is a returned result, place it in this structure.
           "method": "gw_reboot" }
}
```

6.2.6 Restore Factory Settings

```
{
        "method": "gw_restore",   //gw_restore is command keywords
        "params":     {    }
}
```

Response

```
{
     "result": "success",
"resp": {                                    // If there is a returned result, place it in this structure.
           "method": "gw_restore" }
}
```

6.2.7 Upgrade

```
{
        "method": "gw_upgrade",    //gateway_reboot   is command keyword
        "params":     {

         "url":"http://192.169.4.53/simple_ota.bin"          //The device only supports HTTP URL. }
}
```

Response

```
{
    "result": "success",
"resp": {                                    // If there is a returned result, place it in this structure.
        "method": "gw_upgrade" }
}
```

Chapter 7 After-sales Service

Product Warranty

1. The product warranty period is one year.
2. The company is responsible for free maintenance or exchange within one-year warranty period.
3. The cost of the components and freight shall be charged for improper meter installation and/or operation.
4. Over the warranty period, part of the maintenance cost according to actual situation will be charged.

Service Guarantee

1. Product technical consulting and quality complaints will be replied within 12 hours.
2. Solutions for quality complaints will be provided within 24 hours.
3. Except statutory holidays and force majeure.

Chapter 8 Contact Us

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