# Setting up Basics Station on The Things Network (TTN v2)

## Sentrius RG1xx

*Application Note* *v2.0*

## Revision History

| Version | Date | Notes | Contributors | Approver |
|---------|------|-------|--------------|----------|
| 1.0 | 14 July 2020 | Initial Release | Seokwoo Yoon | Chris Boorman |
| 1.1 | 05 May 2021 | Updated root certificate and references | Seokwoo Yoon | Chris Boorman |
| 2.0 | 06 May 2025 | Ezurio rebranding. | Dave Drogowski | Dave Drogowski |

# Contents

**Important Note:** This application note guides you through setting up the Sentrius RG1xx Gateway with the original TTN (v2) platform.

As announced during The Things Conference held in January 2021, The Things Network software is upgrading to The Things Stack (TTS) V3. Rather than a basic upgrade, this is a complete rebuild of TTS with a new architecture, new features, out-of-the-box integrations, extended coverage, and improved user experience. More information can be found on this in the following Ezurio blog: https://www.ezurio.com/resources/blog/migrating-things-stack-v3-changes-ahead

In light of TTN (v2) being deprecated, we recommend following our alternative app note *Setting Up Basics Station on The Things Stack v3*

# 1 Introduction

Ezurio's Sentrius RG1xx firmware update v93.8.5.18 (GA5.0) introduced Semtech Basics Station as a forwarder, while removing the TTN and MQTT forwarder options.

This document describes how to configure the Sentrius™ gateway to use Basics Station along with The Things Network (TTN).
If you already have experience with using Semtech Forwarder on TTN, the setup procedure on the TTN will remain same but just the gateway's configuration needs to be changed. The document demonstrates the setup with a RG191 (US version) gateway and an RS191 (US version) end-device.
The steps for using an RG186 and RM186 are similar, refer to notes detailed within where the EU version differs from US.

For more detailed information on how to use all the features of the Sentrius gateway, please see the Sentrius™ RG1xx User Manual, available from documentation tab at;
https://www.ezurio.com/wireless-modules/lorawan-solutions/sentrius-rg1xx-lora-enabled-gateway-wi-fi-ethernet

## 1.1 Product Overview

The Sentrius™ RG1xx Gateway from Ezurio is the ultimate in secure, scalable, robust LoRa solutions for end-to-end control of your private LoRaWAN network. Leveraging Ezurio's field-proven and reliable 50 Series "Wireless Bridge" certified module, it also offers enterprise dual-band Wi-Fi, BT v4.0 (BLE and Classic) and wired Ethernet for complete design freedom. Based on the Semtech SX1301/SX1257 chipset designs, it offers a LoRa range up to 10 miles and pre-loaded LoRa Packet Forwarder software, perfect for highly scalable, flexible IoT networks. The Sentrius™ RG1xx Gateway works with Ezurio's **Sentrius™ RS1xx Series** LoRa+BLE certified modules for simple out-of-the-box integration and is compatible with 3rd party Cloud and LoRa partners, as well as any LoRaWAN certified client devices.
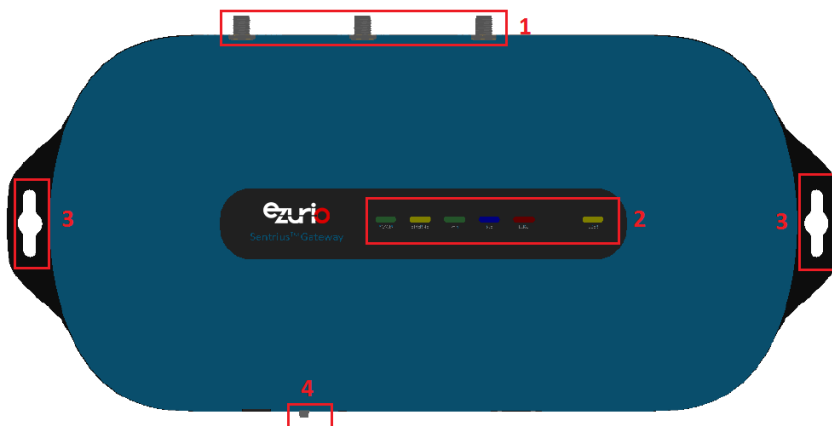


1. LoRa and Wi-Fi antennas
2. LEDs
3. Mounting holes
4. User button

*Figure 1: Top of the Sentrius™ RG1xx Gateway*



1. DC power input
2. User button
3. Reset button
4. SD card slot
5. Ethernet connector

*Figure 2: Back panel of the Sentrius™ RG1xx Gateway*

# 2  Connect the Hardware

## 2.1  Connect the Gateway

To use the gateway, you must power up the gateway and access the web interface via the Ethernet port. To do this, complete the following steps:

1.  Follow the label on the box and connect the three antennas. Refer to Figure 3 for additional information.
2.  Connect the power supply (see #2 in Figure 3).
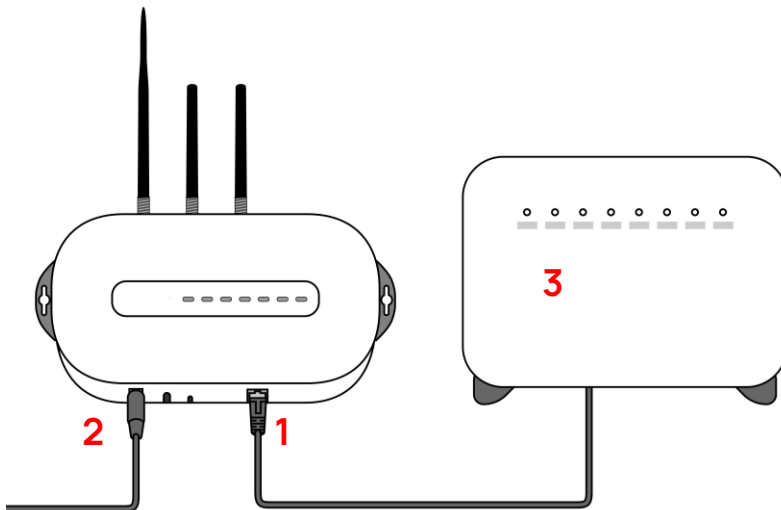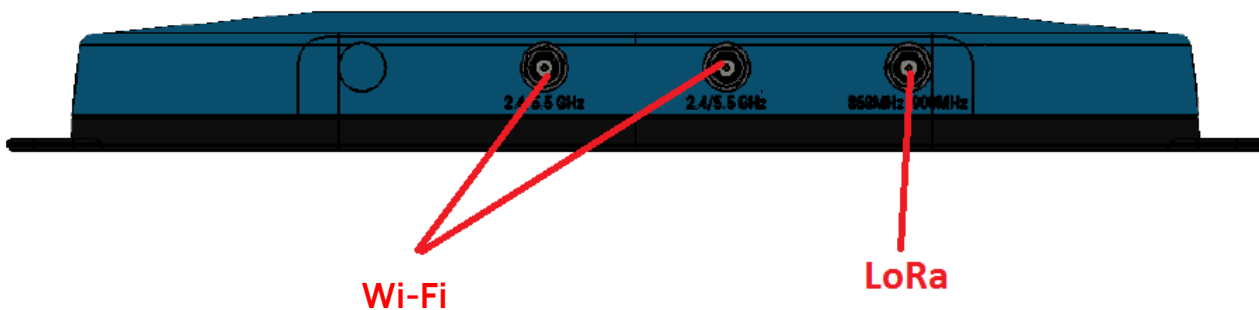3.  Connect the gateway to your router (#3 in Figure 3) using the Ethernet cable (#1 in Figure 3).



*Figure 3: Connecting the gateway*

### 2.1.1  Antenna Configuration

To configure the antenna properly, complete the following steps:

1.  Attach the two shorter antennas to the 2.4/5.5 GHz (Wi-Fi) ports.
2.  Attach the third and longer antenna to the 868 MHz/900 MHz (LoRa) port.

### 2.1.2 Wi-Fi Quick Config

The gateway includes a mode to allow you to configure without ethernet access, in case you want to join a wireless network.

Apply power to the gateway and allow to start, then perform the following:

1. Depress and hold the user button (see #2 in Figure 3) for seven seconds.
2. From a wirelessly enabled device, perform a scan.
3. Connect to the access point rg1xx**29378B**, where *29378B* are the last six digits of the Ethernet MAC address found on the label on the bottom of the gateway (Figure 3).

   The network is secured with WPA2 with a password that is the same as the SSID. We recommend that the default password is changed for security reasons. The password can be changed on the Wi-Fi › Advanced web page.

Upon logout or client disassociation, Wi-Fi Quick Config shuts down and normal operation resumes.

# 3  Log into the Gateway

To log into the gateway web interface, follow these steps:

1. Determine the last three bytes of your gateway's Ethernet MAC address. This can be found on the label on the bottom of the gateway; the last three bytes are highlighted (Figure 4).



*Figure 4: Bottom label (Standard GW – Left, AS923 & AU915 Region Supported/Latest Version – Right) – last three bytes of the Ethernet MAC address highlighted*

2. Enter the URL into the web browser to access the web interface. For example, for the gateway used in this guide, the URL is https://rg1xx**29378B**.local., where 29378B are the last six digits of the Ethernet MAC address. In Wi-Fi quick config mode, the gateway can also be accessed via the IP address at https://192.168.1.1
3. Accept the self-signed security certificate in the browser.
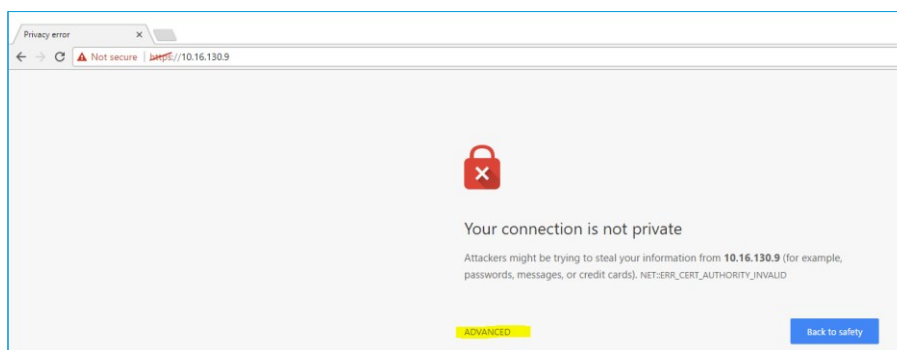4. Click **Advanced** (Figure 5).



*Figure 5: Web interface – first screen*

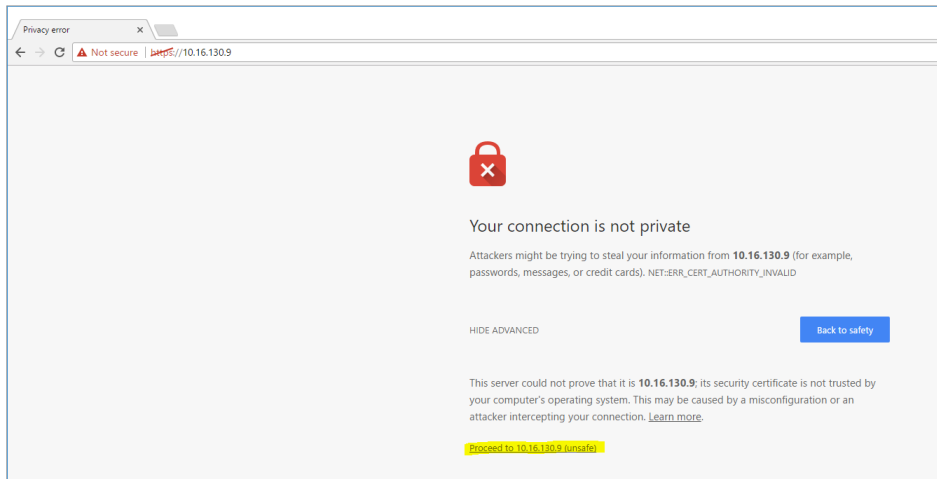5.   Click **Proceed** (Figure 6).



*Figure 6: Web interface – second screen*

6.   Log on using the following default credentials (Figure 7):
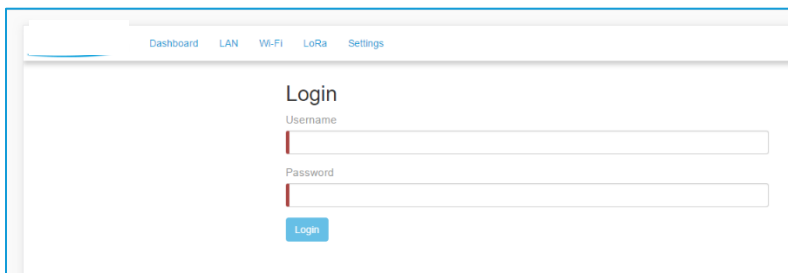
Username: sentrius
Password: RG1xx



*Figure 7: Gateway interface login screen*

# 4   Connecting the Gateway to the Internet

## 4.1   Setting Up Ethernet

By default, the Ethernet port is set up for DHCP addressing. Connect the Ethernet cable to a network with internet access. If more advanced Ethernet configuration is needed, please see the Sentrius™ RG1xx User Manual in the documentation tab of the RG1xx product page at;
https://www.ezurio.com/wireless-modules/lorawan-solutions/sentrius-rg1xx-lora-enabled-gateway-wi-fi-ethernet

## 4.2   Setting Up Wi-Fi

If Ethernet connection is made, this step is not necessary. By default, the Wi-Fi in the gateway is not configured to connect to a Wi-Fi network. You must access the web interface on the gateway via the Ethernet interface to setup the Wi-Fi connection.

To set up the Wi-Fi, follow these steps:

1.   Once logged into the web interface, navigate to the Wi-Fi page (Figure 8).
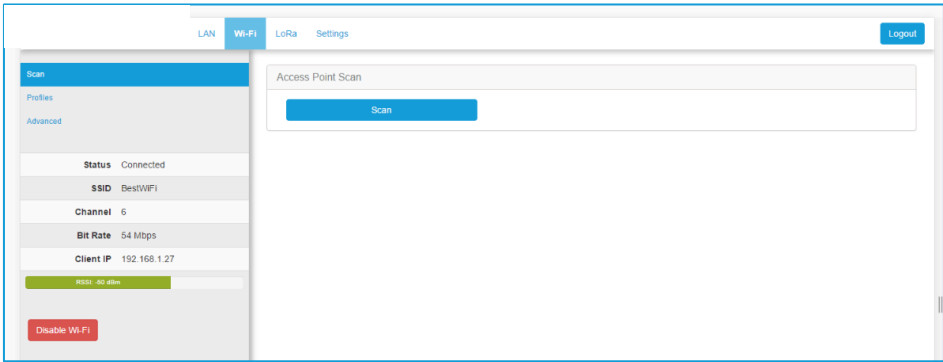


**Figure 8: Wi-Fi page**

2.   To connect to a Wi-Fi network, click **Scan** to scan for nearby Wi-Fi networks (Figure 9). Scanning continues until you click **Stop** or select one of the scan results in the list.
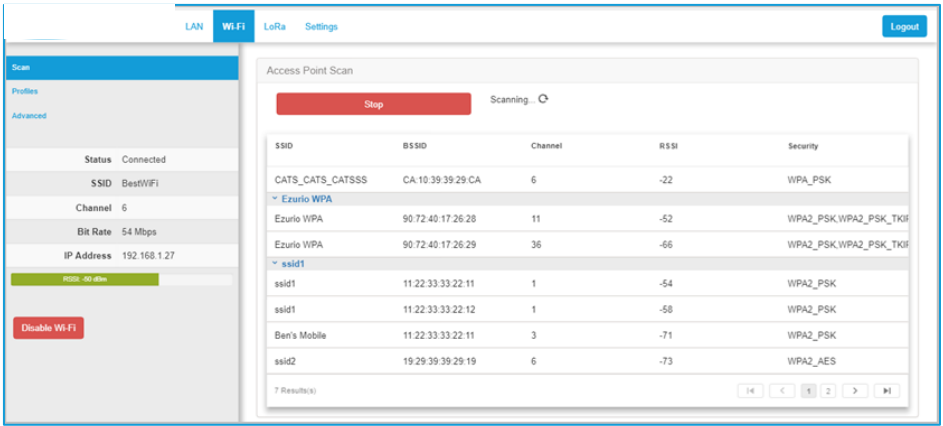


**Figure 9: Wi-Fi scan results**

3. Click on the applicable scan result.

4. Enter the information for the Wi-Fi network (Figure 10).
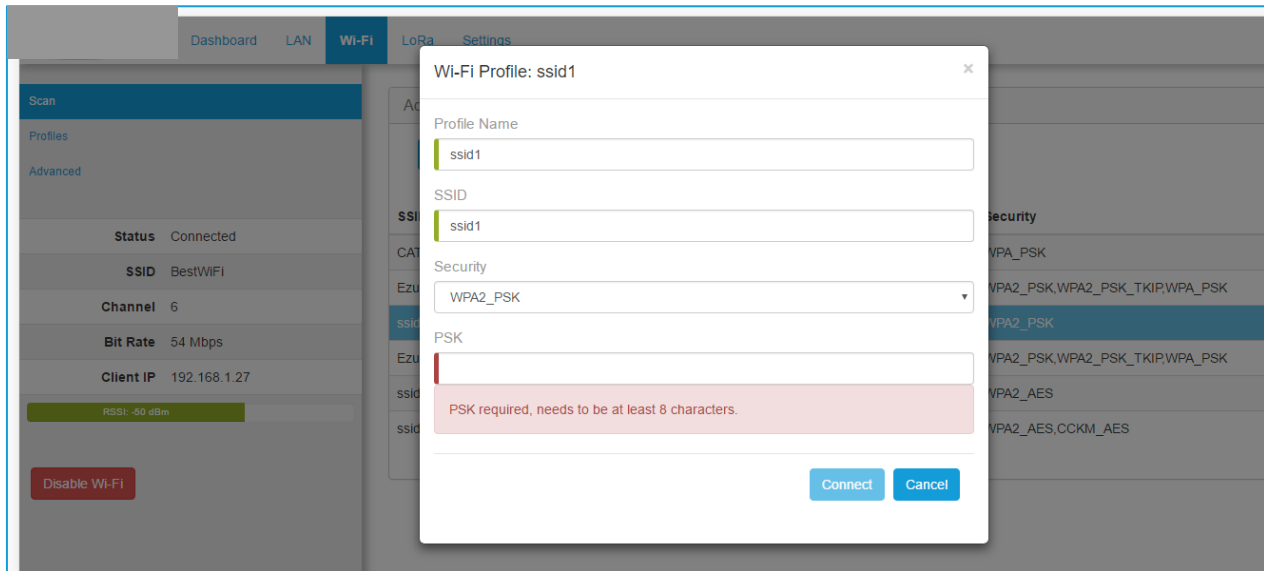


*Figure 10: Wi-Fi profile dialog*

5. Click **Connect**.

# 5   Basics Station Setup on Gateway

This section describes how to configure Basics Station with The Things Network (TTN) on your gateway.

Follow these steps:

1. Click the **LoRa** tab in the main menu (Figure 11).

2. In left column, click **Forwarder** and choose **Semtech Basics Station** from the dropdown labeled *Mode*

   ### Click Update.
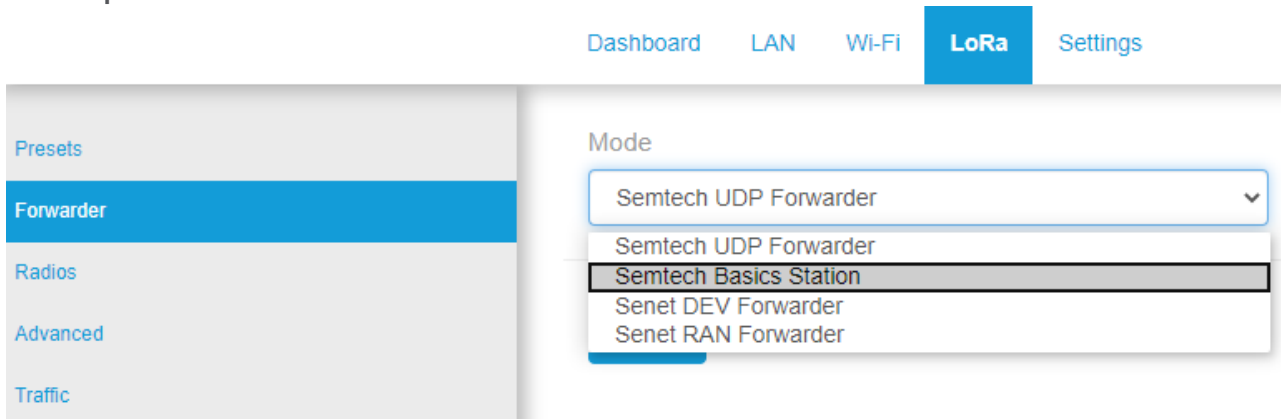


*Figure 11: LoRa › Forwarder › Semtech Basics Station*

3. Enter **wss://lns.us.thethings.network:443** into *LNS Server* (Figure 12).

   **Note:** If using RG186 for EU version for TTN, use **wss://lns.eu.thethings.network:443** for LNS Server.

4. You can download root certificates to be used as the *LNS Certificates* from https://www.thethingsnetwork.org/docs/gateways/certificates/index.html.

Some certificates may need to be modified to work with RG1xx. For example, in Minimal Certificate List, the string between "-----END CERTIFICATE-----" and "-----BEGIN CERTIFICATE-----" should be removed.
An example of a modified Minimal Certificate List can be downloaded from [HERE].
Upload the root certificate in *LNS Certificates*, click **Choose File** for *Server Certificate File* and **upload Certificate**.

*Figure* 12 : **Configuration page for Semtech Basics station**

# 6   Configuration on TTN

## 6.1   Set Up a Gateway

If you already have a TTN account, skip to step 3.
To set up your account with The Things Network, follow these steps:

1.   Go to https://www.thethingsnetwork.org/.

2.   Create an account or log in to your existing account (Figure 13).
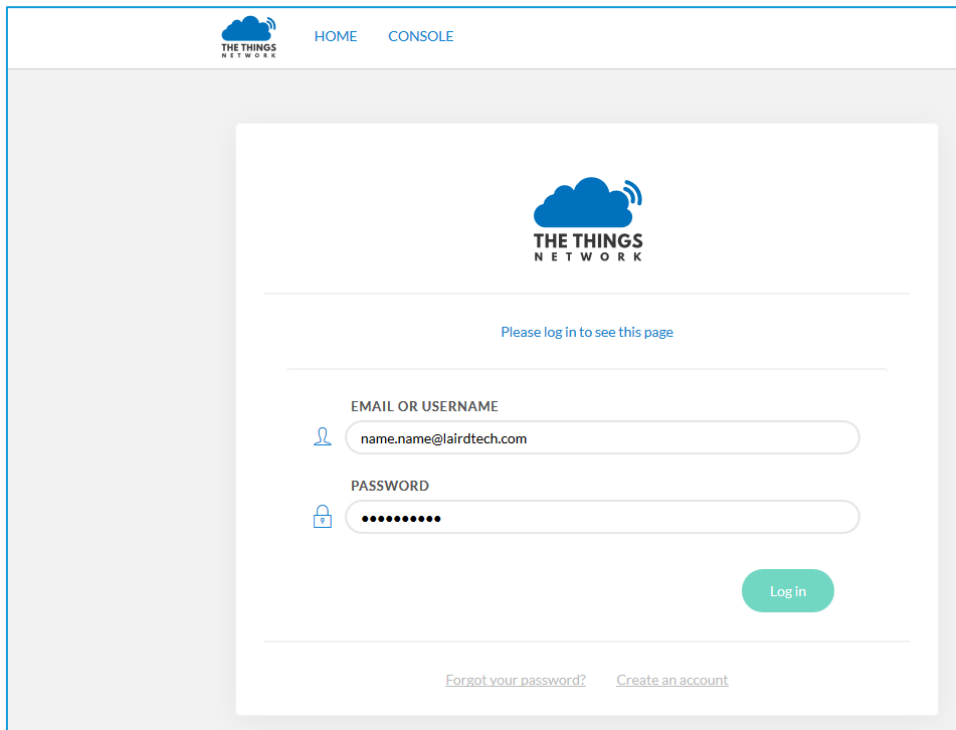


*Figure 13: TTN login page*

3.   Click **Console**.

4.   Register your gateway:

   a.   From the console screen, click **Gateways** (Figure 14).
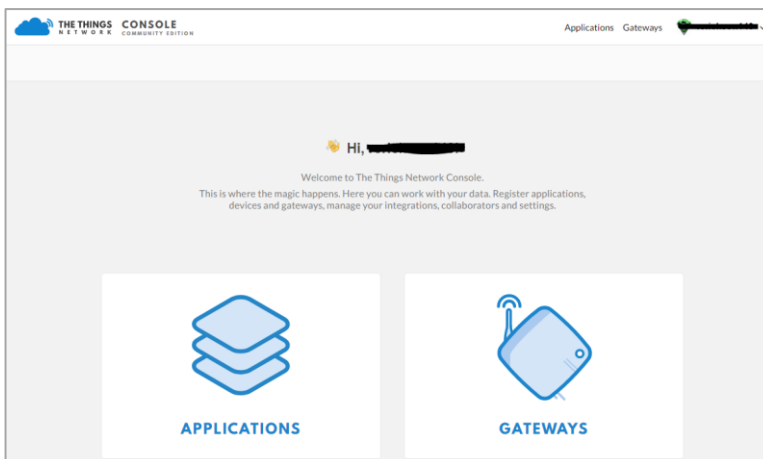


*Figure 14: TTN console screen*

b. Click **register gateway** (Figure 15).
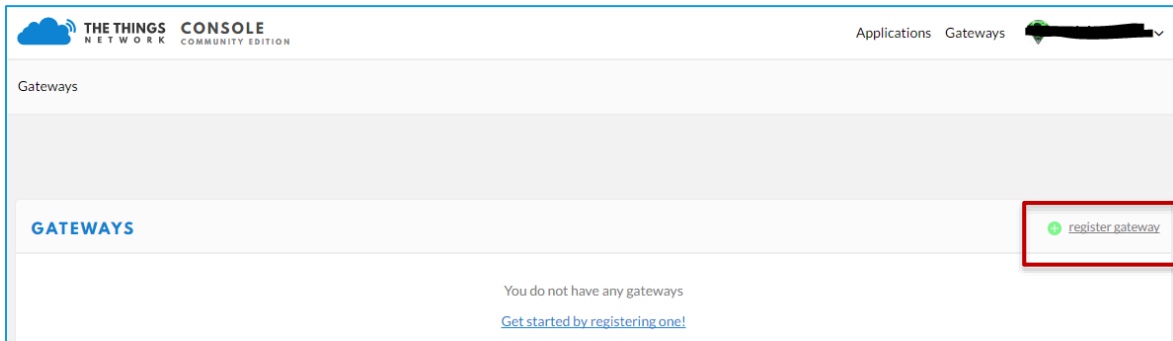


*Figure 15: Click register gateway.*

c. Check the box for *I'm using the legacy packet forwarder*.

d. Obtain the gateway ID from the Sentrius RG1xx web interface (Figure 16) or from the bottom label (Figure 17) on the Gateway and copied it into Gateway EUI (Figure 17).
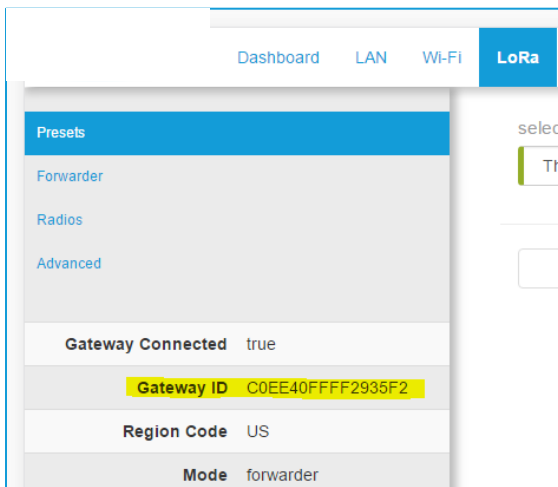


*Figure 16: Gateway ID*



*Figure 17: Gateway label (Standard GW – Left, AS923 Region Supported/Latest Version – Right)*

e. Choose the *Frequency plan* to "**United State 915 Mhz**" and *Router* to **ttn-router-us-west**.

*Figure 18: Gateway registration*

f.     Click **Register Gateway**.

**Note:**     Be sure to select a frequency plan appropriate for the region your device was purchased for.

Once the gateway is registered, and if the gateway is communicating to The Things network, the status should display as *connected* (Figure 19).
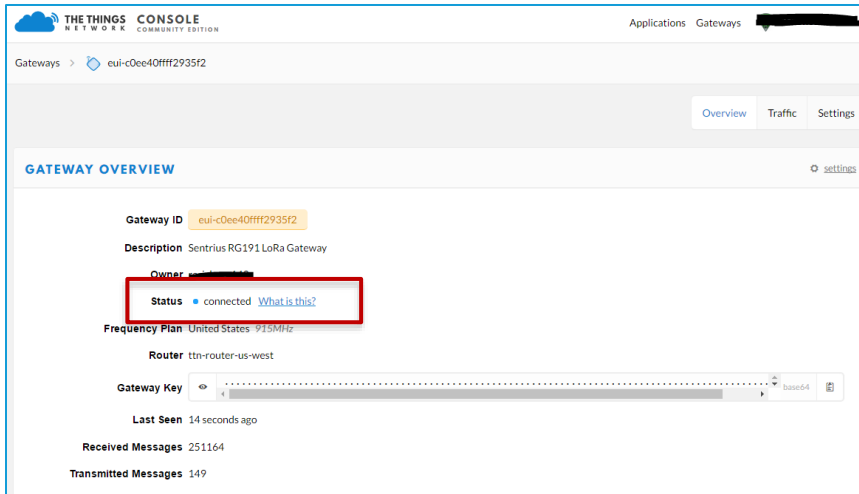
Figure 19: Registered gateway

## 6.2 Create an Application

To create an application that can receive data from your LoRa-enabled gateway, complete the following steps:

1. From *The Things Network's* website, click **Applications** in the top right of the menu.
2. Click **Add Application**
3. Complete the field as shown in Figure 20. Note that application ID should be in lower case and used to uniquely identify your application on the network.
4. Once you've created your application, click **Add application** to save it.
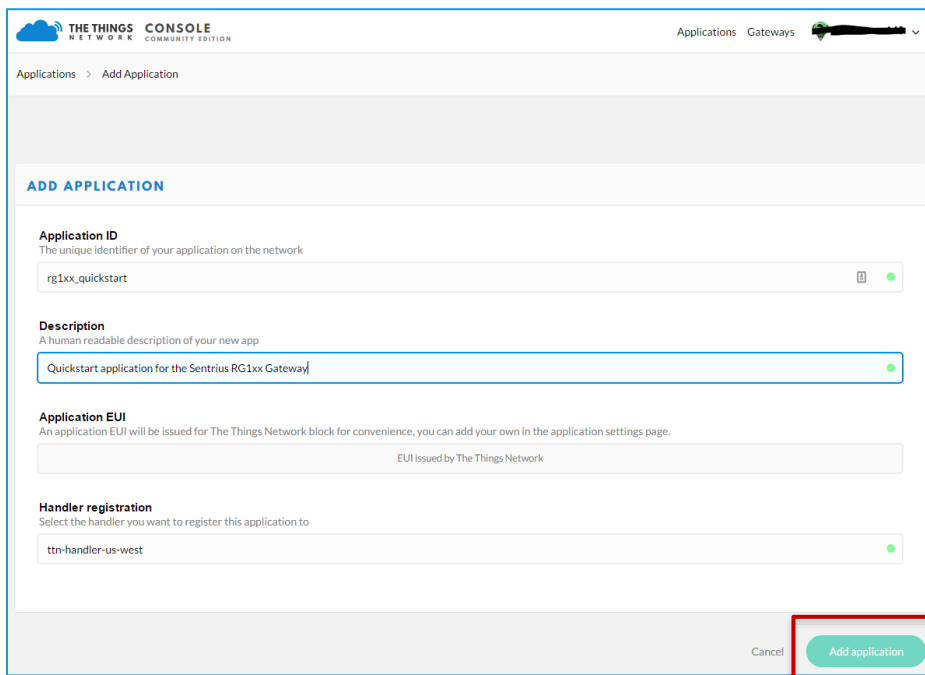


Figure 20: Add application screen

**Note:**  Be sure to select a handler registration appropriate for your location.

## 6.3 Register End-device

To register your end-device TTN, follow these steps:

1. From the applications screen, select the application that you added in the previous section.
2. Click **register device** (Figure 21).
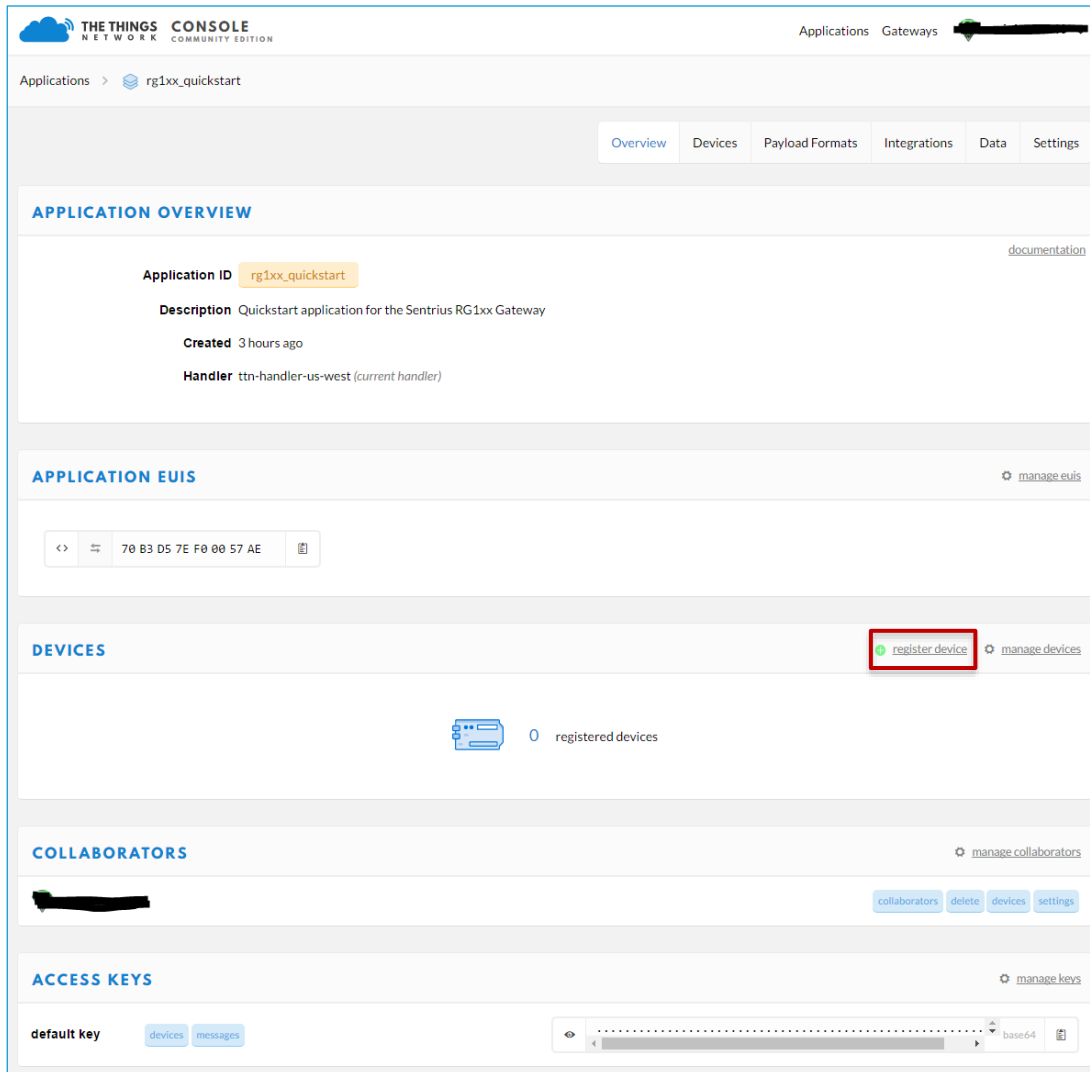


*Figure 21: Application screen*

3. Choose and enter a Device ID and an eight-byte Device EUI (Figure 22).



*Figure 22: Enter a Device EUI*

4. Click **Register**.
5. Make note of the Device EUI, Application EUI, and the App Key. These keys are needed to set up the DVK- RS1xx later (Figure 23).
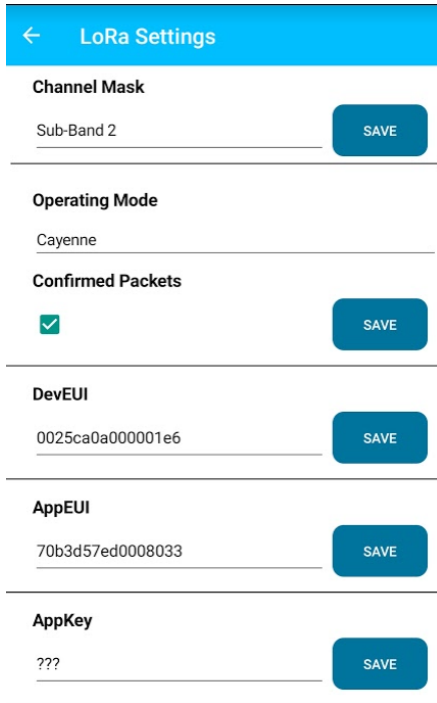


*Figure 23: Device EUI, application EUI, and app keys*

# 7   Setting up RS1xx to send data to TTN

## 7.1   Configuring RS1xx

Download Sentrius app from Google Play or Apple App store if you do not have the app yet.

1. Press physically Bluetooth button on RS1xx and it will start advertising with its Dev EUI and MAC address.
2. Start Sentrius mobile application. It will start scanning for RS1xx device.
3. Choose the target device in scan list to connect to it.
4. Click gear icon under LoRa Radio Settings and Info, and configure DevEUI, AppEUI and AppKey as well as Operating mode. Leave Channel Mask to sub-band 2.

*Figure 24 LoRa settings in Sentrius mobile app*

## 7.2 View RS1xx Data on TTN

To view RS1xx data in the TTN console page, do the following:

1. On the TTN's device page, check if status is updated with green circle icon next to it. (Figure 25).



*Figure 25: TTN device page*

2.  Click on the Data tab to view the data sent by the RS1xx (Figure 26).



*Figure 26: RS1xx data on TTN*

# 8 Additional Information

Please contact your local sales representative or our support team for further assistance:

| | |
|---|---|
| **Headquarters** | Ezurio<br>50 S. Main St. Suite 1100<br>Akron, OH 44308 USA |
| **Website** | http://www.ezurio.com |
| **Technical Support** | http://www.ezurio.com/resources/support |
| **Sales Contact** | http://www.ezurio.com/contact |

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