MESHTASTIC

WisMesh Setup Guide 1

Meshtastic device step-by-step setup guides for the RAKwireless RAK4631 (nRF52840), RAK11200 (ESP32) or RAK11310 (RP2040) modules.

WisMesh Basic Device Setup Guide

This is a step-by-step in setting up a WisMesh device based on the RAKwireless RAK4631 (nRF52840), RAK11200 (ESP32) or RAK11310 (RP2040) module.

> **INFO**
>
> The Meshtastic mobile app used is the Android version. The steps will be similar when using the iOS version of the application, however the UI will be looking different.

This guide is for the basic device setup and is divided into three sections:

1. General setup of a device with the RAK4631 (nRF52840) module and the the RAK11200 (ESP32) module with the Meshtastic mobile app over BLE.
2. Wi-Fi connection setup of a device with the RAK11200 (ESP32) module with the Meshtastic mobile app over BLE and Wi-Fi.
3. General setup of a device with the RAK11310 (RP2040) with the Meshtastic Web Client.

It covers the setup of the device for sending and receiving messages over the Meshtastic network, as well as the configuration of the location acquisition module (if available).

> **INFO**

> A detailed guide on how to set up a Meshtastic device as gateway to an MQTT broker is in the WisMesh Gateway Setup Guide, which covers the setup of a Ethernet or Wi-Fi connection to an MQTT broker to forward sensor data, device location and other information to the Cloud.

Configure WisMesh Device with RAK4631 or RAK11200 via BLE

Connect Device to a Mobile Phone via BLE

The Meshtastic mobile app uses BLE to communicate with the WisMesh device. To be able to use the app, your mobile phone must support BLE communication.

1. Install the Meshtastic Mobile App

- Google Play Store
- Apple App Store

> **NOTE**
>
> - For Android devices, there are other available options to install the application. Details are shown in the Meshtastic Software documentation.

After installation, on the first start of the application, it will ask for multiple permissions. **Make sure to allow all requested permissions, otherwise the application will not be able to communicate with the WisMesh device**

2. Connect WisMesh Device to the Mobile App

1. To connect to a device, enable the BLE on you mobile phone.
2. In the Meshtastic app, press on the (+) button found on the lower-right side.

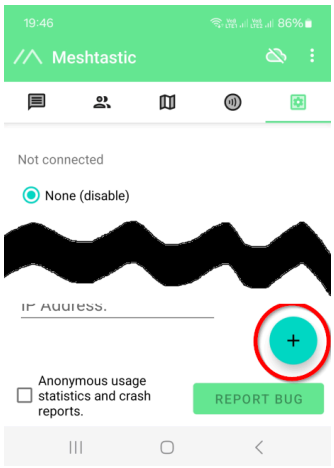

Figure 1: Start to add a device

A list of Bluetooth-enabled devices will appear on screen. Multiple devices may be shown, all of which are running the Meshtastic firmware.

3. Select the device you want to add.

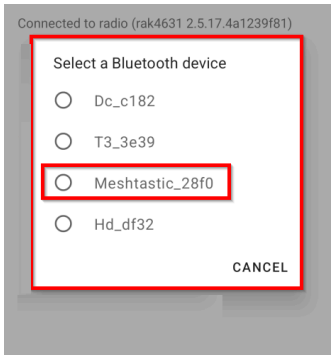

Figure 2: BLE device list

> **NOTE**
>
> If your device features a display, like the WisMesh Board ONE, its name will appear on the screen.

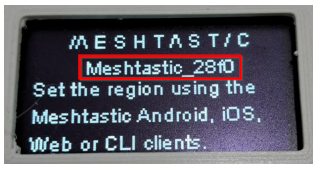

Figure 3: Device name in display

4. After selecting the device, a Bluetooth pairing request will appear on the screen. Enter the pairing PIN, then click **Pair**.

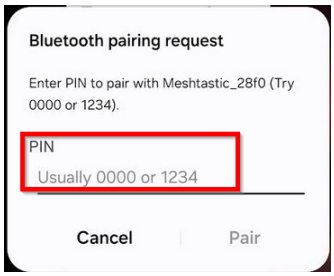

Figure 4: Enter BLE PIN

NOTE

- If your device features a display, like the WisMesh Board ONE, its PIN will appear on the screen.

Figure 5: BLE PIN in display

- If your device doesn't have a display, try the PIN **123456**.
- If the PIN **123456** doesn't work, connect to the device over USB, and use a Serial Terminal application to check the debug output of the device. The PIN number required for the BLE connection will be shown in the debug output.

The device will now show up in the device list of the mobile app.

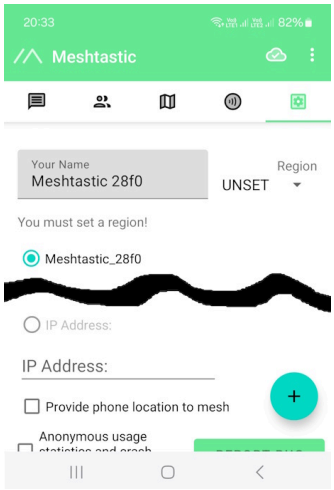

Figure 6: Device added to application

Device Connection Parameters Setup

1. Set the Meshtastic Region

1. To set up is the Meshtastic Region, use the Region selector on the right side. On a new device, the region will initially display as **UNSET**.

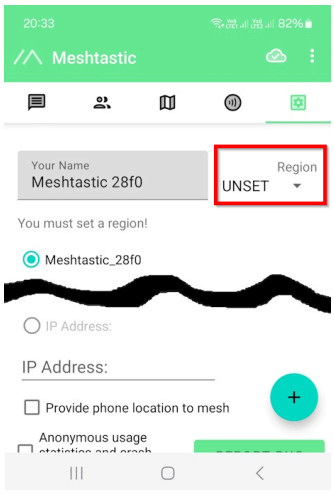

Figure 7: Setup region

2. Select the correct Meshtastic region for your country on the drop-down selector.

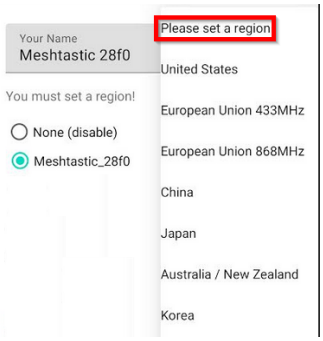

Figure 8: Region list

> **INFO**
>
> - It is necessary to select the correct Meshtastic Region, otherwise the WisMesh device will not be able to connect to other Meshtastic nodes. The region defines the basic LoRa frequency range the device will use to communicate.
> - If you are unsure about the correct region for your country, refer to the region list in the Meshtastic documentation .

2. Open the Radio Configuration

1. To open the Radio Configuration, start by tapping the three dots in the top-right corner of the Meshtastic app. Then, choose **Radio Configuration**.

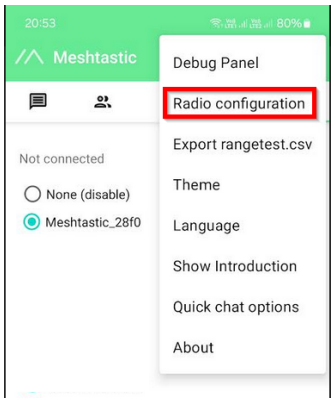

Figure 9: Go to Radio Configuration

2. Check on the following: (1) **Channels** settings, (2) **LoRa** settings, enable the (3) **Location** tracking, and correct the (4) **Display** setting if needed.

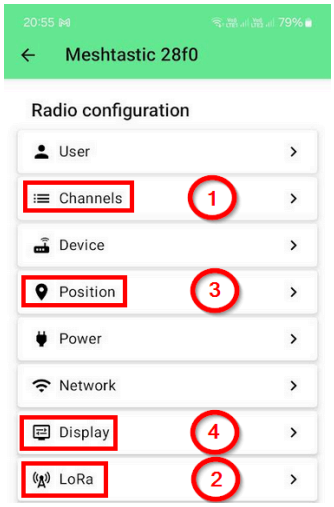

Figure 10: Next steps in the setup

3. Configure the Communication Channel

The default primary channel for communication of the device is preset to **LONGFAST**. However, if you do not want to share your communication with all other Meshtastic devices, you can configure the **Channels** setting, and define your own communication channel.

> **INFO**
>
> *For most users, the default channel setting will work.*

As an example, here is the setup for a **private** channel, that the devices in the Meshtastic Sensor Network are using.

In the **Channels** settings, click on the default channel **LONGFAST**. This will open a new window where you can define a new channel name and assign your own PSK for encryption.

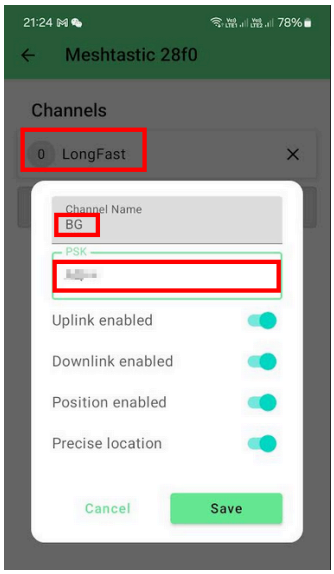

Figure 11: Define a custom channel

> **INFO**
>
> All devices in this **private** group have to use the same channel name **AND** PSK to be able to communicate.

4. Set LoRa Configuration

After selecting the **Meshtastic Region**, the LoRa communication settings are automatically preset to the default configuration for that region.

The private Meshtastic network used by the devices in the Meshtastic Sensor Network updates the default settings, changing the **Modem preset** from **LONG_FAST** to **SHORT_FAST** and the **Frequency slot** from **3** to **2** to match the other devices.

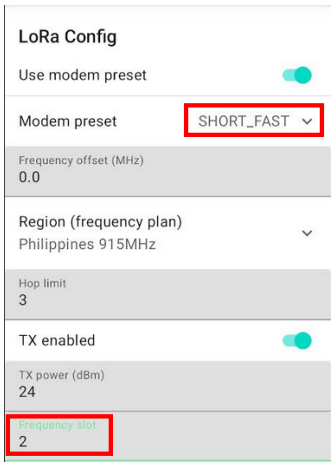

Figure 12: Define custom LoRa settings

> **INFO**

> All devices in this **private** group have to use the same **Modem preset**, **LoRa frequency offset**, and **Frequency slot** to be able to communicate.

Advanced User Settings

Another important setting in the **LoRa Config** is located at the very bottom of the screen. Scrolling down, you'll find two settings related to MQTT, which are essential if the device's messages and sensor data are to be shared with the Cloud via an MQTT broker.

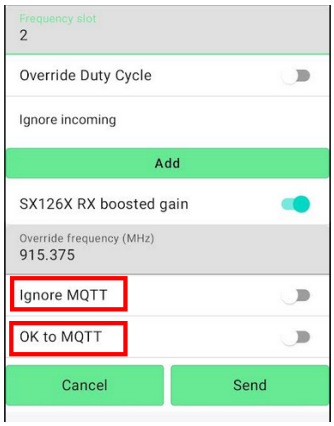

Figure 13: MQTT settings

- Enabling **Ignore MQTT** will ignore messages that are received from an MQTT broker.
- Enabling **OK to MQTT** allows the device's data to be sent to an MQTT broker. This setting is crucial when sharing data, such as sensor or location information, with the Cloud for further processing.

5. Set Location Tracking

If the device is equipped with a GNSS location module, it can send the devices location information over the Meshtastic Network. For devices that do not have such module, a fixed location can be set up.

The location module settings are in the **Position** tab of the **Radio Configuration**.

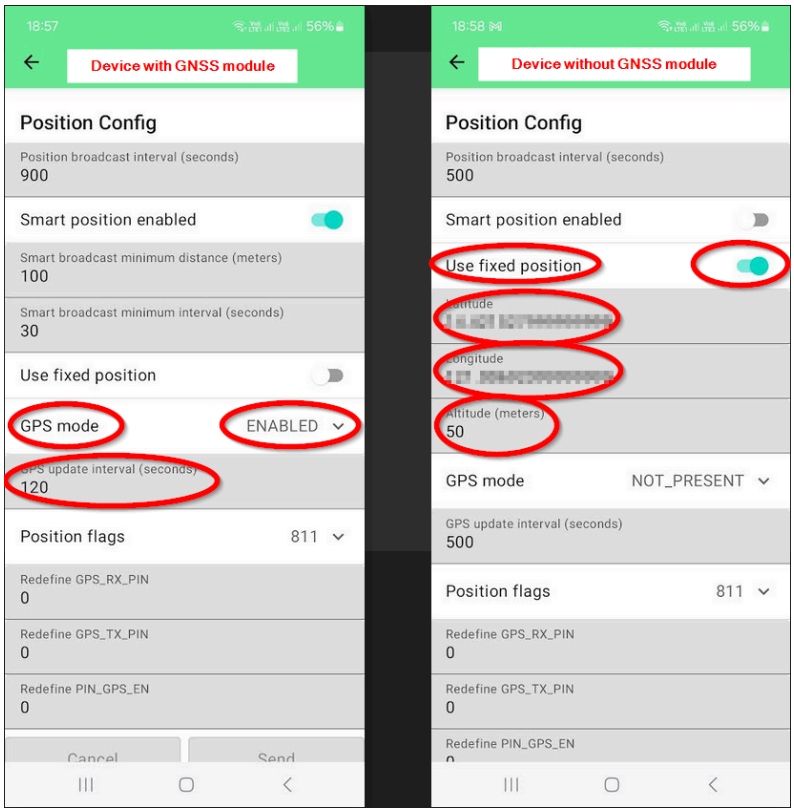

Figure 14: Location settings

- For a device with a GNSS module the default settings will work. This type of module will automatically be detected by the Meshtastic firmware.
- For a device without a GNSS module, it is possible to set a fixed position. This can help, for example, in case a coverage map is built.

6. Check the Display Settings

If there are artifacts visible in the OLED screen, it may be due to an incorrect display setup.

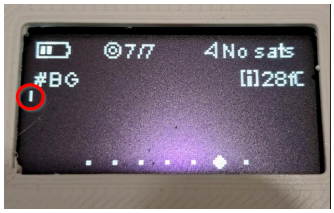

Figure 15: Display settings

In this case, do the following:

1. Click on the **Display** settings in the **Radio Configuration**.
2. In the **Override OLED auto-detect** try a different display model.

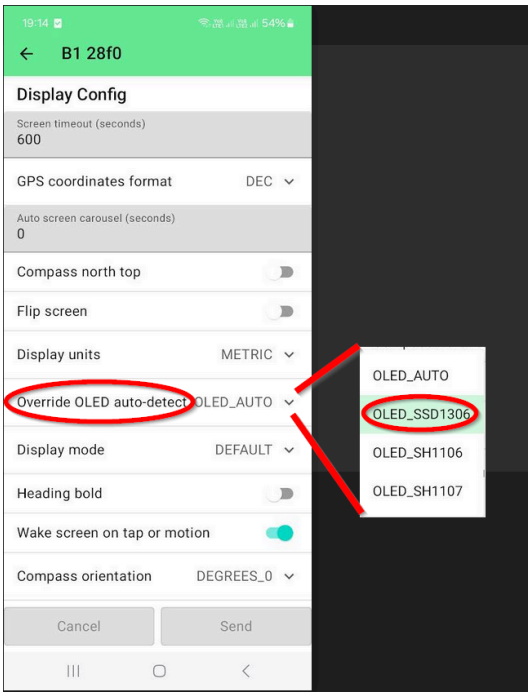

Figure 16: Change display settings

For the WisMesh Pocket and WisMesh Board ONE, the **OLED_SSD1306** is the best selection.

RAK11200 Wi-Fi Connection Configuration

> **INFO**
>
> Once the Wi-Fi connection is established, and the RAK11200 is connected to the same Wi-Fi network as the mobile phone, the device will show up with it's Wi-Fi connection in the mobile app!

Set Wi-Fi Credentials in Radio Configuration

Follow the steps of Part 1 to connect the RAK11200 to the Meshtastic mobile app.

1. Click on the three dots on the top right side of the Meshtastic app. Then, select **Radio Configuration**.

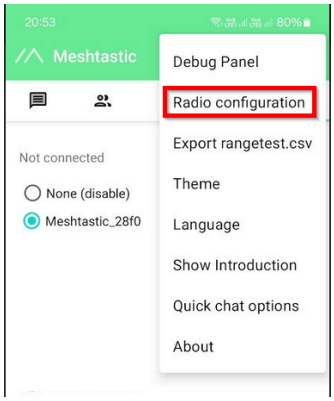

Figure 17: Go to Radio Configuration

2. In the **Radio Configuration** options, choose **Network**.

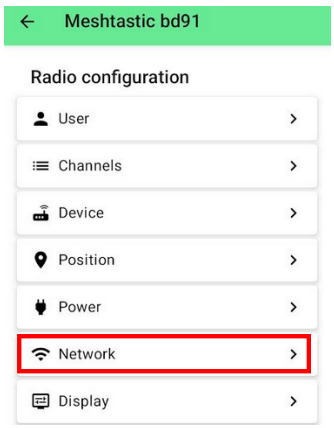

Figure 18: Wi-Fi network settings

The **Network Config** is for both Wi-Fi and a wired connection through Ethernet.

3. Enable Wi-Fi and keep Ethernet disabled.
4. Enter the Wi-Fi SSID that should be used and the Wi-Fi PSK for this Wi-Fi Network.

> **NOTE**
>
> Optional (if available), you can scan a QR code with the Wi-Fi credentials.

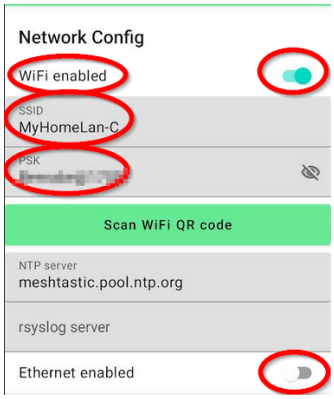

Figure 19: Wi-Fi network configuration

> **INFO**
>
> The settings for the Network Time Provider (NTP) server are optional. You can use the default `meshtastic.pool.ntp.org` or choose one that works better for your country.

Once the Meshtastic node is connected to the Wi-Fi network, the BLE connection to the Meshtastic mobile app is no longer available.

> **WARNING**

> If you configure the device for a Wi-Fi network that you cannot access from your phone, such as an isolated guest access point on your router, you cannot access the device anymore. The only way to recover the device is to do a factory reset by reflashing the Meshtastic firmware.

Connect to the Device via Wi-Fi

1. Connect your phone to the same Wi-Fi network that is set up in the **Network Config** of the device.
   The device will appear in the device list with its IP address now.

> **NOTE**
>
> - If the device is not showing in the list, you can try to obtain the IP address of the device from the following:
>   - the USB log output
>   - a network scanner application

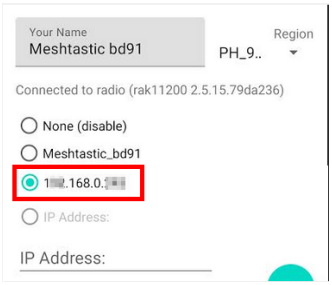

Figure 20: Device connected through Wi-Fi

2. Once you have the IP address, enter it in the **IP Address** field and try to connect.

> **INFO**
>
> - If the device is not showing up with its IP address and the manual entry of the IP address does not work either you might have selected a Wi-Fi network that you cannot access from your phone.
> - Connect the phone to the same Wi-Fi network and check if it is listed.
> - If this doesn't work as well, you might need to reset the device with the factory reset.

Set Up a WisMesh Device with RAK11310 via the Web Client

The Raspberry RP2040 MCU on the RAK11310 does not have Wi-Fi nor BLE connectivity. The only way to set up the device is via the Web Client.

Connect the Device to the Computer via USB

> **INFO**
>
> It is not easy to determine the USB port the RAK11310 will use. To simplify this, it is recommended to disconnect all other devices that may be recognized as USB ports by the computer.

Connect the Device to the Web Client

> **INFO**
>
> - The Web Client using Web Serial API is only supported by a few browser. Refer to the Meshtastic documentation for the Web Client to find the list of supported browsers.
> - The Web Client may not always reflect the latest Meshtastic firmware updates. For example, the Web Client in this guide doesn't include the new Regions for the Philippines. If some settings are missing, you can use the Meshtastic Python CLI to modify them.

In this tutorial, the setup of the RAK11310 Meshtastic node is done using the Chrome browser and the hosted version of the Web Client.

Open the Web Client

1. In your web browser, open the Meshtastic Web Client to start the Web Client. Initially, the start screen will show that no devices are connected.

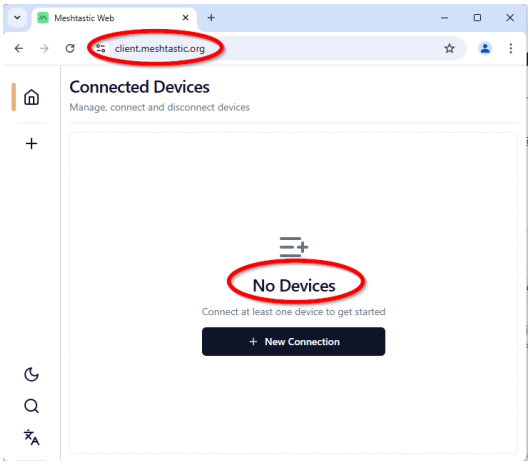

Figure 21: Web Client starting

2. Click on **New Connection** to set up the USB connection to the RAK11310.
3. In the new window, select **Serial** as connection method.
4. Based on the connected devices, a list will appear. Select the device corresponding to the RAK11310.

> **INFO**
>
> It is not easy to determine the USB port the RAK11310 will use. To simplify this, it is recommended to disconnect all other devices that may be recognized as USB ports by the computer.

Figure 22: Web Client device selection

If the correct USB port is selected, the Web Client screen will display initial information about the device, such as:

- Device name
- Battery status
- Meshtastic firmware version

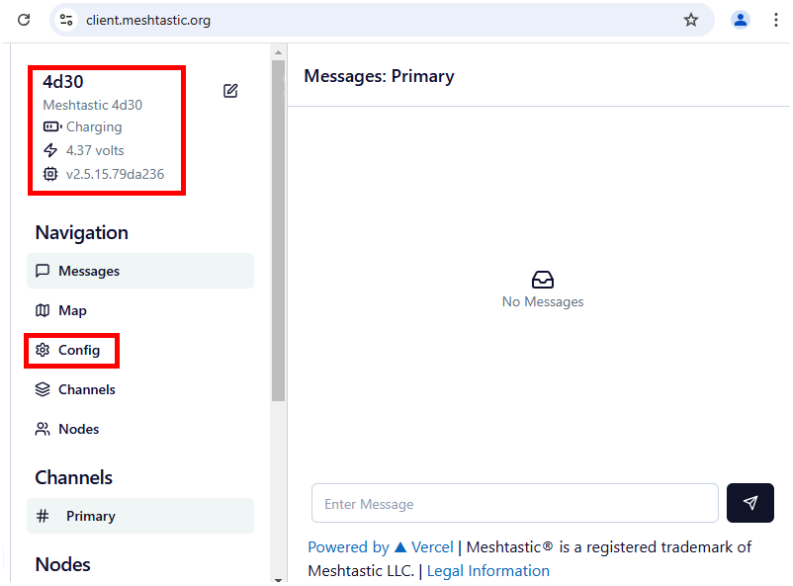

Figure 23: Web Client configuration and device information

5. Click on **Config** to start with the configuration of the device.

Set LoRa Configuration

Configure the Meshtastic Region

1. To set up is the Meshtastic Region, navigate to **Config** > **Radio Config** > **LoRa** tab. On a new device, the region will initially display as **UNSET**.

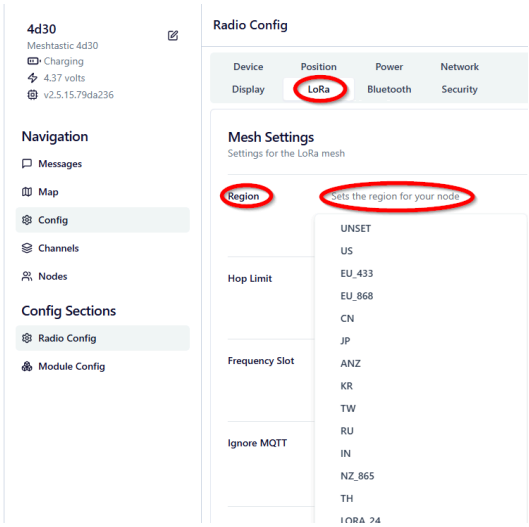

Figure 24: Setup region

2. Select the correct Meshtastic region for your country on the drop-down selector.

> **INFO**
>
> - It is necessary to select the correct Meshtastic Region, otherwise the WisMesh device will not be able to connect to other Meshtastic nodes. The region defines the basic LoRa frequency range the device will use to communicate.
> - If you are unsure about the correct region for your country, refer to the region list in the Meshtastic documentation .

Set the Frequency Slot and MQTT

In the same tab, you'll find the **Frequency Slot** selection. Below it, you'll find the control for the MQTT settings.

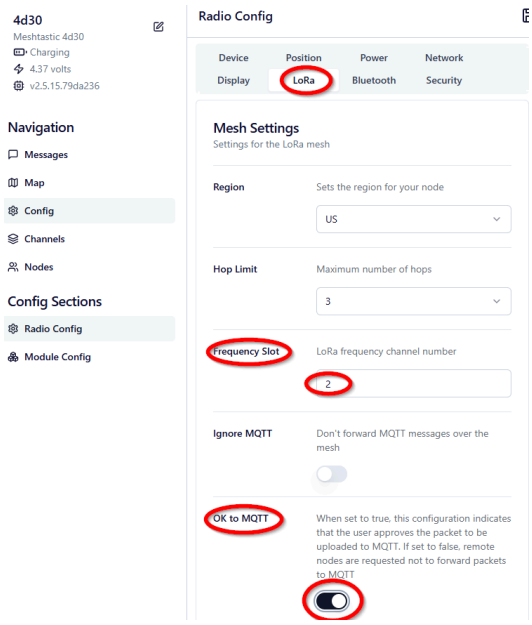

Figure 25: Setup Frequency Slot

> **INFO**
>
> *For most users, the default Frequency Slot setting will work.*

Advanced User Settings

- Enabling **Ignore MQTT** will ignore messages that are received from an MQTT broker.
- Enabling **OK to MQTT** allows the device's data to be sent to an MQTT broker. This setting is crucial when sharing data, such as sensor or location information, with the Cloud for further processing.

Configure Modem Preset

After selecting the **Meshtastic Region**, the LoRa communication settings are automatically preset to the default configuration for that region.

> **INFO**
>
> - *For most users, the default LoRa setting will work.*
> - The default setting can be changed under **Waveform Settings** in the **Modem Preset**.

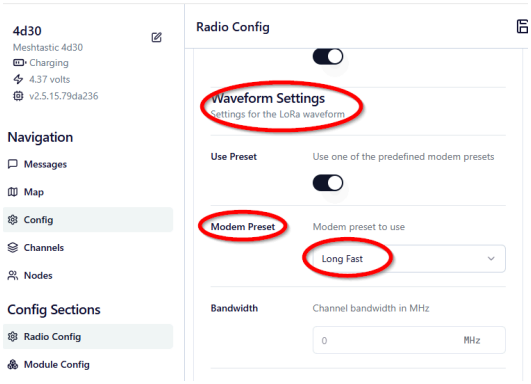

Figure 26: Setup LoRa Configuration

Set the Communication Channel

The communication channel settings are found under **Channels**. By default, the primary communication channel is set to **LONG_FAST**. However, if you prefer not to share your communication with other Meshtastic devices, you can change it in the **Name** setting and define your own channel.

> **INFO**
>
> *For most users, the default channel setting will work.*

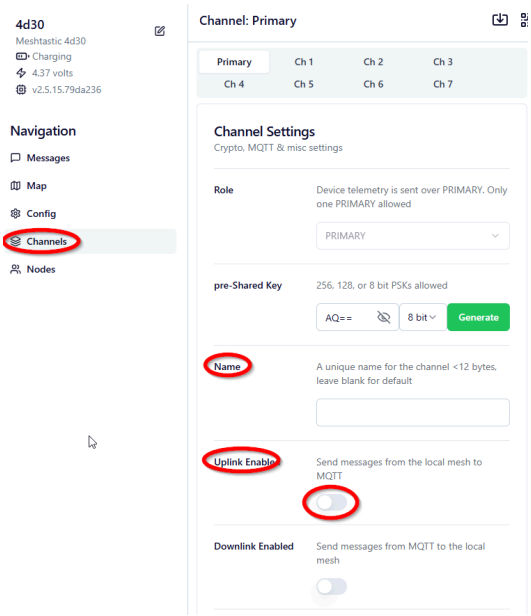

Figure 27: Setup Meshtastic channel

Advanced User Settings

If the devices messages and sensor data should be shared over an MQTT broker to the Cloud, it is important to check **Uplink Enable**.

Appendix: Use the Meshtastic Python CLI to Change Settings

> **INFO**
>
> The Web Client may not always reflect the latest Meshtastic firmware updates. For example, the Web Client in this guide doesn't include the new Regions for the Philippines. If some settings are missing, you can use the Meshtastic Python CLI to modify them.

In this tutorial, the RAK11310 needs to be set to the Meshtastic Region Philippines 915 MHz, which is not yet available in the Web Client. To configure this, you'll need to use the Meshtastic Python CLI.

1. Install the Meshtastic Python CLI. Refer to the Meshtastic documentation .
2. Once the Python CLI is installed, set up the required region using this command:

```
python -m meshtastic --set lora.region 21
```

Set a fake GPS location:

```
python -m meshtastic --setalt 50 --setlat 244215281 --setlon 1010068872
```

Every setting of the RAK11310 can be changed using the Meshtastic Python CLI. You can find a complete guide in the Meshtastic documentation in Using the Meshtastic CLI .

Home