thermoscientific

Smart-Vue Pro LoRaWAN Enabled Receiver

User Guide

331676H02 • Revision B • 08/27/2024

ThermoFisher SCIENTIFIC

IMPORTANT Read this user guide. Failure to follow the instructions in this user guide can result in damage to the unit, injury to operating personnel, and poor equipment performance.

CAUTION All internal adjustments and maintenance must be performed by qualified service personnel.

Material in this manual is for informational purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising from or related to the use of this manual.

Contents

Regulatory Information

Legal Information

47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Certification

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all users and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC id, except in accordance with FCC multi-transmitter product procedures.

FCC Interference Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference
(2) This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

1. The device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation.

Safety Notices

Lithium Battery

- A lithium battery (3 V, coin cell, CR1632) located within the product provides backup power for the timekeeping. This battery has an estimated life expectancy of ten years.
- When this battery starts to weaken, the date and time may be incorrect.
- Battery is not user replaceable. If the battery fails, the device must be sent back to MultiTech Systems for battery replacement.

CAUTION: Risk of explosion, if this battery is replaced by an incorrect type. Dispose off batteries according to instructions.

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Power Supply Caution

CAUTION: Do not replace the power supply with one designed for another product; it can damage the modem and void your warranty. Adapter is installed near the equipment and is easily accessible.

Device Maintenance

When maintaining the device:

CAUTION: Do not attempt to disassemble the device. There are no user serviceable parts inside.

CAUTION: Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device and/or other equipment or harm users.

CAUTION: Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.

CAUTION: Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause explosion or fire and may result in property damage, severe injury and/or death.

CAUTION: Do not expose the device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or fire.

CAUTION: Do not expose the device to water, rain or spilled beverages. It is not waterproof. Exposure to liquids could result in damage to the device.

CAUTION: Do not place the device alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the device.

CAUTION: Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with MultiTech's accessory specifications may invalidate the warranty.

Introduction

This document describes the set up and use of the Smart-Vue Pro LoRaWAN™ enabled receiver, a key component for collecting data in your monitoring solution.

Product Overview

It is designed for the use with Thermo Scientific wireless modules featuring Smart-Vue Pro LoRaWAN connectivity.

The Smart-Vue Pro LoRaWAN receiver is a wireless receiver that leverages new-generation Smart-Vue Pro LoRaWAN Internet of Things technology to offer exceptionally long-range wireless communication.

This receiver can be connected to your local network via a wired Ethernet or a Wi-Fi connection or a cellular connection (based on model).

Figure 1. Smart-Vue Pro LoRaWAN Enabled Receiver- PRO Model

Figure 2. Smart-Vue Pro LoRaWAN Enabled Receiver- Advanced Model

Detailed Description

Key Features

- Compatible with LoRaWAN data loggers
- Low energy technology preserves data logger battery
- LED status indicators
- Software updates via integrated web interface

Data Management

- Collects/forwards data from data loggers to Cloud or On-premises server

Connectivity

- LoRaWAN long-range wireless technology
- Range up to about 15 km/10 miles
- Automatic data logger detection
- LoRaWAN channel plans in ISM spectrum (depending on model): EU868, US915, AU915, IN865, KR920, AS923-1, AS923-2, AS923-3, AS923-4, and RU864

Hardware Details (Both Pro and Advanced Models)

- Antenna (+3dBi default; +5dBi or +8dBi optional)
- External power supply (110-240V AC adapter)
- ARM9 400MHz; 256 MB DDR RAM; 256 MB Flash
- Storage conditions: -40 °C to +85 °C (-40 °F to +185 °F); 20 to 90% RH (non-condensing)
- Wall-mount, screw attachment
- LoRaWAN / Wi-Fi / Cellular data: FCC, CE, IC
- ROHS 3, REACH, PROP-65
  Introduction > Detailed description
  LoRaWAN Gateway User Guide Page 9

Hardware Details - Advanced Model (Blue)

Figure 3. Advanced Model (Blue)

- Connectivity options: Ethernet; Wi-Fi (802.11 a/b/n/g, 2.4 & 5 GHz); and/or 4G-LTE cellular

Note: Cellular connection requires standard sized SIM card.

- Operating conditions: -30 °C to +70 °C (-22 °F to +158 °F); 20 to 90% RH (non-condensing)
- Anodized aluminum, IP30 rating
- Dimensions: 161.3 x 107.4 x 42.8 mm (6.4 x 4.2 x 1.7 in.)
- Weight: 450 g (16 oz.)

Hardware Details - Pro Model (Gray)

Figure 4. Pro Model (Gray)

- Connectivity options: Ethernet/4G-LTE cellular

Note: Cellular connection requires micro-SIM.

- Operating conditions: 0 °C to +70 °C (32 °F to +158 °F); 20 to 90% RH (non-condensing)
- PC-ABS (polycarbonate-ABS), IP30 rating
- Dimensions: 165 x 135 x 36 mm (6.5 x 5.3 x 1.4 in.)
- Weight: 284 g (10 oz.)

Technical Highlights

- Wireless range up to about 10 miles (16 km) line-of-sight
- 2-way wireless communications
- Available LoRaWAN protocol frequencies: 915 MHz and 868 MHz
- Wired Ethernet or Wi-Fi network connection
- Optional cellular data module

Package Contents

- LoRaWAN enabled gateway
- AC adapter (110-240 v)
- LoRaWAN antenna
- Ethernet cable
- Optional and to be ordered separately.
- Wi-Fi wireless module (Optional) and Antenna
- Cellular data module (Optional) and SIM card (Optional) (standard or micro-SIM depending on the gateway model)

Architectures and Technologies

Installed locally at your site, the Smart-Vue Pro LoRaWAN enabled receiver collects data from compatible Thermo Scientific modules within wireless range.

The receiver is connected permanently via internet to the serve where data logger data is pushed by the receiver and accessed using the Smart-Vue Pro web application. The following diagram shows the overall solution organization with the receiver collecting data from data loggers and forwarding it to the cloud platform.

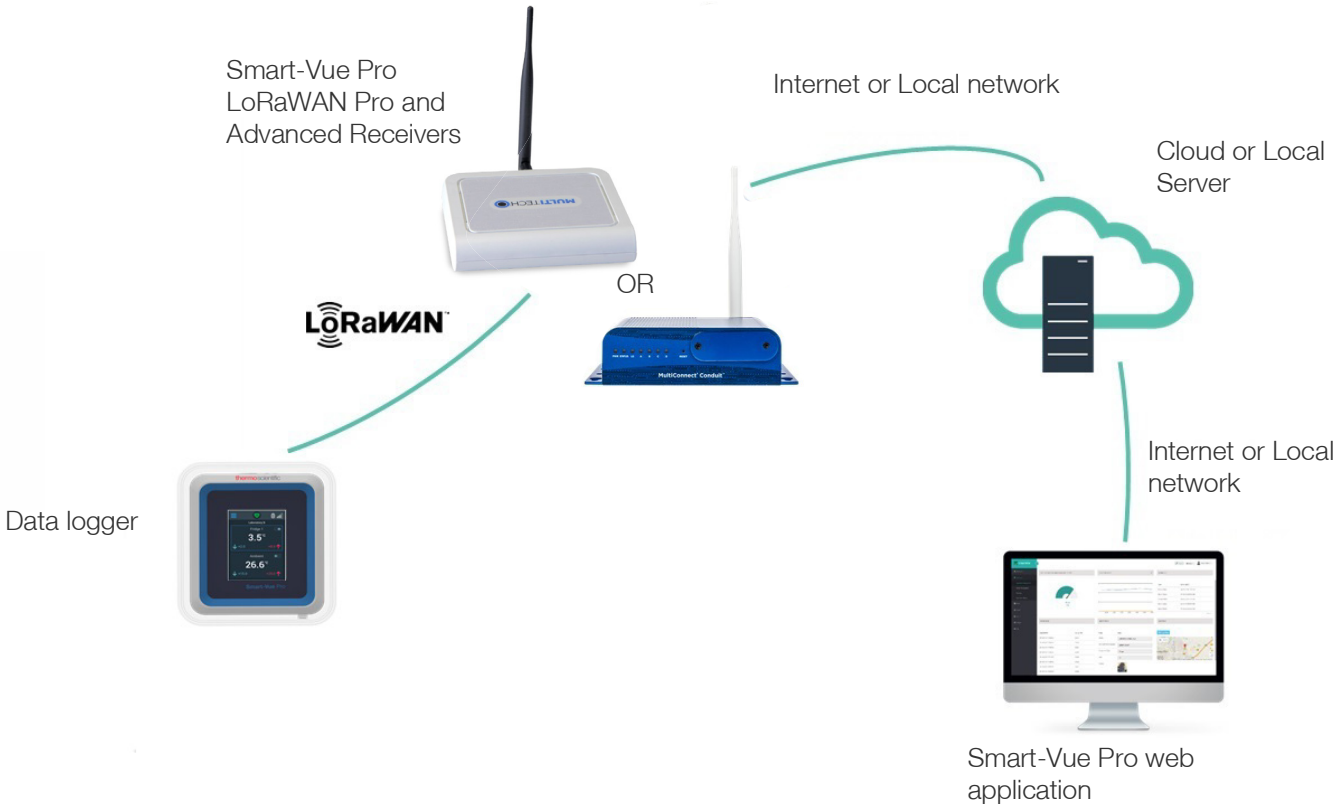


Figure 5. Receiver connecting Smart-Vue Pro Quatro/Duo data logger to the Cloud

Setting Up your Receiver

The Smart-Vue Pro LoRaWAN enabled receiver is configured using an integrated web interface. You must use that interface to determine how your receiver connects to the internet, that is, via an Ethernet or Wi-Fi. This chapter describes how to connect to your receiver and enter the appropriate setting for your solution.

Getting Started

Plug in the Smart-Vue Pro LoRaWAN Antenna

Advanced Model

1. Plug the white Smart-Vue Pro LoRaWAN radio antenna into the “RF” connector (the location may vary according to your unit’s options).
2. Hand-tighten the antenna by rotating the ring clockwise.

Figure 6. Attach Smart-Vue Pro LoRaWAN Antenna to connector labeled “RF”

Pro Model

1. Plug the provided art-Vue Pro LoRaWAN Pro radio antenna on the connector on the back of the device.
2. Hand-tighten the antenna by rotating the ring clockwise.

Figure 7. Attach Smart-Vue Pro LoRaWAN Antenna to connector labeled “RF”

Plug in the Power Cable

Advanced Model

1. Plug the power cable into the stainless-steel connector behind the receiver. The cable fits correctly onto one of the connectors.
2. Tighten the cable by rotating the steel ring clockwise to attach it firmly to the unit.

Figure 8. Plug in the power cable to the stainless steel connector

3. Plug the AC adapter into a power socket to boot the receiver. The startup process may take 2-3 minutes to complete. When the unit is ready for use, the left-hand LED remains lit as shown here (the status LED continues to blink):

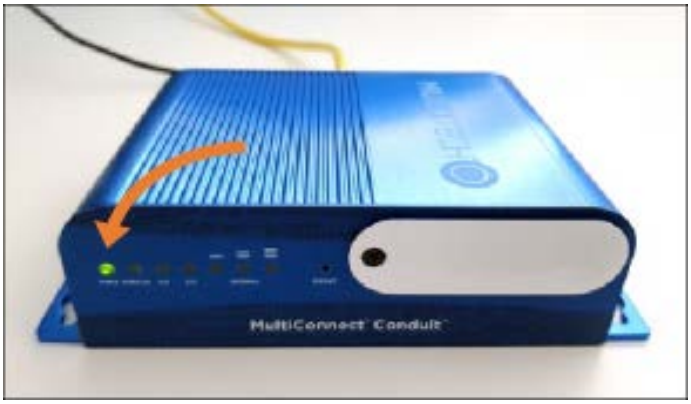


Figure 9. Power indicator remains on when receiver is ready to use

Pro Model

1. Plug the power cable firmly into the power plug on the back of the device.

Figure 10. Plug in the power cable into the power plug and wait for the LED to turn green

2. Plug the AC adapter into a power socket to boot the gateway. The startup process may take up to 5 minutes to complete. When the unit is ready for use, the status LED turns green. LED activity will vary depending on the connection type.

Connect to the Configuration Interface

1. Plug the ethernet network cable into the ethernet port behind the receiver.

Figure 11. Advanced model receiver with ethernet cable

Figure 12. Pro model receiver with ethernet cable

2. Plug the other end of the cable into either your:
   a. Local Area Network

      If your Local Area Network uses the following IP addresses: 192.168.2.x, you may skip to step 3. Otherwise or if you are unsure, see step (b).

   b. Computer

      The receiver does not have a DHCP server which means you must manually set an IP address on your computer to communicate with the receiver.

      In your computer's network settings, assign the following IP information temporarily (ensure you change it back when done configuring your receiver):

      IP: 192.168.2.199

      Mask: 255.255.255.0

      Do not change the Default Gateway or DNS
3. Use your web browser to connect to the receiver's default IP address: http://192.168.2.1

IMPORTANT NOTE: We recommend to use Google Chrome as your web browser. Internet Explorer is not supported.

Upon first boot, the gateway is in "commission mode" and you will be prompted to create a new user-name and password. There is no default user-name or password.

4. Assign user-name in commissioning mode and press **OK.**

Figure 13. Assign user-name in commissioning mode

5. Assign a password for that user-name and press **OK**:

Figure 14. Assign a password for the user-name

6. You may then login using the information you just entered.

Figure 15. Enter Login Credentials

Note: User-name and Password

While performing the initial configuration of the device for the network, an administrative user-name and password is set.

Ensure that this information complies with your organization's user account provisioning policies and follows best security practices.

Rather than setting a password for the administrative account, consider setting a pass phrase. A combination of 4 or more unrelated words with spaces is statistically more secure than assigning a password, regardless of complexity.

Store this user-name and password information in the designated repository defined by your organization's policies. A digital password vault that has the ability for multiple users is one option, while storing it in a fireproof safe is another.It is recommended that the user-name and password should not be stored in a location easily accessible by those not requiring access because of the access privileges allowed to the device with these credentials.

First-Time Setup

Setting Up Your Device Using Setup Wizard (After Choosing Reset and Factory Default Settings)

When the power is turned on the device, set the device to factory default settings to see the first-time setup. This wizard helps you configure the main features of your device.

Here are the steps for first-time setup:

1. When the power is turned on for the first time or after you set factory default settings, the device goes into commissioning mode. The system requires you to set up an admin user. Enter your user-name and click **OK**.
2. Enter a password for the admin user and click **OK**. This password must be of sufficient length and strength (with a mix of character classes such as letters, numbers and symbols). Enter the password again to confirm. Click **OK**.
3. On the first page, you see the below screen. Click **Next**.

Figure 16. First Time setup wizard

4. Configure **Call Home.**

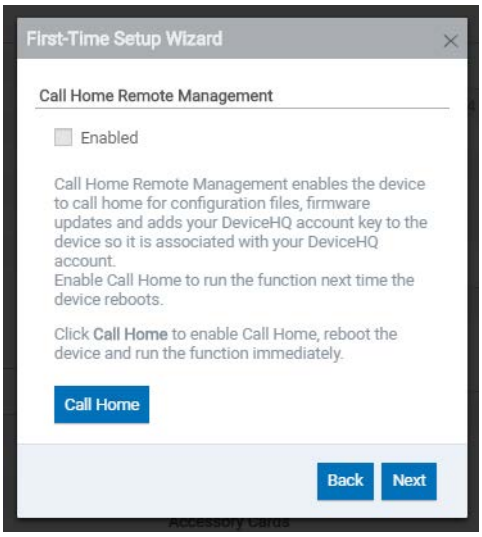


Figure 17. Call home configuration

a. This feature is not supported for the Smart-Vue Pro solution so click **Next** to go to the next screen without changing the settings.

5. Set the date, time and time zone.

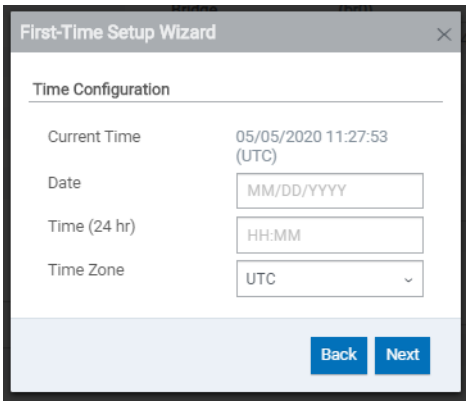


Figure 18. Time configuration

a. Enter the **Date**.
b. Enter the **Time**.
c. Select the **Time Zone** in which the device operates.
d. Click **Next**.
e. By default the date and time are in UTC format. If you do not wish to change the current settings of date and time simply click **Next** to go the next screen.

6. Configure LAN network interfaces Eth0 and Br0.

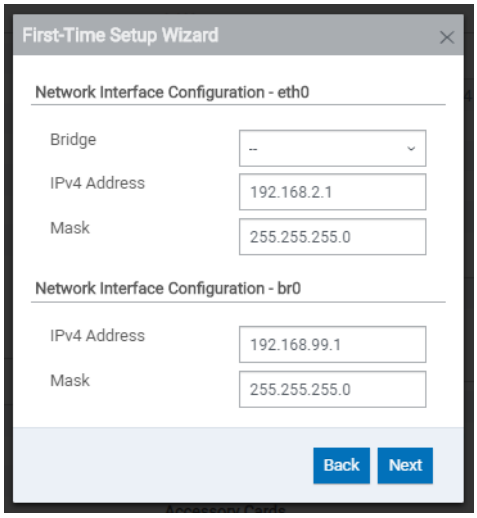
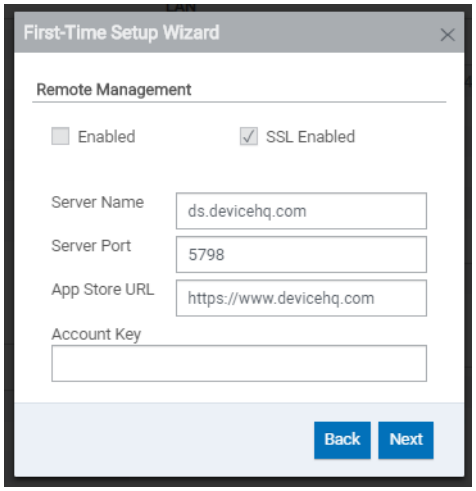


Figure 19. Network interface configuration

a. Leave the settings to default and click Next to go to the next screen. The detailed procedure to configure the Ethernet is mentioned in "**Setting Up an Ethernet Connection**".

7. Set up **Remote Management**.



a. This feature is not supported for the Smart-Vue Pro solution so simply click **Next** to go to the next screen without changing the settings.

8. Configure **HTTP/HTTPS Access**.

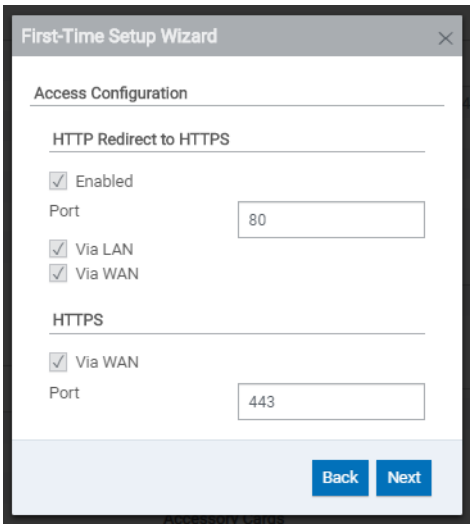


Figure 20. Access configuration

a. This feature is not supported for the Smart-Vue Pro solution so click **Next** to go to the next screen without changing the settings.

9. Set up **Bootloader Protection** by setting a u-boot password.

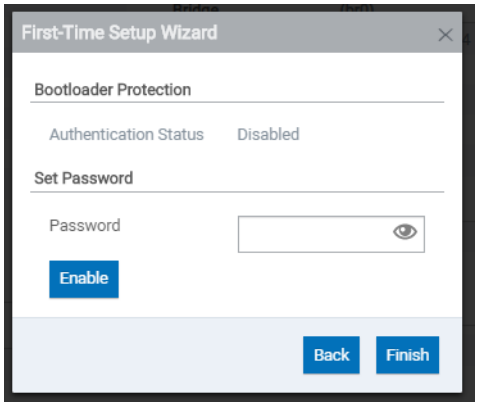


Figure 21. Bootloader Protection

a. This feature is not supported for the Smart-Vue Pro solution so click **Next** to go to the next screen without changing the settings.

10. Click **Finish**.

11. To save your changes, click **Save** and **Restart**.

LoRaWAN Configuration

IMPORTANT NOTE: When you connect to the receiver for the first time, a First-Time Setup Wizard runs automatically. We recommend that you close the wizard and set up the receiver manually as described here.

Start your receiver configuration by verifying LoRaWAN networking settings.

1. Click **LoRaWAN (Network Settings).**

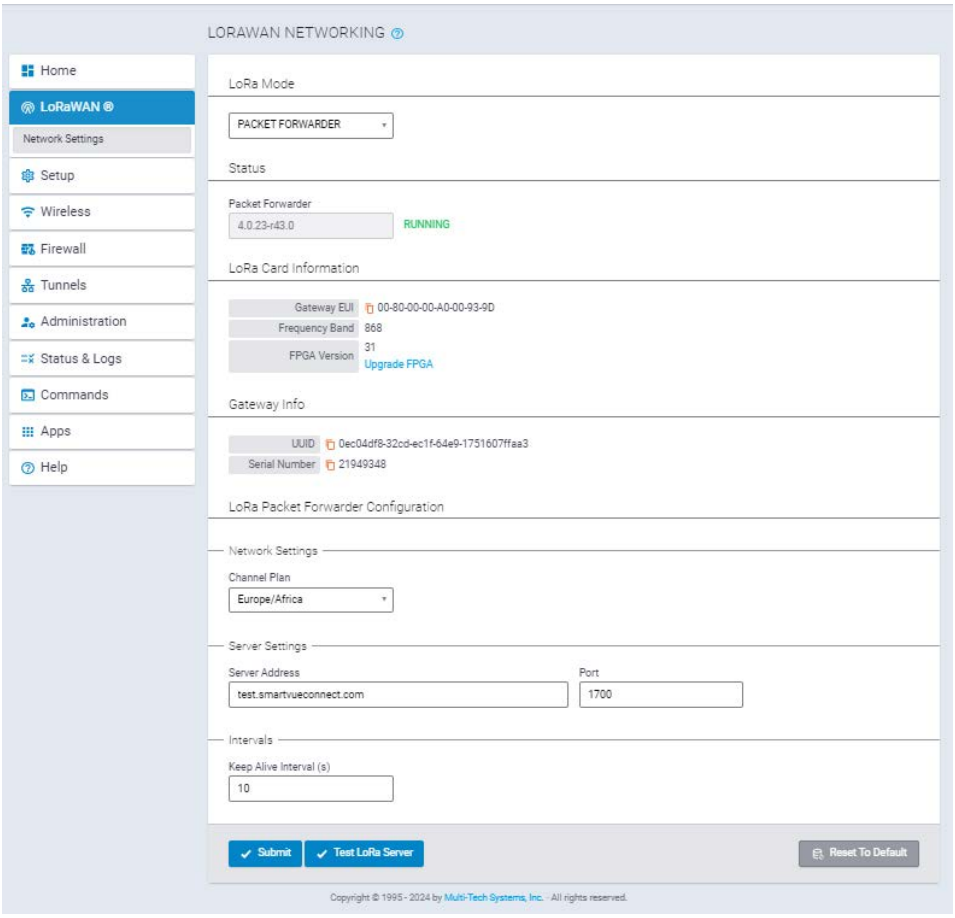


Figure 22. LoRaWAN configuration screen

2. Ensure the following default values are entered.
   a. For Smart-Vue Pro Quatro/Duo data loggers:
   - Server Address: **smartvueconnect.com**
   - Port (up & down): **1700**
   - Keep Alive Interval: 10 seconds

CAUTION: If you enter a domain name rather than an IP address, the DHCP client in the receiver must be able to resolve the name to connect to the internet (described in the next section).

3. Click Test LoRa Server in the lower left-hand corner to verify the connection.

CAUTION: Test Lora Server will only work once you configure your network properly (see **Setting Up an Ethernet Connection** to **Setting Up a Wi-Fi Connection to your Network**).

4. When the test run has succeeded, click Submit to apply your changes.
5. You must restart gateway services for settings to be saved. Click on Save and Apply in the menu on the left-hand side of the screen (or Save and Restart) to complete configuration. This process takes several minutes.
6. Once the services are restarted, LoRaWAN networking status is updated.

Setting Up an Ethernet Connection

This section describes how to configure your receiver with an Ethernet wired connection. The receiver does not require to be placed in its final location for this operation, but it does need to be accessible over your network.

1. Click **Setup ➔ Network Interfaces ➔ Options** (Edit) for “eth0” **(1).**

Note: The Cellular and WiFi configuration will be available based on the model you purchased.

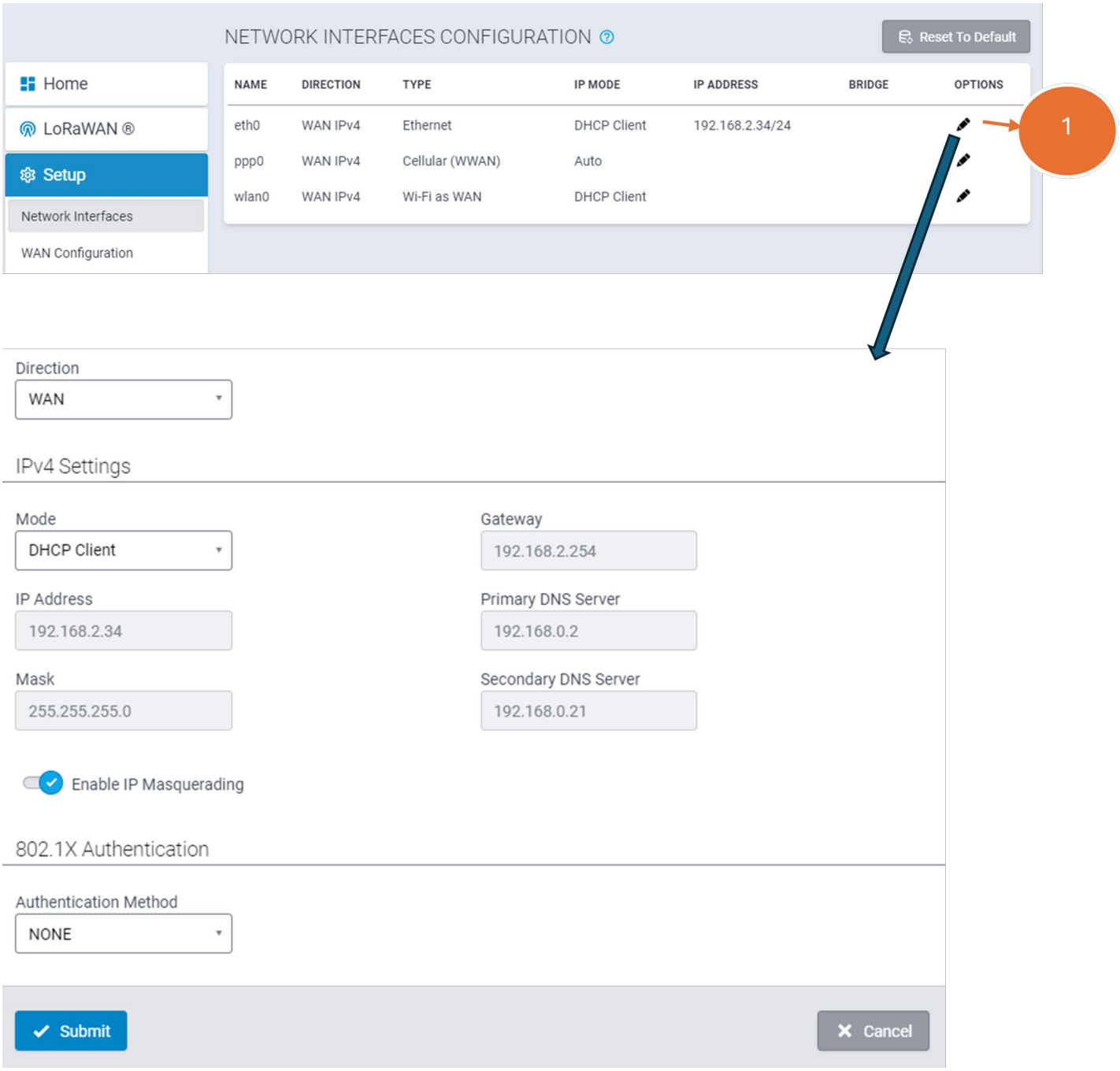


Figure 23. Ethernet adapter settings for your network

2. Adjust the various settings in the **Network Interface Configuration** window to match your network:

Table 1. Network Interface Configuration

Option	Settings
Direction	**WAN**
Mode	**Static** (in which case you must set the IP Address in the field below) or **DHCP Client** (the receiver gets its IP address from your network's DHCP server).
IP Address, Mask, Gateway, Primary DNS Server, Secondary DNS Server	Enter the IP addresses according to your network configuration.

3. Click Submit when you are done.

If you connected your computer directly to the receiver with an ethernet cable remember to plug the receiver into your Local Area Network.

CAUTION: It is essential to leave the DHCP server option disabled on your receiver **(Setup ➔ DHCP)**. Enabling that option could create a conflict with your network's DHCP server. This is not to be confused with the DHCP client option described above. Its not required to configure other options in the Network Interfaces (described in **Setting Up a Wi-Fi Connection to your Network**).

Note: Ethernet Network Address Settings
If you wish to specify what devices can communicate with the system by way of Access Control Lists (ACLs), the network address should be set to a static IP. Your IT team will assist in ensuring the routes required are open for each device to connect through any firewalls.

Setting Up a Wi-Fi Connection to your Network

This section describes how to configure your receiver with a Wi-Fi wireless connection using DHCP automatic IP address assignment.

CAUTION: If you need to use your LoRaWAN router in Wi-Fi mode with a static IP address, See **Applying a Static IP address for Wi-Fi Connection**.

To set up Wi-Fi wireless access for your receiver:

1. Plug the provided Wi-Fi antenna into the Wi-Fi connector and rotate the ring clockwise to fasten the antenna securely:

Figure 24. Attaching antenna for Wi-Fi network

2. Click **Wireless ➔ Wi-Fi as WAN**, as shown below:

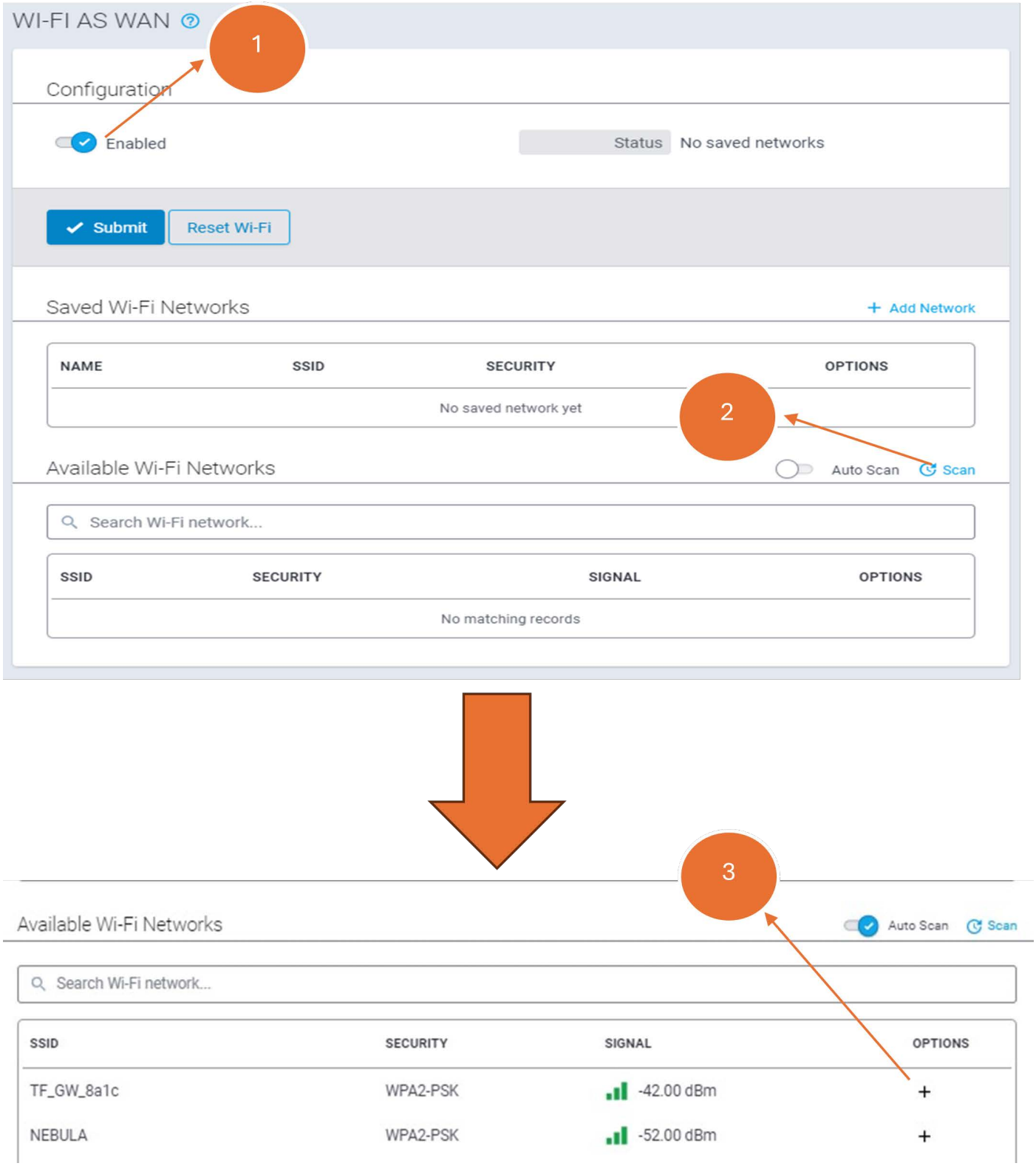


Figure 25. Wi-Fi configuration for advanced model

3. Click on Enabled (1) to activate Wi-Fi, then on Scan (2) to display available WiFi networks.
4. If your network is listed, click on the corresponding + (3) icon and enter the required security information (notably the Shared key to access the network). Then click on Finish to save your changes.

5. If your network is not listed, click on to add a network and fill in the information as required:

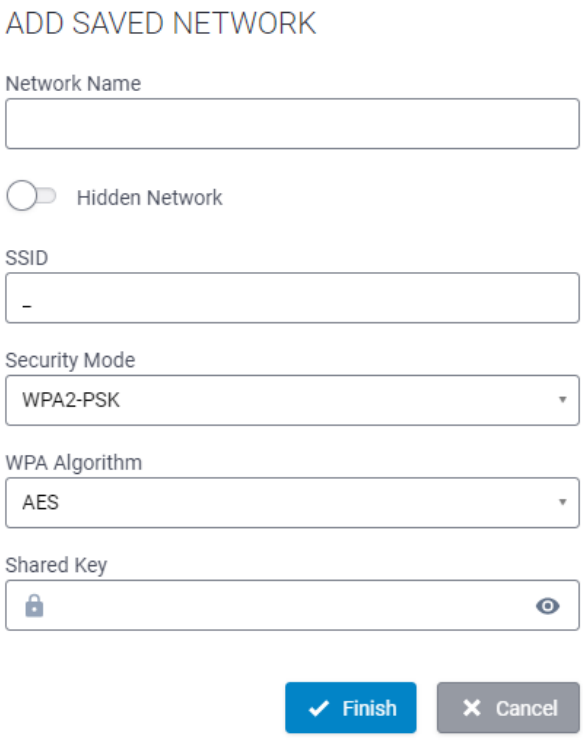


Figure 26. Wi-Fi Network Settings

Table 2. Network Information

Option	Setting
Network Name	Assign a “friendly” name for the network.
Hidden Network	Indicate whether this network is publicly visible.
SSID	Enter the exact network name.
Security Mode	Choose the security and key encryption methods used by your Wi-Fi network.
WPA Algorithm	TKIP+AES, TKIP, or AES according to your network.
Shared Key	Enter the network access code.

6. Click on Finish to save these settings.
7. If this is the only change you are making to your configuration, click on Save and Apply. Otherwise, we recommend waiting until you have made all your changes and do a global Save and Apply when you are done (or Save and Restart depending on the settings you changed). The process takes several minutes and there is no reason to launch it multiple times.

Applying a Static IP address for Wi-Fi Connection

Follow these steps if you would like to use a static IP address with your Wi-Fi configuration:

1. Click on Setup -> Network Interfaces
2. Click on Options (edit symbol) (1) on line containing the Wi-Fi as WAN configuration.

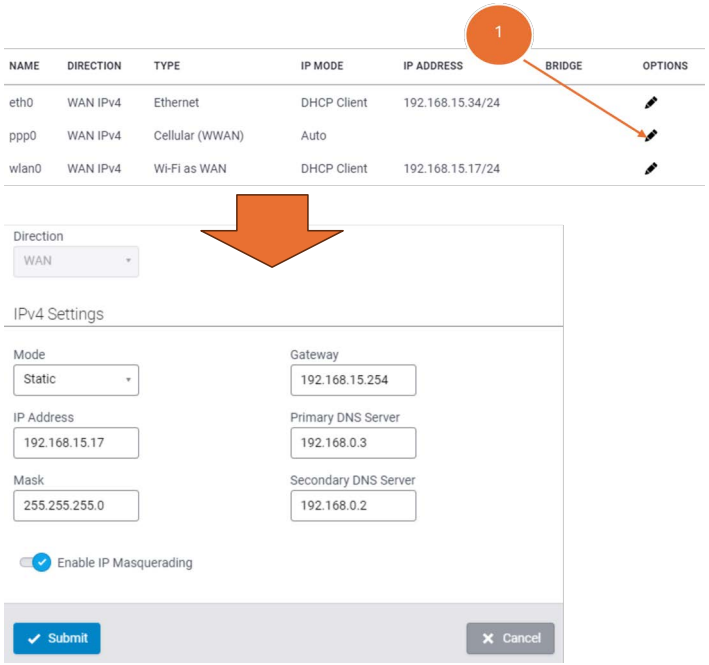


Figure 27. Applying a Static IP Address for Wi-Fi Connection

3. Enter the appropriate IP address information for your network, then click on **Submit**.

Using a Pre-shared WPA/ WPA2 Key

Wi-Fi Protected Access Pre-Shared Key (WPA-PSK) is an encryption method for authenticating users or devices on wireless local area networks.

Some Wi-Fi networks may require you to enter a pre-shared WPA/WPA2 key in order to connect the LoRaWAN gateway.

In the gateway's administration interface:

1. Click on Wireless ->Wi-Fi Access Point, then click in the Security Options field:

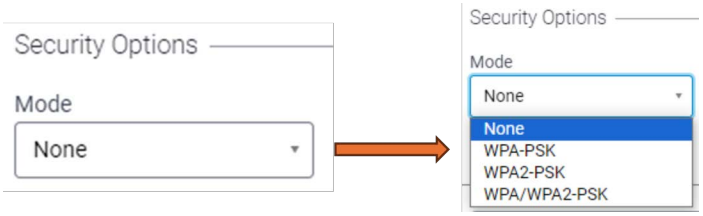


Figure 28. Wi-Fi access point selection

2. Choose the security option used for your network. For example, if you choose WPA or WPA2, click to select the appropriate WPA Algorithm:

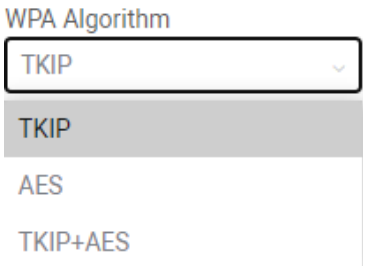


Figure 29. Select the appropriate algorithm

3. Enter the key in the Shared Key field.

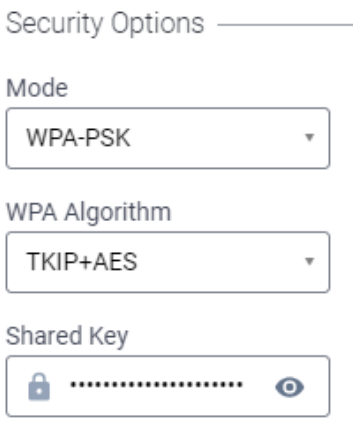


Figure 30. Enter the shared key

4. Click on Submit in the lower left-hand corner of the screen when done.
5. If this is the only change you are making to your configuration, click on Save and Apply.
   Otherwise, we recommend waiting until you have made all your changes and do a global Save and Apply when you are done (or Save and Restart depending on the settings you changed). The process takes several minutes and there is no reason to launch it multiple times.

Cellular Data Connection

1. The cellular antenna is integrated inside the gateway casing, so you do not need to connect an external antenna.
2. Insert the SIM card completely into the slot on the back of the gateway as shown below. The slot is "keyed", so the SIM card can only be inserted with the cut corner on the left-hand side, facing forward.

Figure 31. Insert the SIM into the gateway

Software Configuration

3. In the administration interface, select Cellular ➔ Cellular Configuration:

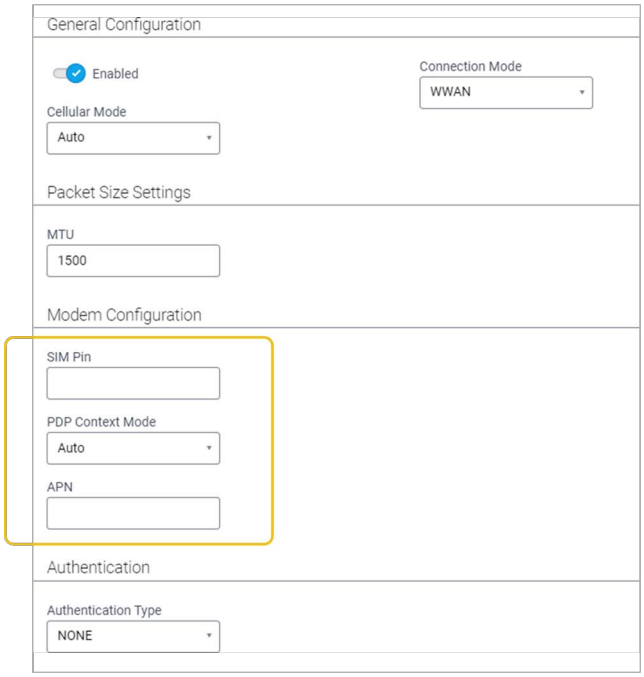


Figure 32. Cellular configuration interface

4. In this screen, the only fields you should need to edit are:

SIM Pin	If necessary, enter the PIN number to unlock access to your SIM card. Many data-only (Internet of Things) solutions do not require a SIM code.
APN	Enter the code provided by your cellular service provider.

All other fields may be left with their default values.

5. Click on Submit to save your settings.
6. If this is the only change you are making to your configuration, click on Save and Apply.
   Otherwise, we recommend waiting until you have made all your changes and do a global Save and Apply when you are done (or Save and Restart depending on the settings you changed). The process takes several minutes and there is no reason to launch it multiple times.
7. You can check the gateway's cellular status by clicking on Cellular ➔ Radio Status:

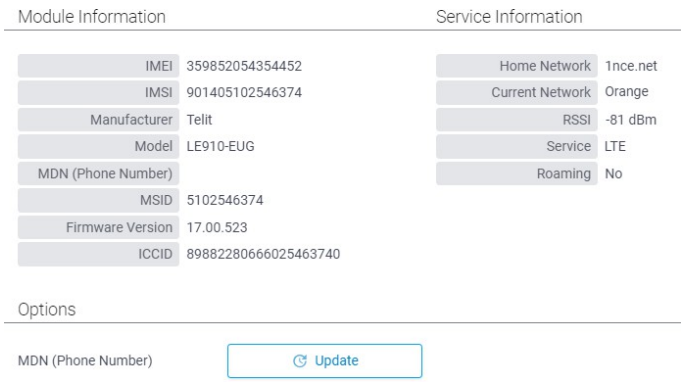


Figure 33. Cellular status interface

Configuring "Failover" Order for Network Access

If you have more than one Internet connectivity option installed in your gateway, the gateway can switch from one to another in case of failure.

As a reminder:

- The Advanced model supports Ethernet and Wi-Fi
- The Pro model supports Ethernet and 4G/cellular

Connectivity options are specified at the time of purchase.

For example, if you choose to run Ethernet as your primary connection and the connection fails at some point, you could backup the communication channel by also configuring the optional cellular data connection as described below:

1. Click on Setup ➔ WAN Configuration.
   The list below shows the priority order in which connectivity options are used. In the case below, Ethernet is used as the priority connection. The gateway would switch automatically to WiFi if communication via Ethernet fails, and then cellular data if WiFi fails.
2. Click on the up/down arrows (1) to change network priority order.

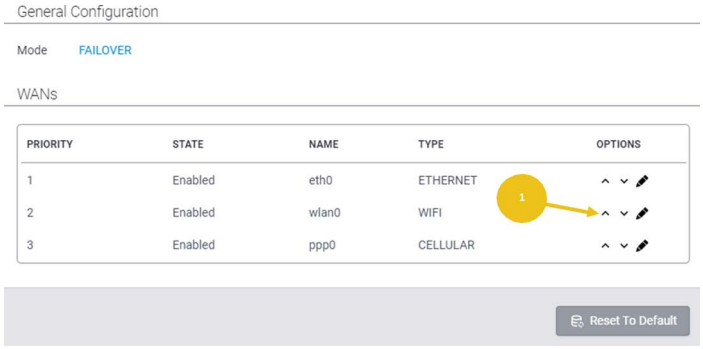


Figure 34. Changing network priority order

Troubleshooting

How do I access the Smart-Vue Pro LoRaWAN configuration page?

For the first time when you plug in your Smart-Vue Pro LoRaWAN, use your web browser to connect to the receiver's default IP address: http://192.168.2.1.

Once Wi-Fi or ethernet is successfully configured and saved then use the IP address assigned to the Smart-Vue Pro LoRaWAN to connect.

The assigned IP address for your Smart-Vue Pro LoRaWAN can be seen on the home page of Smart-Vue Pro LoRaWAN. Note the IP address for later use.

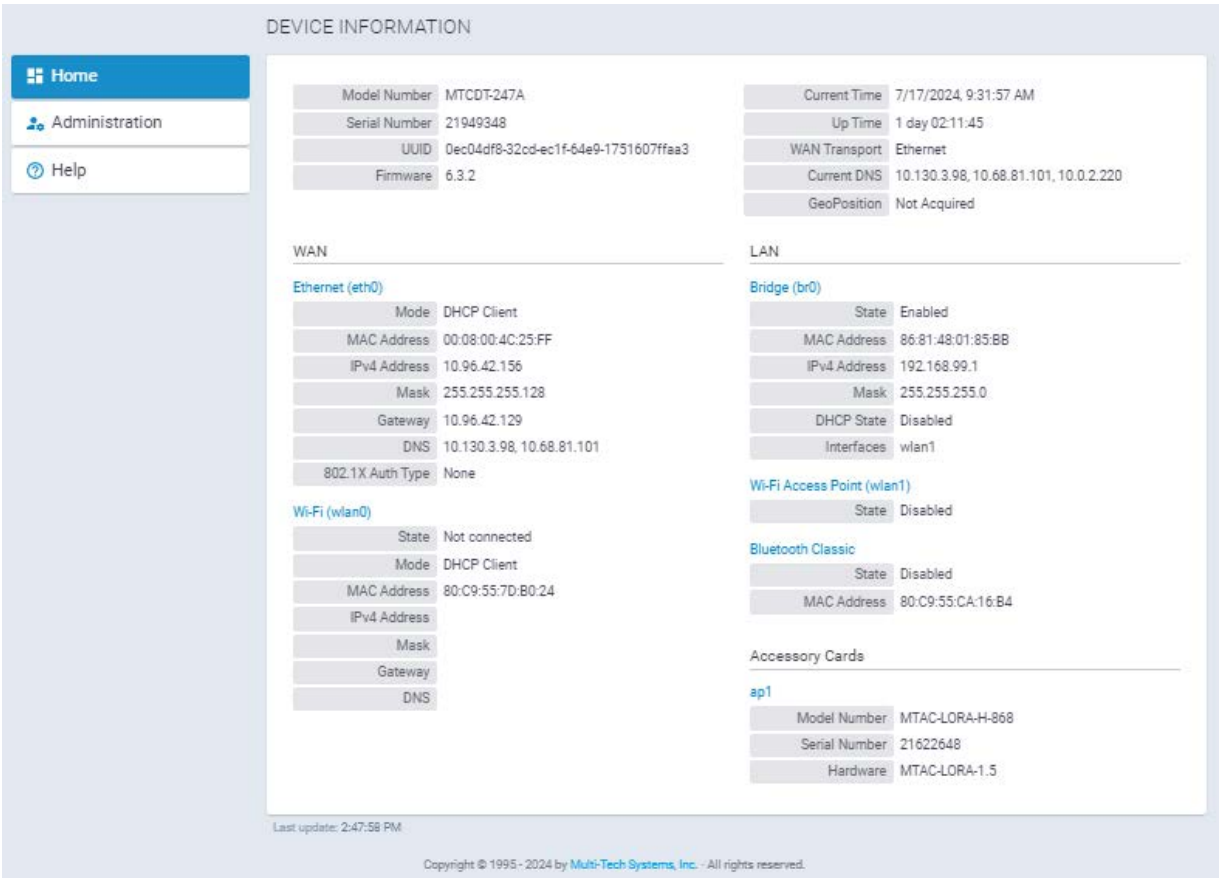


Figure 35. Smart-Vue Pro LoRaWAN configuration page

Can I test my Smart-Vue Pro LoRaWAN network connection?

In the **Setup ➔LoRa** window (described in **Smart-Vue Pro LoRaWAN Configuration**), is a **Test LoRa Server** button. When you Click that button, you receive an acknowledgment that the connection is up and running.

Why sensors connected to Smart-Vue Pro Quatro does not get detected in the web application?

Sensors attached on Smart-Vue Pro Quatro sometimes may not be detected due to the latency in the network which is configured in Smart-Vue Pro LoRaWAN. If the latency is greater than 200 mSec, then this issue occurs. Use the 'Test LoRa Server' option to measure the latency.

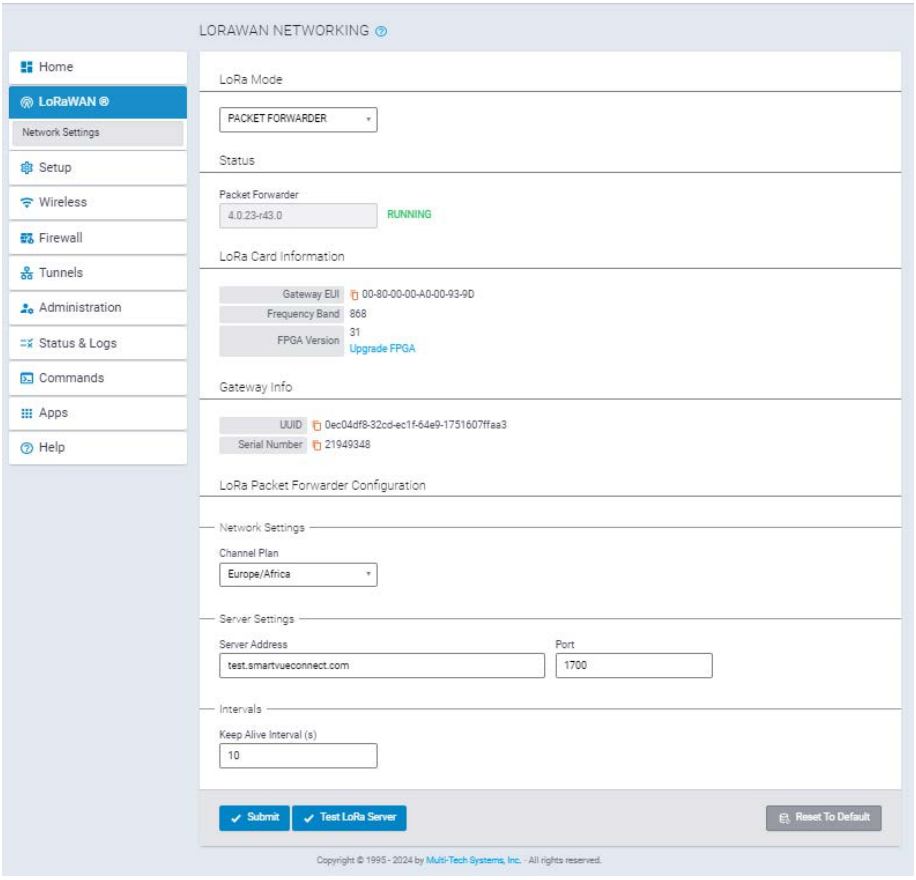


Figure 36. Smart-Vue Pro LoRaWAN network connection

How can I be confirmed that communication between the Smart-Vue Pro LoRaWAN and the webapp is established?

This can be confirmed by the latency time. The latency (time taken for the data logger to communicate with the web application via the Smart-Vue Pro LoRaWAN and receive a response) should be less than 200 ms. Latency details are visible when the 'Test LoRa server' option is clicked on the Smart-Vue Pro LoRaWAN web interface page. (See **Figure 36**).

I would like to see how well the LoRaWAN connection works at my site. Is there an easy way to test this?

You may test the wireless connection between your receiver and a Smart-Vue Pro LoRaWAN data logger as described in the data logger user guide. For more information, or to conduct a more complete site survey, contact your Thermo Scientific representative.

How can I check the coverage status of the Smart-Vue Pro LoRaWAN signal between Smart-Vue Pro Quatro and the Smart-Vue Pro LoRaWAN?

On Smart-Vue Pro Quatro, the 'Range Test' feature helps you know if there is Smart-Vue Pro LoRaWAN signal coverage between Smart-Vue Pro Quatro and the Smart-Vue Pro LoRaWAN.

A good coverage (100%) will be shown on the device.

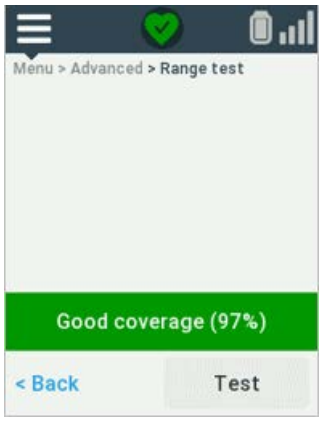


Figure 37. Smart-Vue Pro LoRaWAN signal

Why is the telemetry data from the sensors (connected to Smart-Vue Pro Quatro) not showing on the web app?

Verify the below:

- Check if the option "**Smart-Vue Pro LoRaWAN ON/ OFF**" on Smart-Vue Pro Quatro is enabled.
- Ensure the sensor is disconnected from earlier data logging sessions completed.

- Smart-Vue Pro LoRaWAN is switched **ON** and configured network latency is less than 200 mSec.
- Switch off the Smart-Vue Pro LoRaWAN Quatro by disconnecting the AC Adapter (If plugged in) and remove the batteries and then replace batteries and connect back AC Adapter (if required). Press show sensor on device.
- Disconnect sensor and connect the sensor back. Press "Refresh sensors" and ensure the sensor value is seen in "Show Sensor" screen of Smart-Vue Pro LoRaWAN Quatro.

What is the default time to wait for complete functionality to start on Smart-Vue Pro LoRaWAN after restart / power on restart?

After a power on restart/ restart waits for at least 2 minutes for the complete setup to be up.

Why is data logging not starting/stopping on web app?

- This would be due to bad network. If the latency is more than 200 msec, then the selected command will not reach the Smart-Vue Pro LoRaWAN and Smart-Vue Pro LoRaWAN Quatro.
- Ensure that the network used for communication from Smart-Vue Pro LoRaWAN has good internet speed.
- Stop data logging takes certain time to stop based on the data which need to be synced from Smart-Vue Pro LoRaWAN Quatro to cloud. Audit trails in web app shall show the time of the event happened.

What to do when it shows "Unable to reach Smart-Vue Pro LoRaWAN server"?

Ensure port 1700 is open and inform IT team that it should communicate via UDP.

I'd like to test LoRaWAN wireless coverage at my site. The receiver is in place, but I don't want to use it on the internet and just use LoRaWAN to check coverage. Is it possible?

There is an auto-acknowledgment wireless testing feature in SVP Quatro data logger firmware. If you want to test on-site coverage without an internet connection (that is, just the LoRaWAN part), you may configure the SVP Quatro data logger as follows:

Select **Menu ➔ Advanced ➔ LoRaWAN ➔ Network ➔ Custom**.

Select the region and enter this 8-digit number via the keypad: "00000000". On gateway side, click **LoRaWAN (Network Settings)**, change the "Server Address" to 127.0.0.1. Click to use the **Range test** feature on the SVP Quatro data logger to test LoRaWAN connectivity with your receiver.

How to reset the login password if password is blocked or forgotten?

The LoRaWAN receiver need to be reset, to set a new password.

How do you reset the LoRaWAN receiver?

Switch on the power on the Lora receiver and then press and hold the reset button on front panel for more than 30secs and then release the button. The status LED on front panel will be steady for more than 2mins and then blink. Once the device is ready, as explained in section "**Connect to the Configuration Interface**" configure the device.

How to assign a Static IP address in Windows 7, 8, 10, XP or Vista?

In the "Network Connections" window, right-click the adapter for which you want to set a static IP address, and then select the "Properties" command.

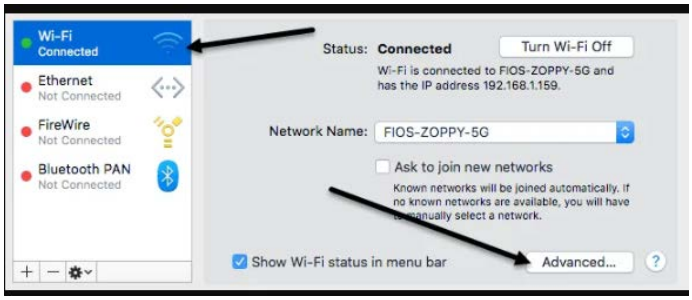
Step by step illustration:

1. Go to **System Preferences**.

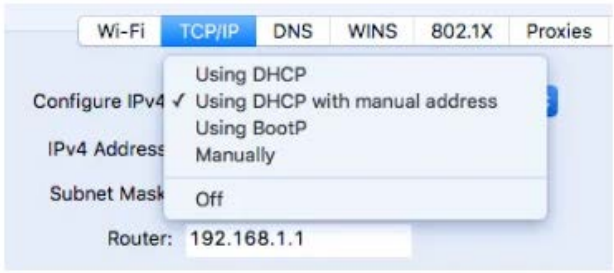
2. Click the **Network icon**.

3. You will see a list of network connections on the left. If the connection is green, that means it is active.

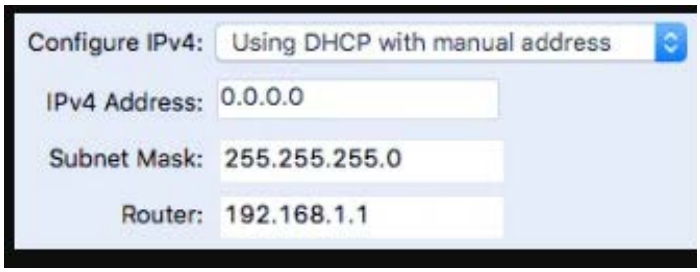
Click the connection and then click the **Advanced button** at the bottom right.



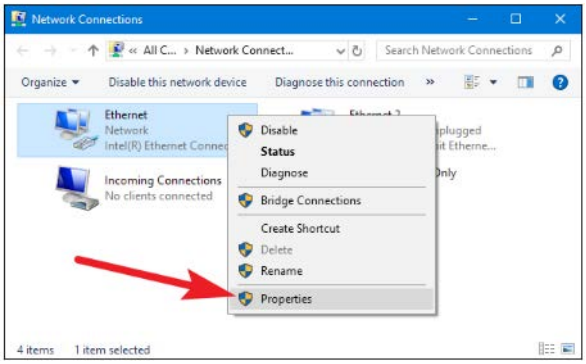
4. This will bring up all the advanced settings for the network connection. Click the TCP/IP tab and you'll see a drop-down next to Configure IPv4.

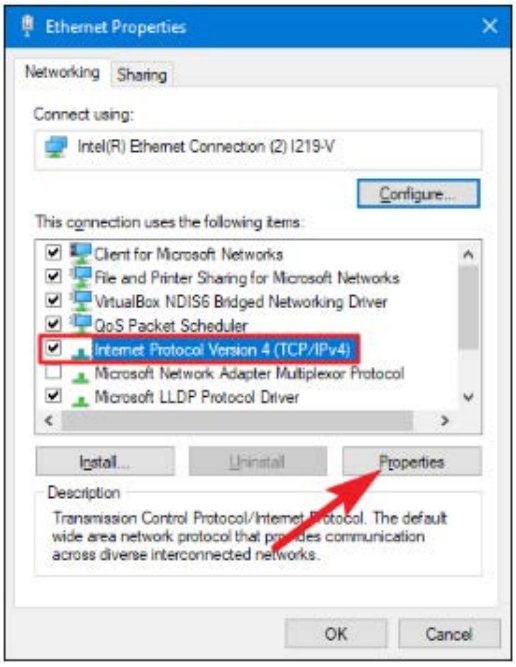


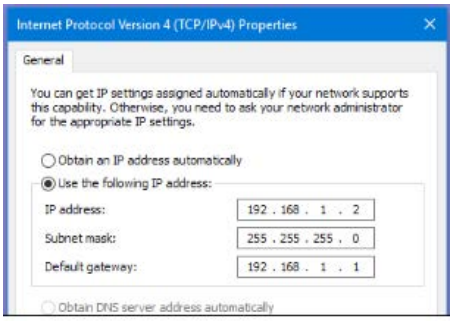
5. This will bring up all the advanced settings for the network connection. Click the TCP/IP tab and you'll see a drop down next to Configure IPv4.



For Windows OS:







Firmware Upgrading Process

CAUTION: Use official firmware files provided by thermo scientific.

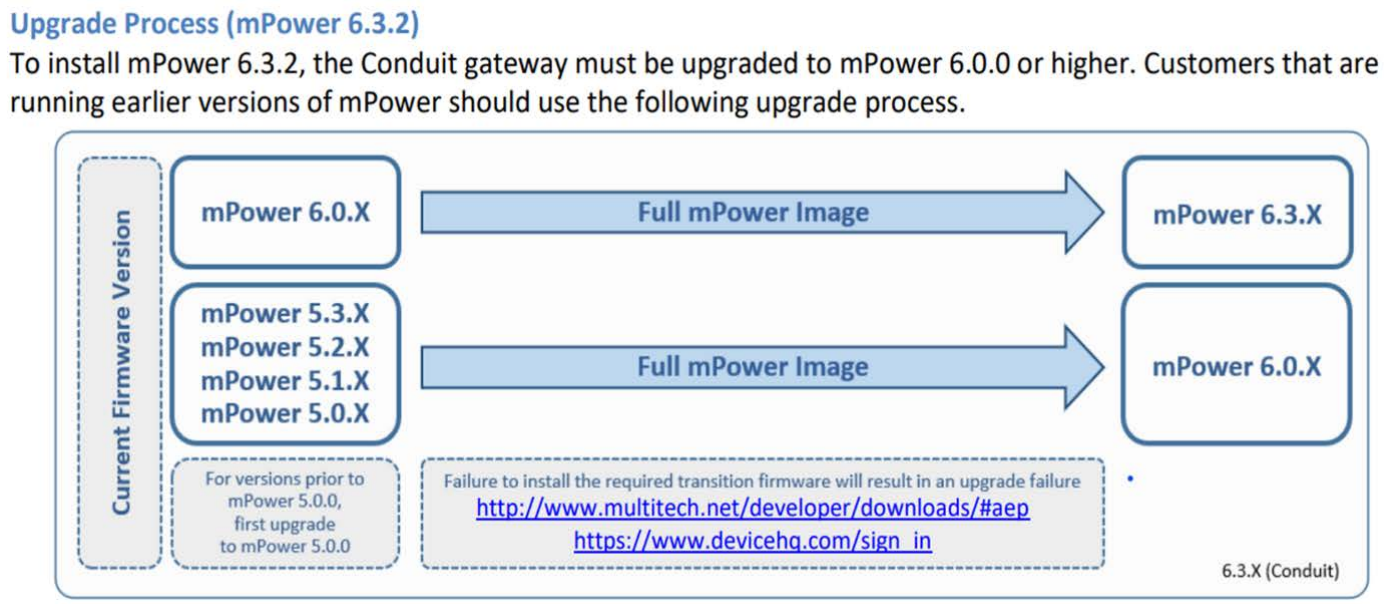


Figure 38. Firmware Upgrading Process

Set Up Procedure

Smart-Vue Pro LoRaWAN Set Up Procedure with Smart-Vue Pro Duo/ Quatro and Web app

1. Ensure Smart-Vue Pro Quatro is connected with sensors and sensor value is shown in show sensor screen.

   Example: Smart sensor value displayed in show sensor screen.

Figure 39. Smart Sensor value display

2. Ensure LoRaWAN is ON in Smart-Vue Pro Quatro.

   In Smart-Vue Pro Quatro device,
   Click **Menu ➔Advanced ➔**give the code which is set in webapp and added by user during configuring the user setting i.e., pin code set in webapp by the user.

   Then in Advanced, once a valid code is entered, select the **LoRaWAN ➔**select **ON** option from **ON/OFF** to enable Smart-Vue Pro LoRaWAN connectivity. After selecting the LoRaWAN as ON, go back to LoRaWAN➔ Network➔ ThermoScientific ➔ select your region and Save.

Figure 40. In Smart-Vue Pro Quatro device

3. Press “Test” in Smart-Vue Pro Quatro device to ensure the Smart-Vue Pro LoRaWAN coverage is good.

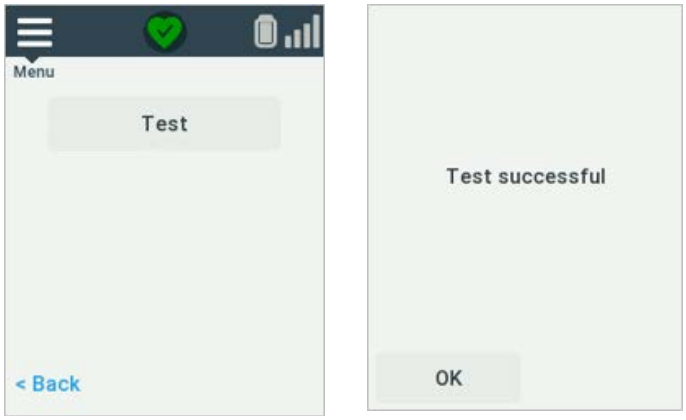


Figure 41. Smart-Vue Pro LoRaWAN coverage

4. Open Smart-Vue Pro LoRaWAN web browser page, Configure the Network in Smart-Vue Pro LoRaWAN settings to communicate to cloud.
   Refer **Setting Up an Ethernet Connection** and **Setting Up a Wi-Fi Connection to your Network** which explains the setting up of different networks like Wi-Fi and Ethernet.

   a. Ethernet Configuration:

Click **Setup ➔ Network Interfaces ➔ Options** (Edit) for “eth0” (1).

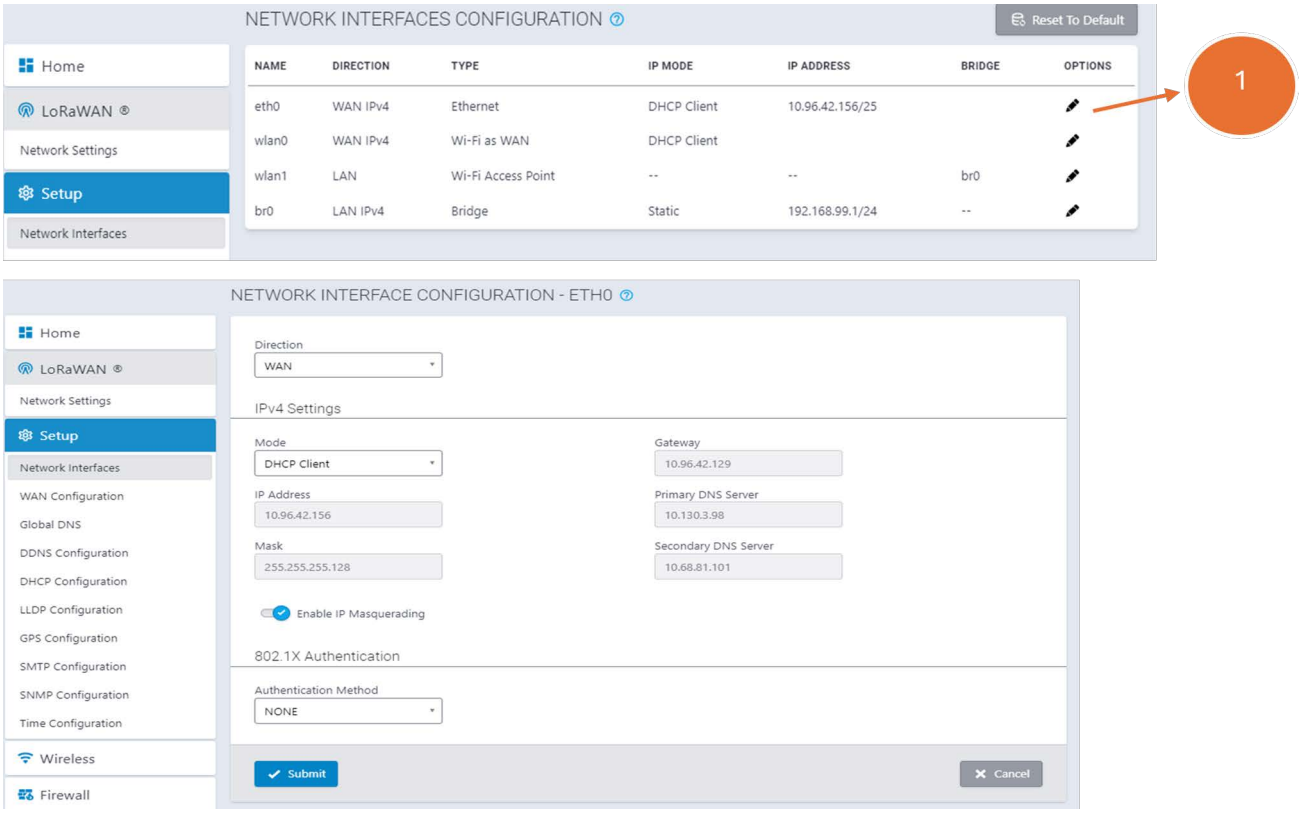


Figure 42. Ethernet Configuration

b. Wi-Fi onfiguration:

- **Wireless ➔ Wi-Fi as WAN ➔** add the network and select the enabled option and submit the settings to save.
- To save the settings, save and restart to be selected.

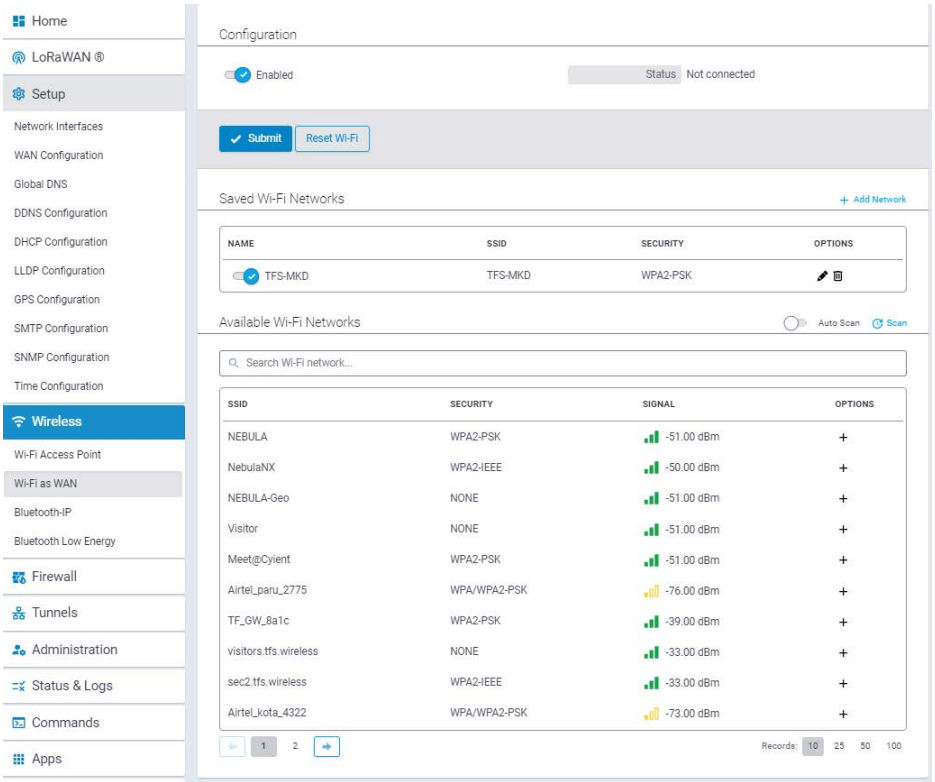


Figure 43. Wi-Fi as WAN

c. Press “Test Lora Server” in Smart-Vue Pro LoRaWAN page after infrastructure is added in webapp (This only works once you configure your network properly (as described in the **Setting Up an Ethernet Connection** and **Setting Up a Wi-Fi Connection to your Network**).

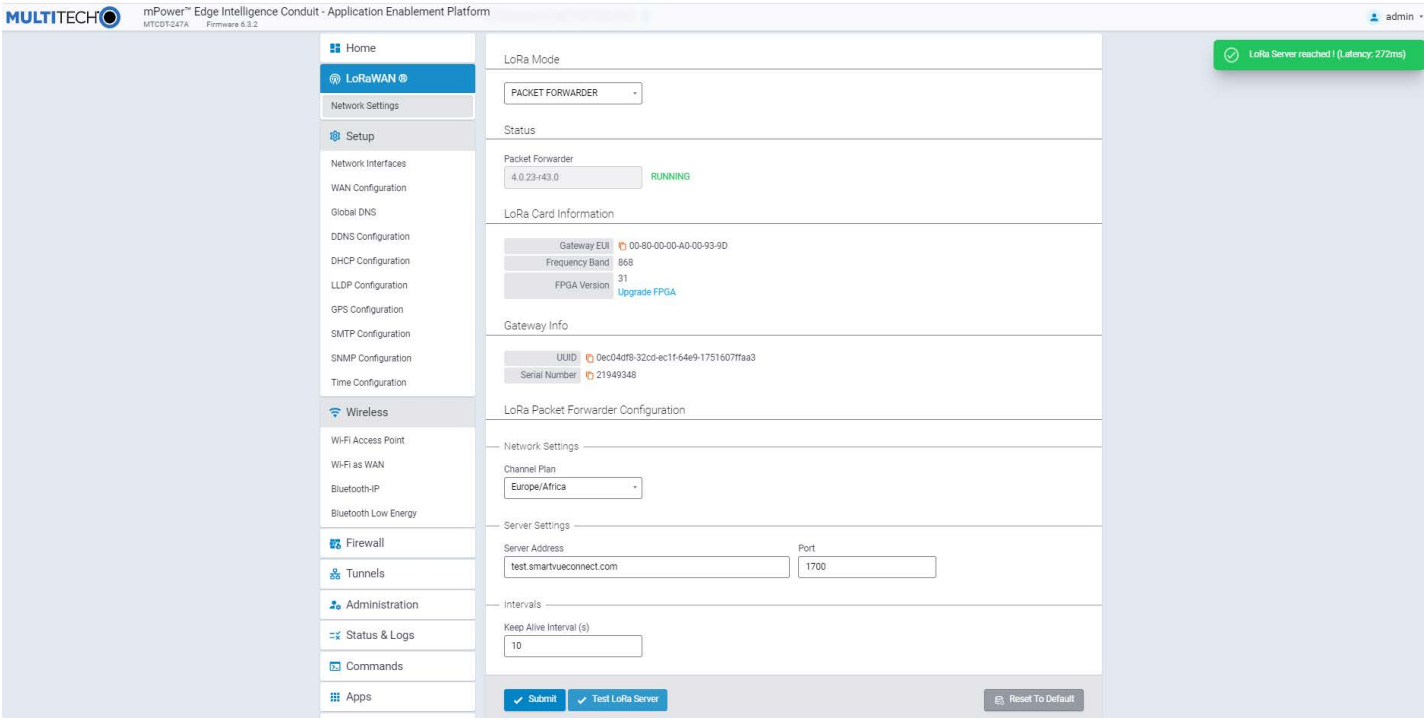


Figure 44. Smart-Vue Pro LoRaWAN Networking

5. Configuration in webapp.

   a. In devices page, add the device name (Smart-Vue Pro Quatro) which is under test.

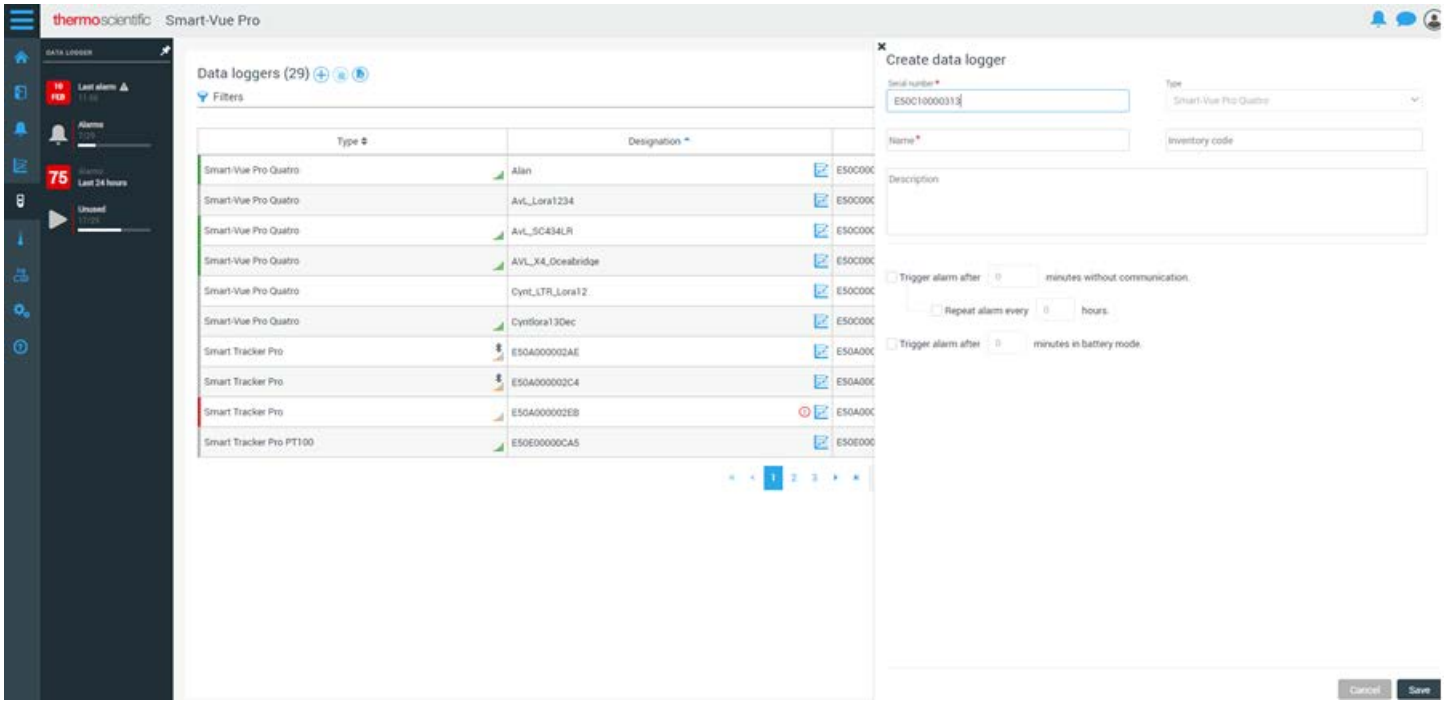


Figure 45. Add the device name

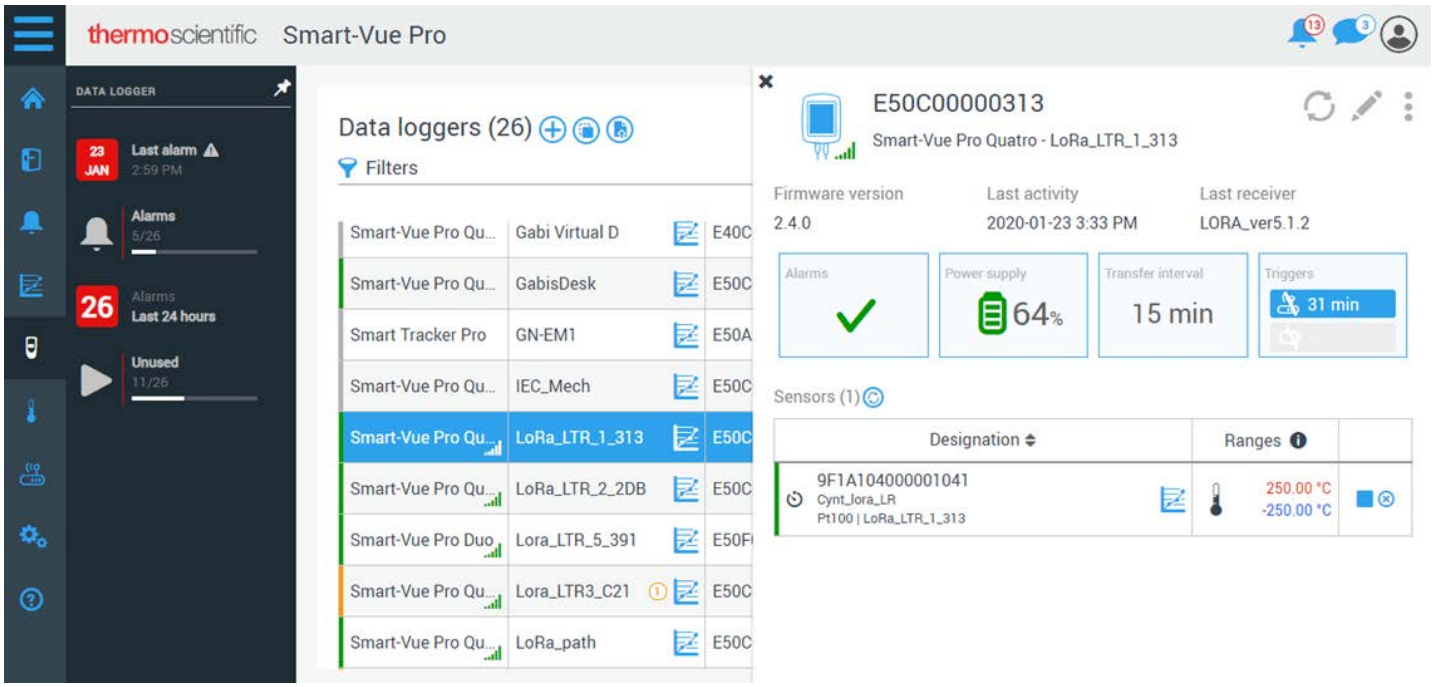


Figure 46. After adding the device

b. In sensor page, verify the associated sensor serial number shown.

c. In infrastructure, add the Smart-Vue Pro LoRaWAN details.

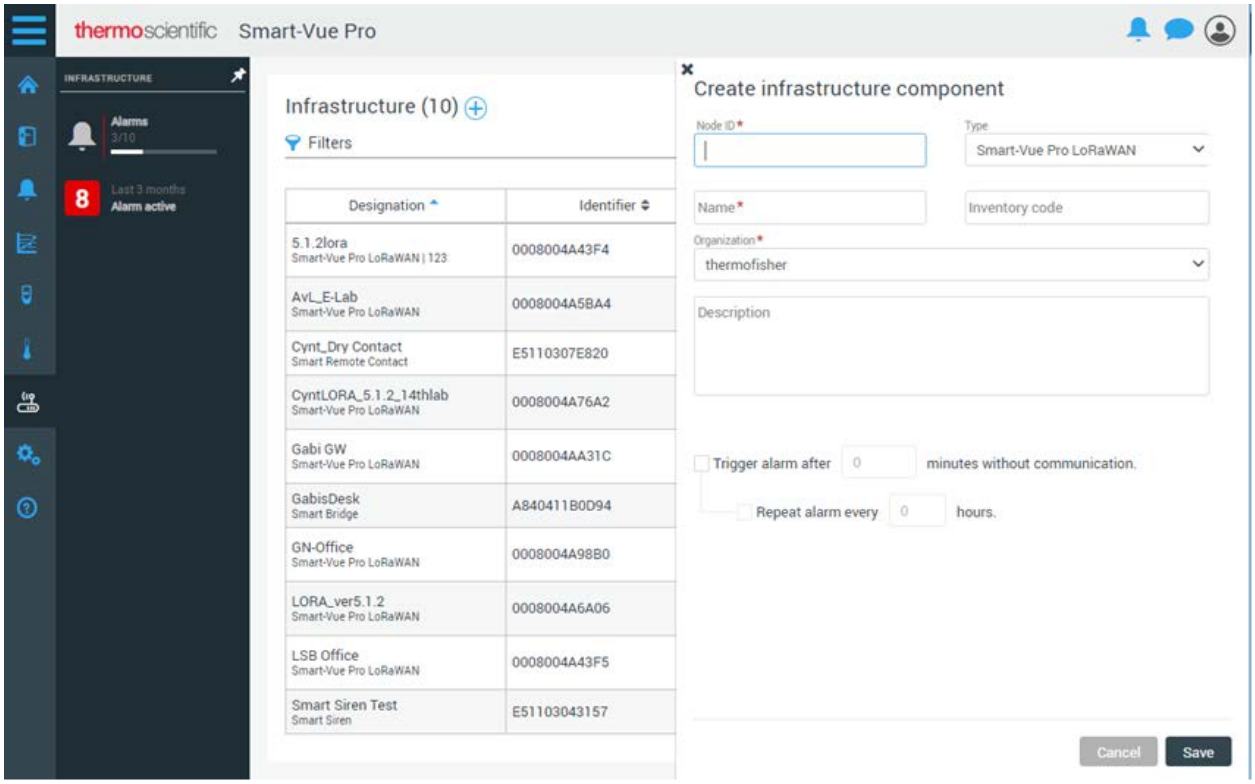


Figure 47. Add Smart-Vue Pro LoRaWAN details in Infrastructure

d. To add a Smart-Vue Pro LoRaWAN, in serial number field, add the node id mentioned on the Smart-Vue Pro LoRaWAN label.

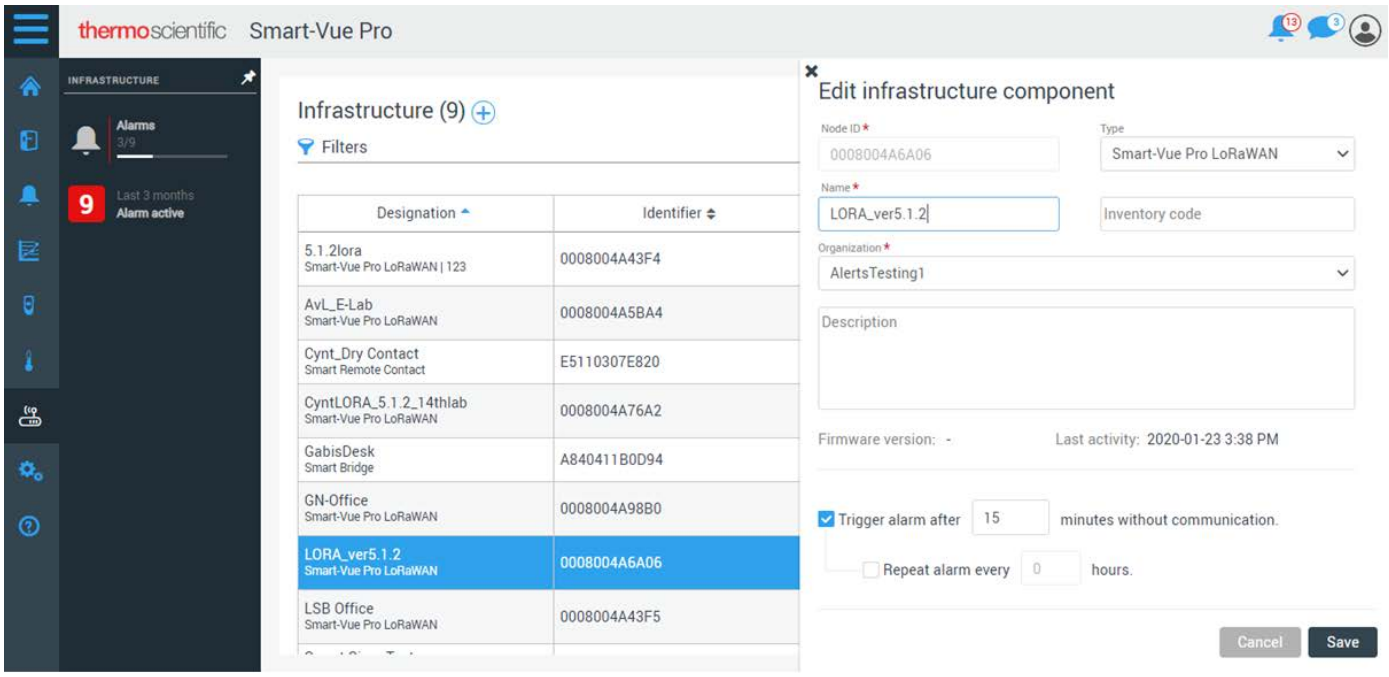


Figure 48. Add the node ID in Smart-Vue Pro LoRaWAN label

e. Create an equipment and then add the sensor to equipment which is recently added to device.

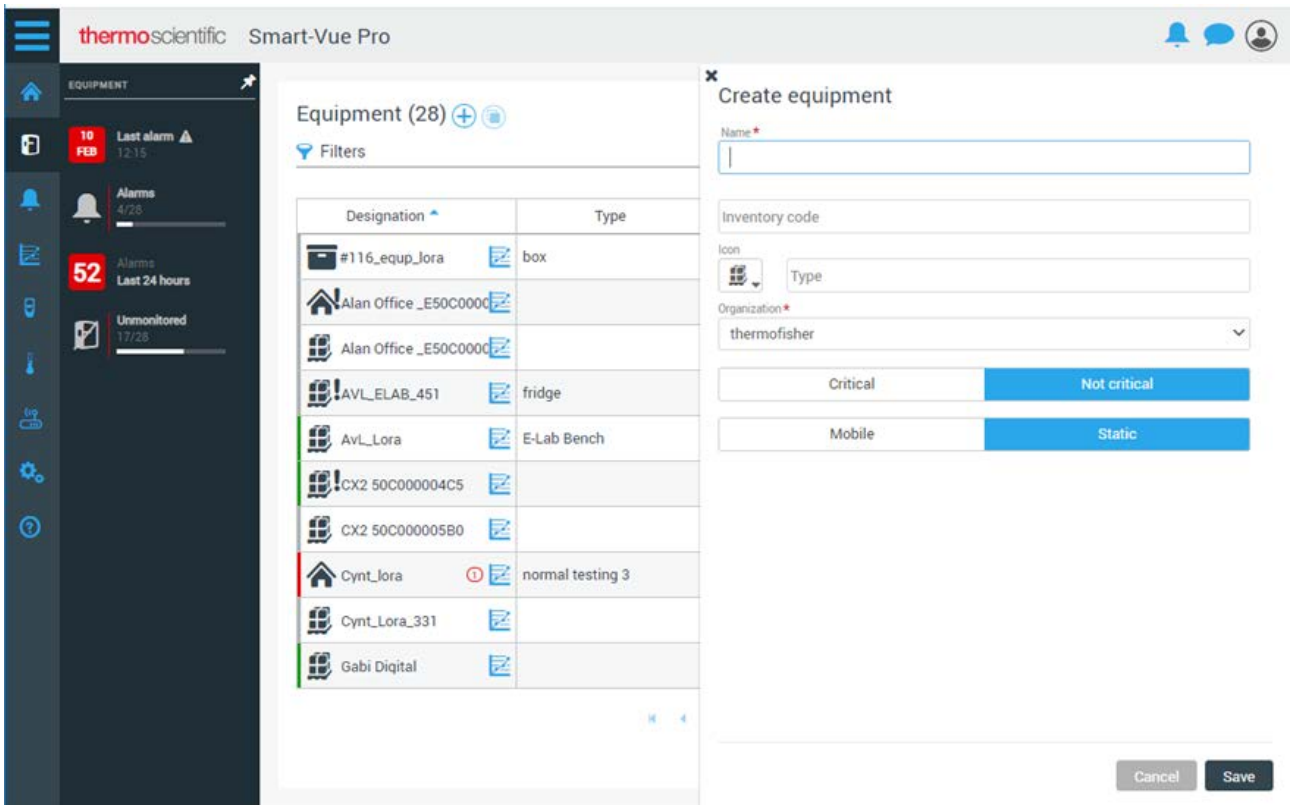


Figure 49. Adding Sensor to equipment (1 of 2)

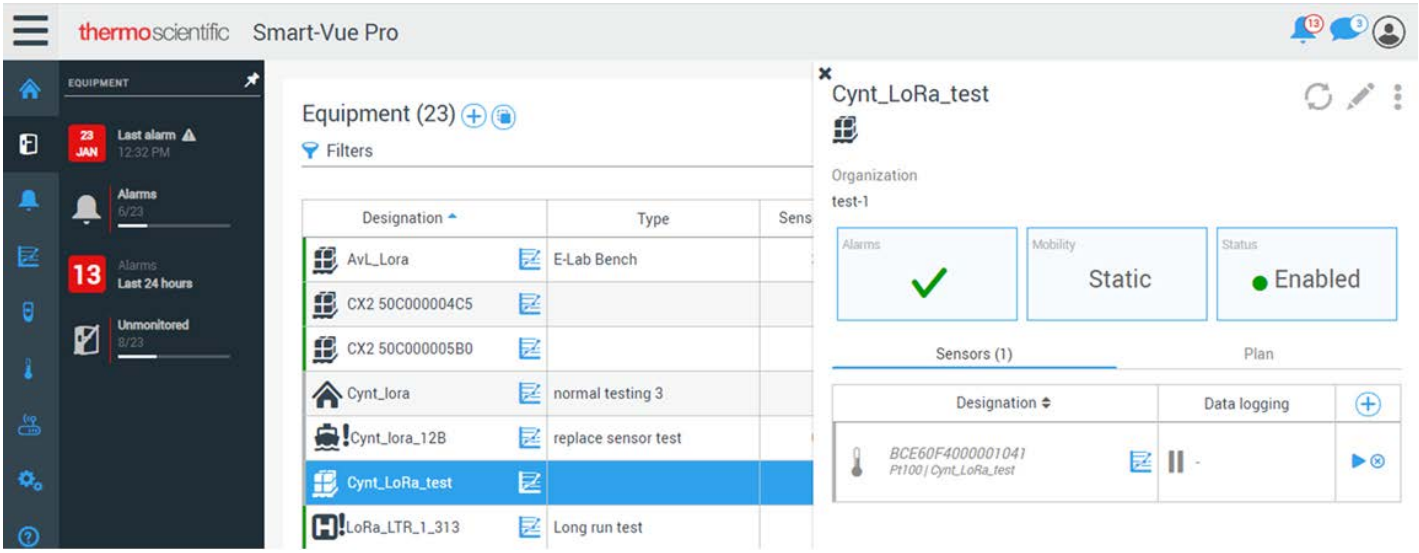


Figure 50. Adding Sensor to equipment (2 of 2)

f. For adding sensor to equipment, open the particular equipment created and click + in equipment details page under sensor.

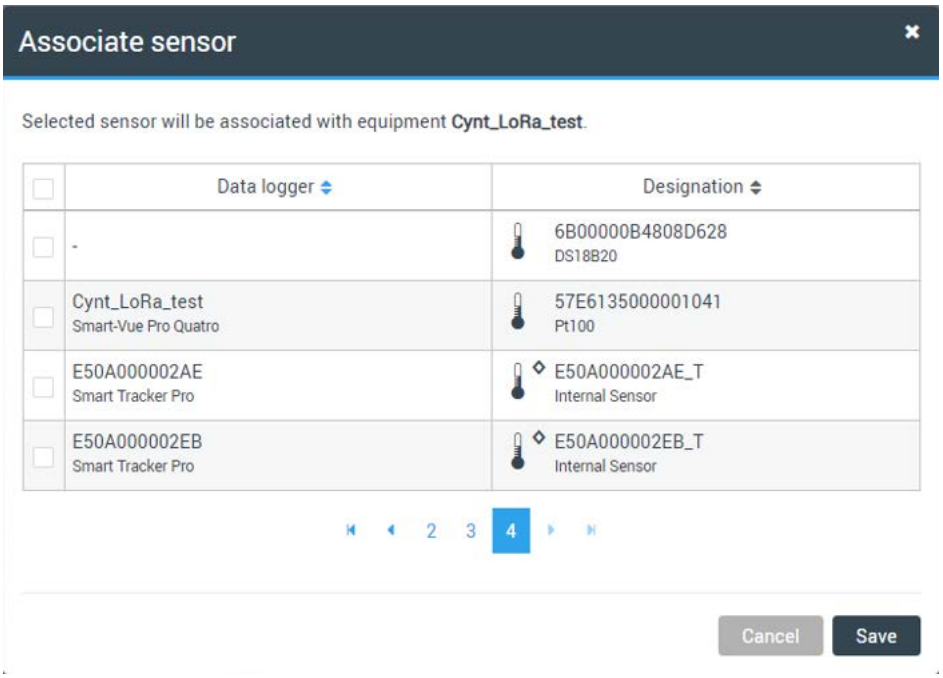


Figure 51. Associate sensor

g. After successfully adding the equipment, device and testing the Smart-Vue Pro LoRaWAN coverage on Smart-Vue Pro Quatro, start the data logging from either Equipment page or Device page by clicking on the play icon.

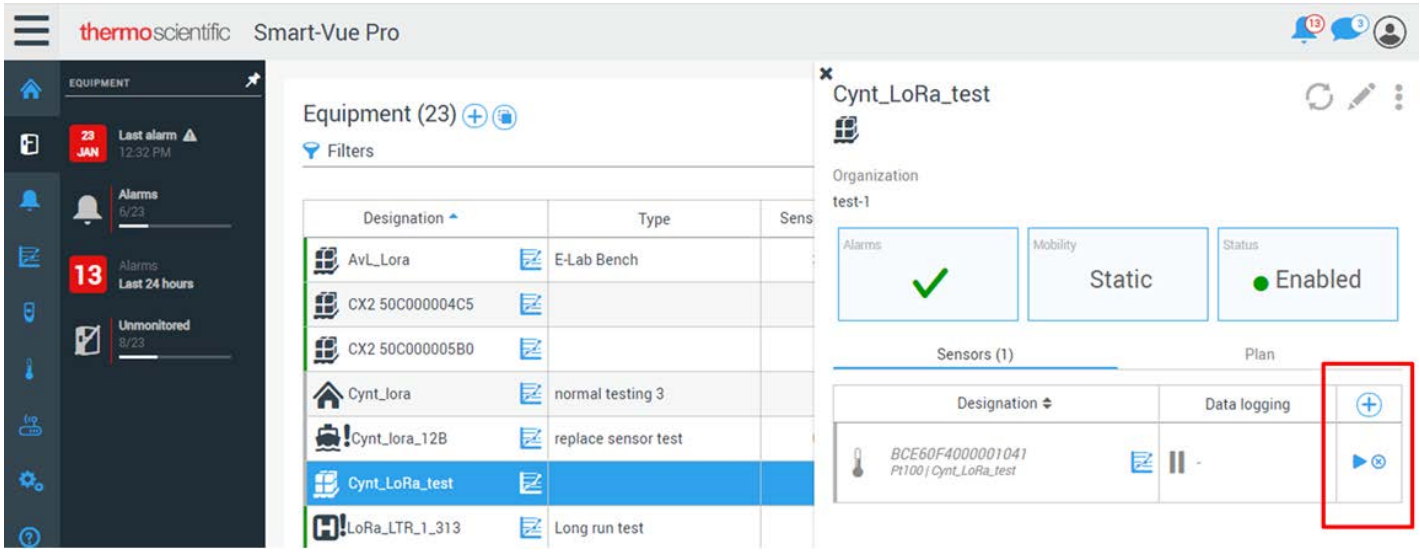


Figure 52. Equipment page

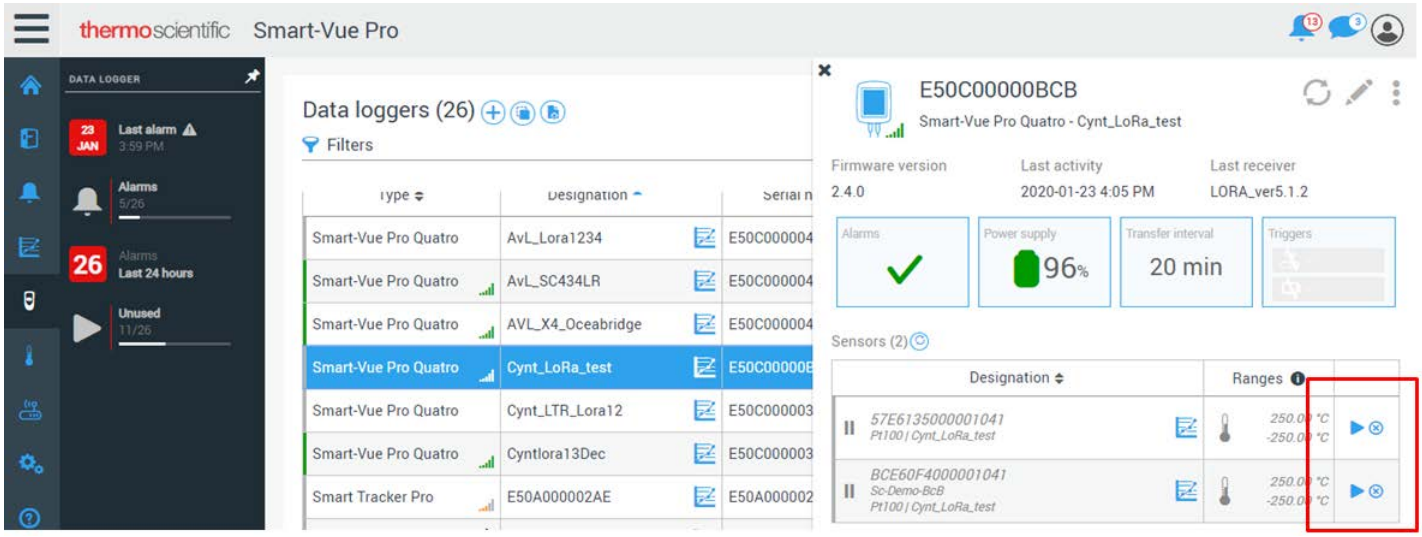


Figure 53. Data loggers page

h. We can see the equipment thumbnail in home screen when data logging is in progress.

Note: For more details refer to the user guides of the data logger.

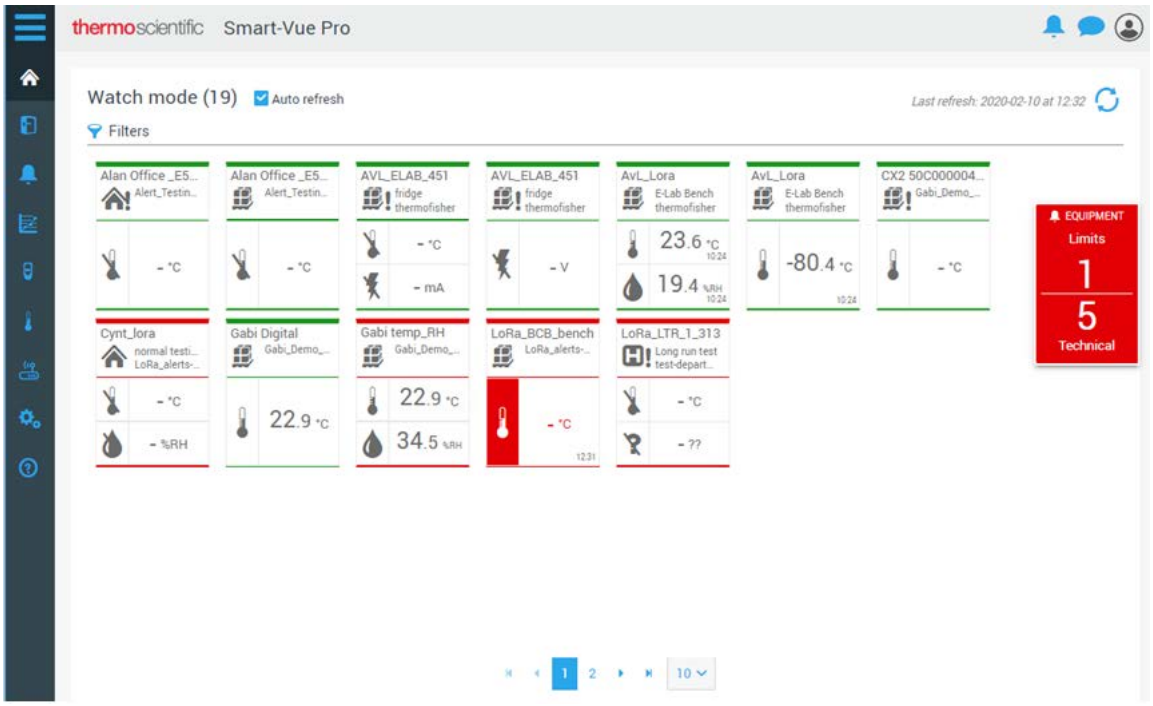


Figure 54. Watch Mode

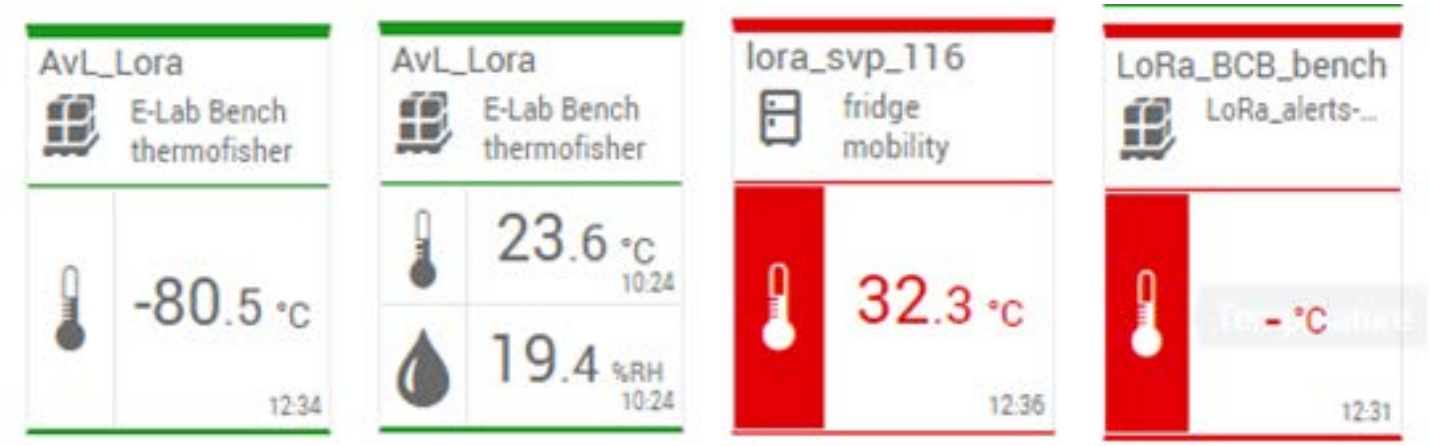


Figure 55. Tiles on watch mode

Appendix - Product Specifications

Smart-Vue Pro LoRaWAN Enabled Receiver Features

- Internet of Things connectivity featuring Smart-Vue Pro LoRaWAN wireless connectivity
- Long asset management range – up to 10 miles/16 km line-of-sight; 1-3 miles/2 km within buildings.

Note: This represents ideal network configuration and equipment set up. Results vary depending on various technical considerations, as well as RF interference and obstruction type (e.g., metal, cement, etc.)

- Ethernet: One RJ-45 Ethernet 10/100 port
- Wi-Fi (optional) via integrated data logger
- Input voltage: 9 V - 32 V
- Dimensions (L x W x H): 6.35" x 4.23" x 1.69" (161.3 mm x 107.4 mm x 42.8 mm)
- Weight: About 16.2 oz. (459 g)
- Chassis Type: Metal
- Operating Temperature: -30°C to +70°C
- Storage Temperature: -40°C to +85°C
- Relative Humidity: 20% to 90%, non-condensing

Related Products

- Smart-Vue Pro sensor monitoring solution (web application).
- Compatible Smart-Vue Pro LoRaWAN enabled wireless sensor modules.

Table 3. Back Panel Connectors

Label	Description	Remarks
CELL, AUX	Cellular antenna inputs CELL: Primary AUX: Rx Diversity/MIMO	Not used.
AP1, AP2	Slots for MultiTech accessory cards.	AP1 slot used for LoRa radio antenna. AP2 slot not used.
USB DEVICE	User-defined, high-speed 480 Mbps, standard USB 2.0 Micro B Connector.	Not used.
E-NET	RJ-45 receptable for standard Ethernet 10/100 Base-T. **CAUTION:** Ethernet ports and command ports are not designed to be connected to a public telecommunication network.	Used for connecting to the ethernet cable.
USB HOST	High-speed, standard USB 2.0 Type A connector. 500 mA maximum current draw.	Not used.
POWER	9.32 V DC power receptable for provided power cord.	Used for connecting to the power supply.

Note: Power Source

When setting up the Smart-Vue Pro LoRaWAN Enabled Receiver (antenna), connect to a power source that is grounded with surge protection as well as on a battery backup, if at all possible. This ensures the availability of the functionality of the device.

Table 4. Front Panel Connectors

Label	Name	Description
PWR	Power	Solid (constant green) if unit is on, indication that power is present.
STATUS	Power Status	Default Condition: LED blinks when mLinux is fully loaded.
LS	Link Status	Varies with radio model.
CD	Carrier Detect	This LED is on when a cellular data connection is made. Present on the Conduit Application model only.
Signal	Signal Strength	These 3 LEDs display the strength of the cellular signal. Present on the Conduit application model only.

Installation Details

The LoRaWAN module is a critical device in your wireless monitoring system. Therefore, we recommend that you keep it plugged it into an interruptible power supply or safety plug.

Smart-Vue Pro LoRaWAN enabled receiver may be placed on a flat surface or mounted using the mounting holes located at bottom of the casing.

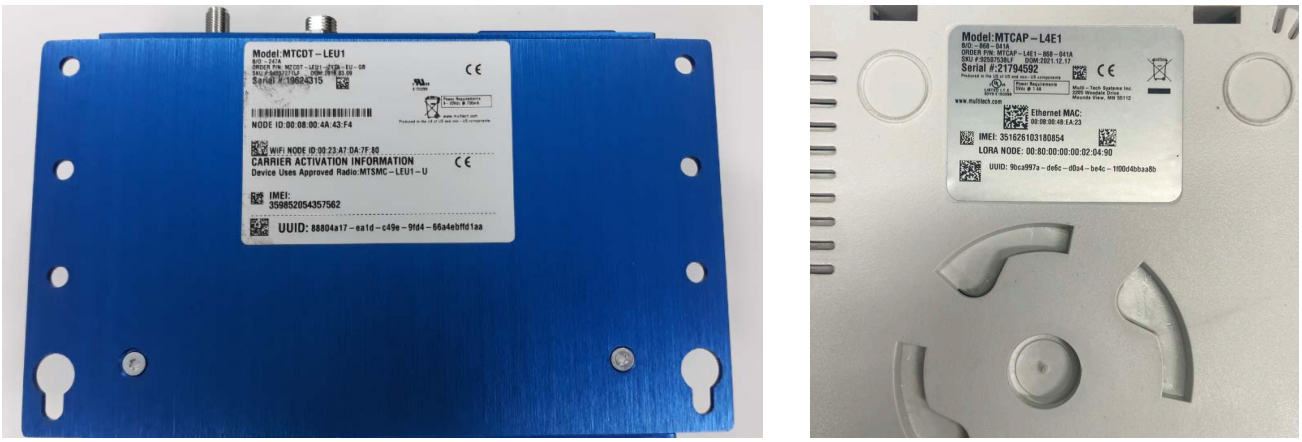
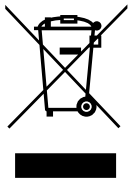


Figure 56. Back/bottom view of LoRaWAN gateway data logger

WEEE Compliance

WEEE Compliance. This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on our compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at www.thermofisher.com under Services & Support.

Great Britain



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Deutschland

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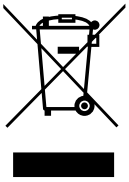
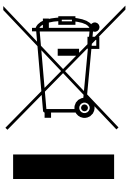
Italia



Conformité WEEE. Ce produit doit être conforme à la directive euro-péenne (2012/19/EU) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est marqué par le symbole suivant. Thermo Fisher Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devraitêtre collecté ou recyclé par celles-ci. Davantage d'informations sur laconformité de Thermo Fisher Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Fisher Scientific qui peuvent aider le détection des substances sujettes à la directive RoHS sont disponibles sur www.thermofisher.com sous Services et Assistance.

France



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