Connecting RG1xx to Loriot Network Server

Sentrius RG1xx Gateway

Application Note   *v1.0*

INTRODUCTION

The purpose of this application note is to demonstrate how to connect the Sentrius RG1xx gateway to the Loriot network server and add devices to transmit data from RM1xx to Loriot.

REQUIREMENTS

- Sentrius RG1xx Gateway
- DVK-RM1xx
    - FW v1xx.6.1.0 was used in this app note
- UWTerminalX v1.08p or later (https://github.com/LairdCP/UwTerminalX/releases)
- *smart*BASIC application that allows Joining the LoRa network and transmitting data
    - lora.app.us.sb
    - lora.app.eu.sb
    - cmd.loramac.rm1xx.sb
    - https://github.com/LairdCP/RM1xx-Applications

Note: This document does not cover initial setup of the Sentrius RG1xx Gateway. Please see *Quick Start Guide – Sentrius RG1xx* for setup information. This guide is available from the Documentation section of the RG1xx Gateway product page on the Laird website.

This document does not cover the initial setup of the DVK-RM1xx, please see *Interfacing with LoRaWAN – RM186* or *Interfacing with LoRaWAN – RM191* for setup information. These application notes are available from the Documentation section of the RM1xx product page on the Laird website.

SETTING UP A LORIOT ACCOUNT

To begin, you must create an account at https://www.loriot.co. To do so, complete the following steps:
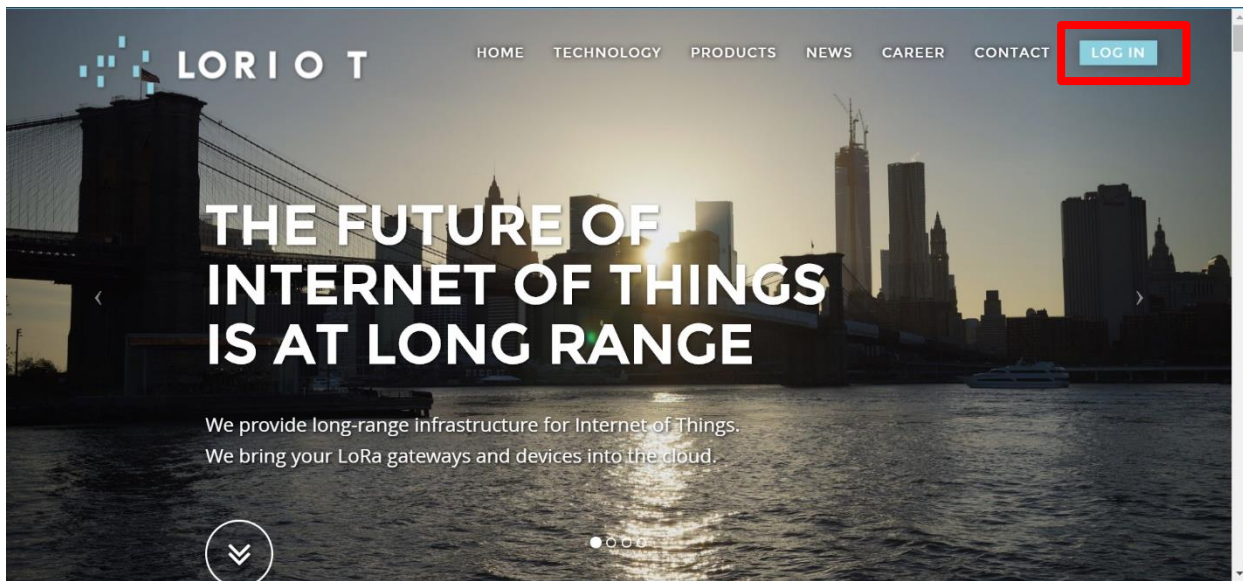
1. Go to https://www.loriot.io.
2. Select **Log In** from the main page.

Figure 1: Log in at loriot.io

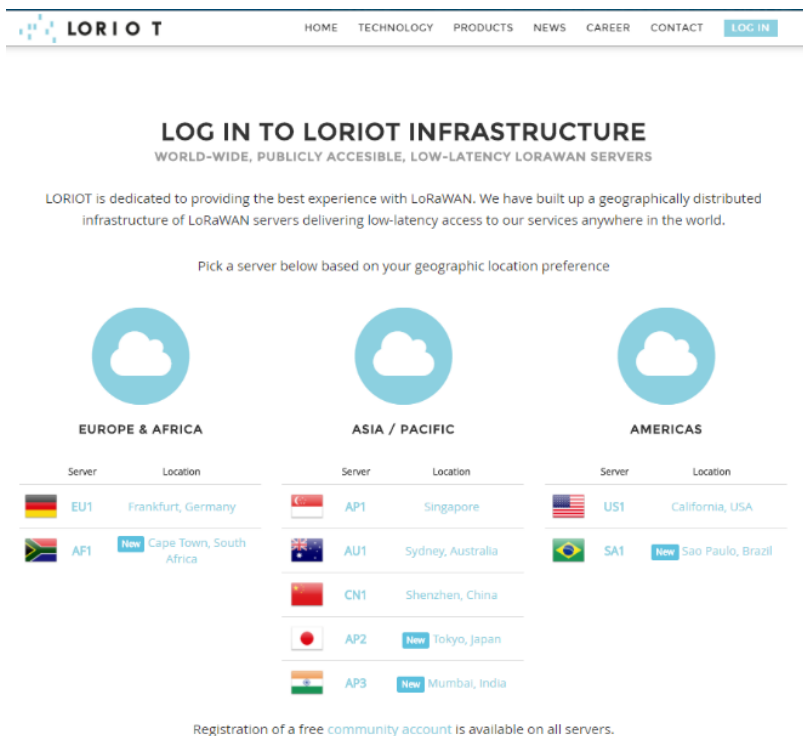3. Select the server for your geographic location (Figure 2).

Figure 2: Choose Loriot server

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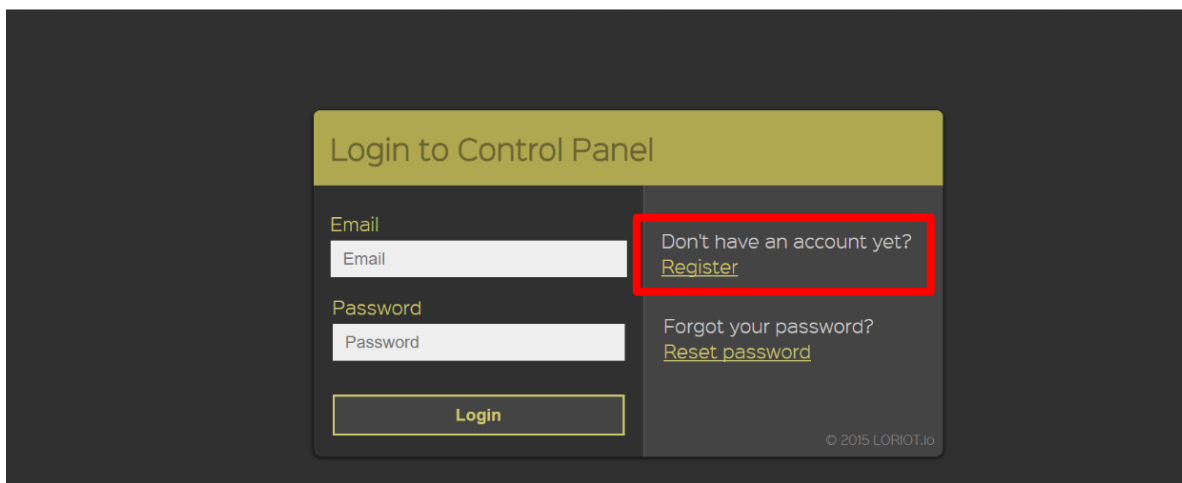4. Click **Register** on the Login screen to register a new account (Figure 3).

Figure 3: Registration button

5. Fill in the relevant fields and select **Create a Free Account**.
6. An activation email will be sent to the email address you used during signup. Follow the instructions to activate your account.
7. Once your account is activated you can navigate back to https://us1.loriot.io/home/login.html and log in to view the main Loriot dashboard.
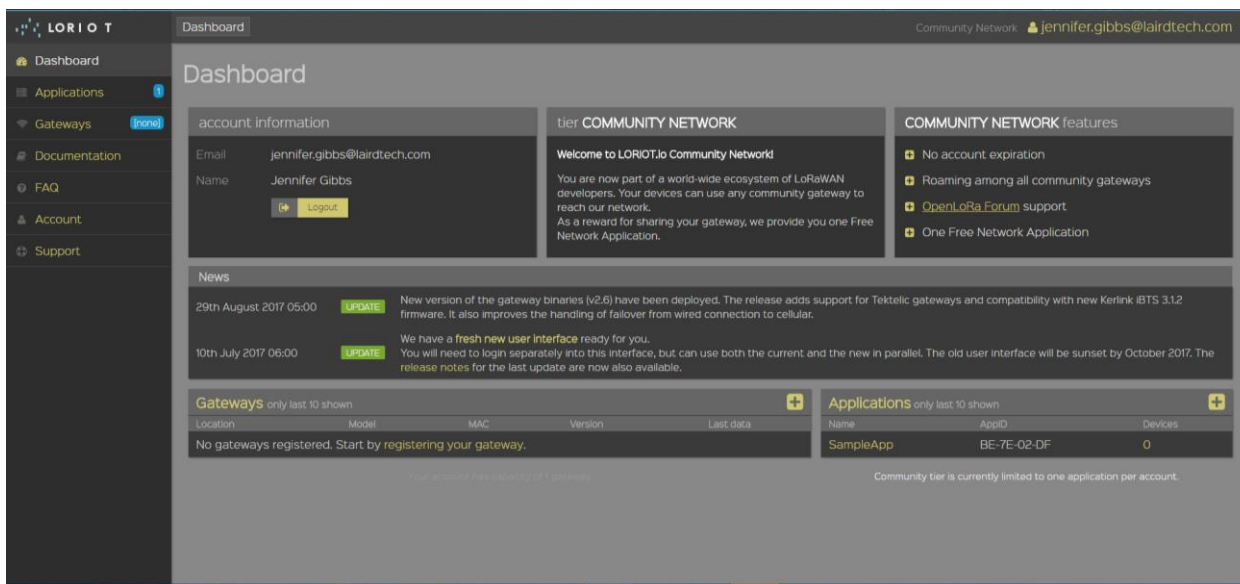
Figure 4: Main Loriot dashboard

CONFIGURING THE SENTRIUS RG1XX FOR LORIOT NETWORK SERVER

1. Login to your Sentrius RG1xx Gateway.
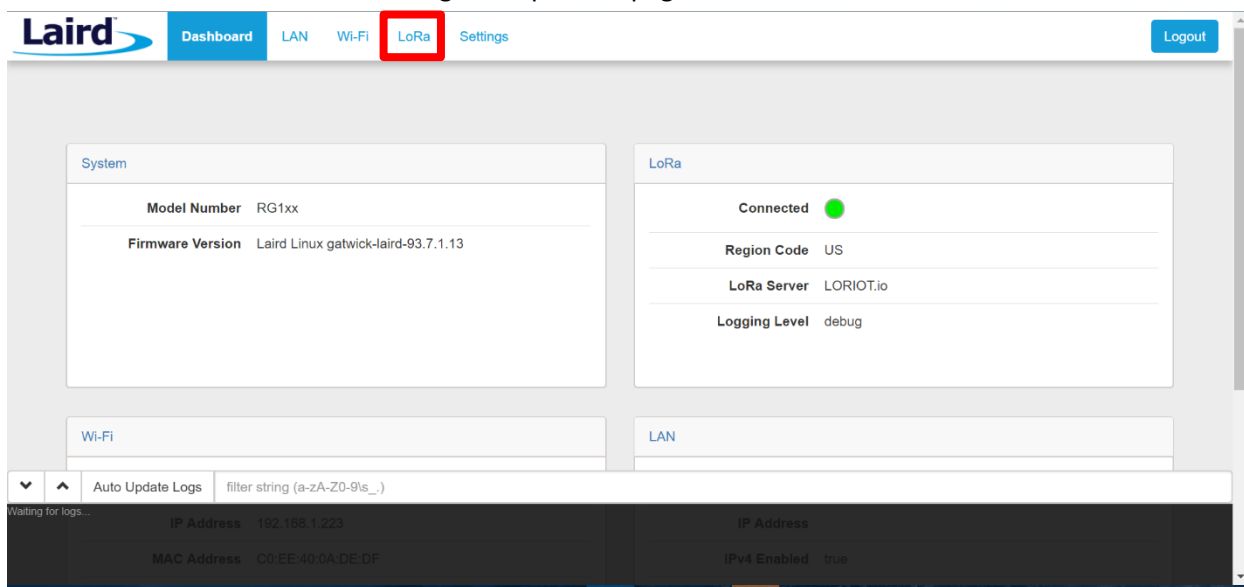2. Select **LoRa** from the selections along the top of the page.

Figure 5: LoRa tab in RG1xx configuration

3. In the select preset drop-down menu select **LORIOT.io – US**.
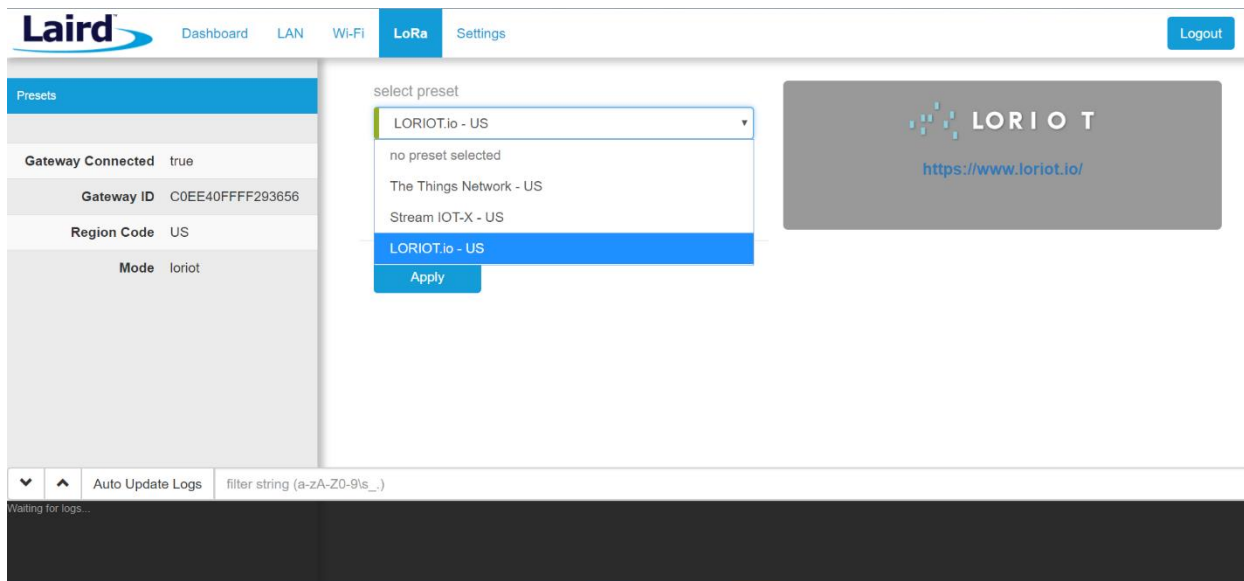4. Click **Apply**.

Figure 6: Choose "LORIOT.io - US" in preset selector

The Sentrius RG1xx is now ready to communicate as a Packet Forwarder to the Loriot Network Server.

CONNECTING THE SENTRIUS RG1XX GATEWAY TO LORIOT

Note: Each free account with Loriot allows you to register a single gateway.

To connect the gateway via the Loriot gateway management panel, complete the following steps.

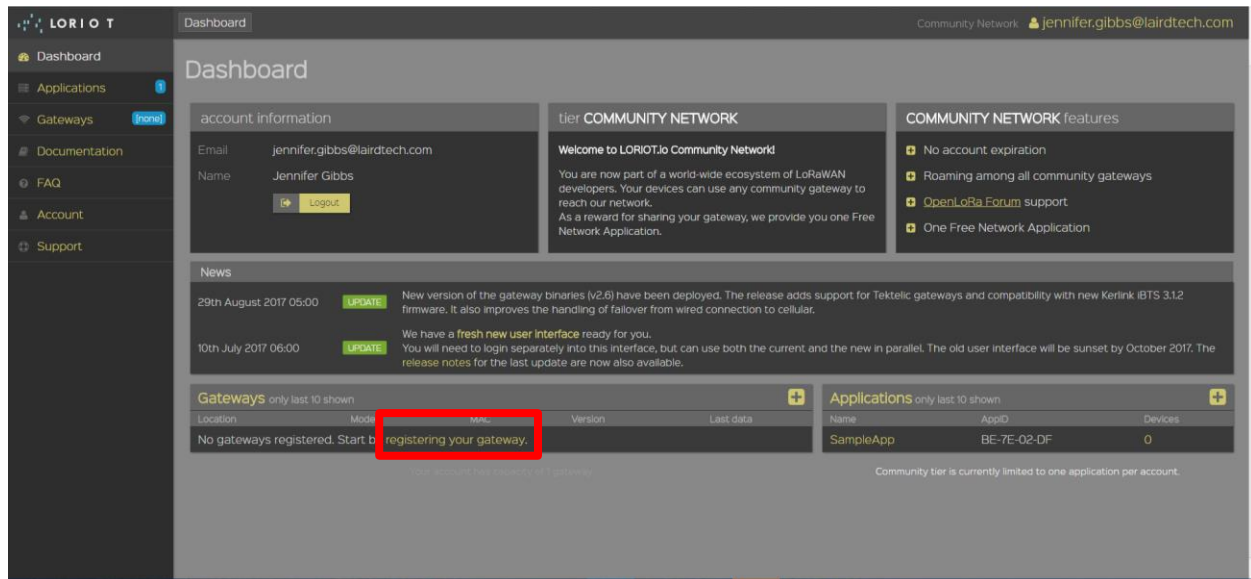1. Select **registering your gateway** from the main dashboard screen.

Figure 7: "Registering your gateway" link

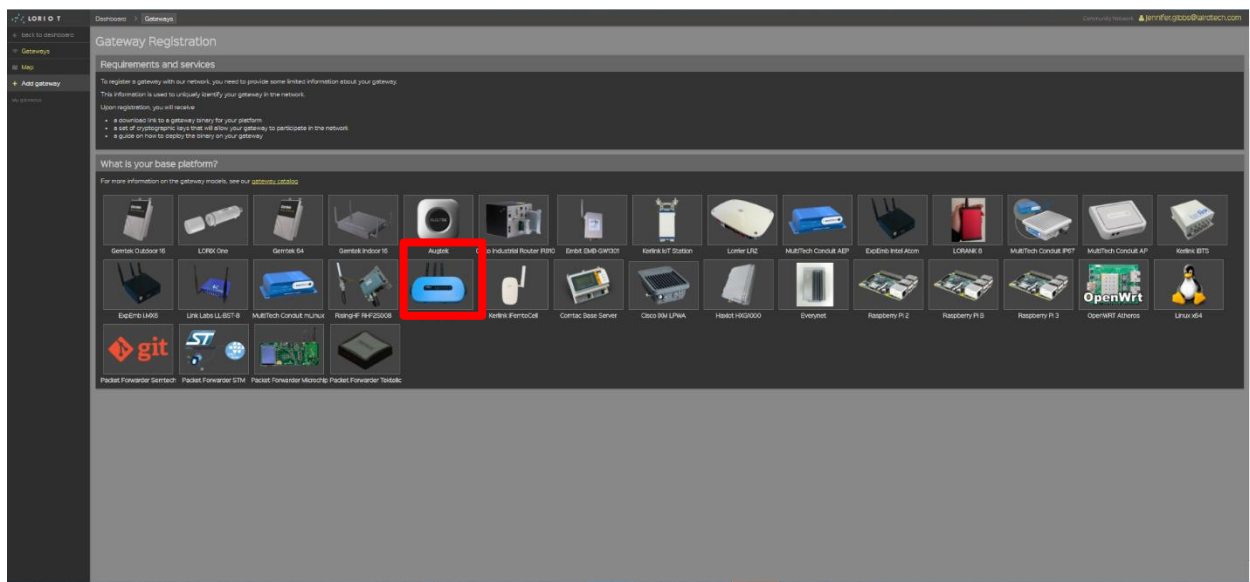2. Select the Laird RG1 from the selection of Gateways on the next page.

Figure 8: Laird RG1 in the gateways panel

3. The MAC address for the Ethernet port is located on the bottom of the Sentrius RG1xx. Note this value as it is required to register the gateway.
4. Enter the Ethernet Address in the **eth0 MAC address** field on the Gateway Registration page.

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5. Fill in the Country, Address, Zip Code, and City information for your Gateway.
6. Click **Register Laird RG1 Gateway** at the bottom of the page.
7. Once registered, click the link to visit the Gateway Detail page. It appears at the bottom of the page once the Gateway is registered, as shown in Figure 9.
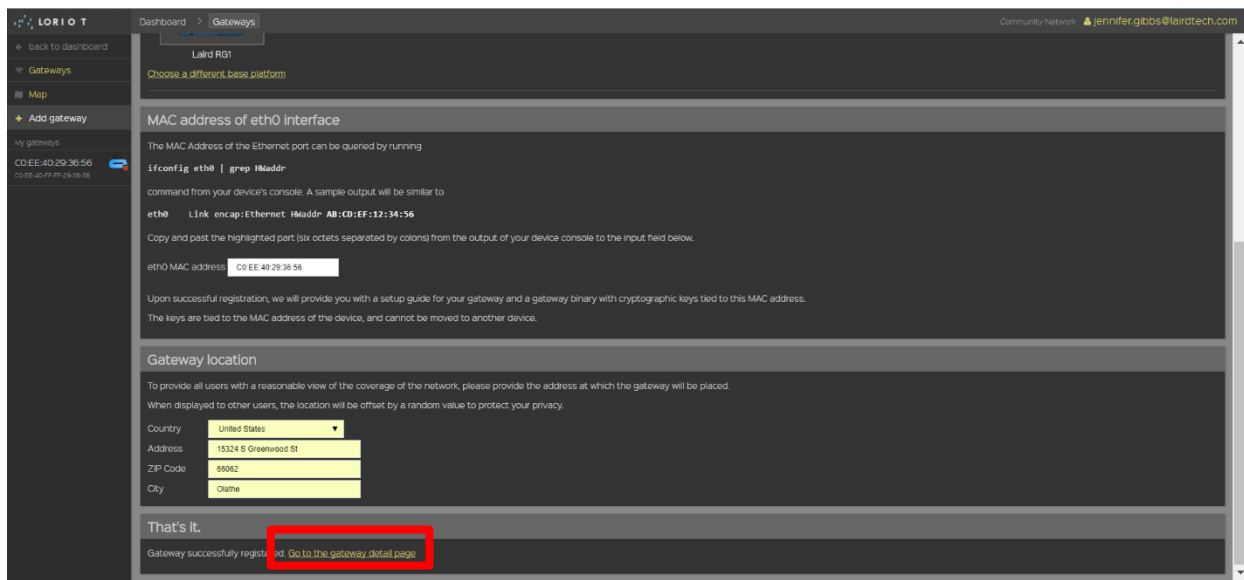

Figure 9: Link to the gateway detail page

There is no need to install any binaries or other software on the Sentrius RG1xx; it automatically connects to Loriot after a few minutes. You should eventually see the *Connected* message on the Gateway page as shown in Figure 10. You may need to refresh the page or click **Ping Gateway** to refresh and show the connected status.
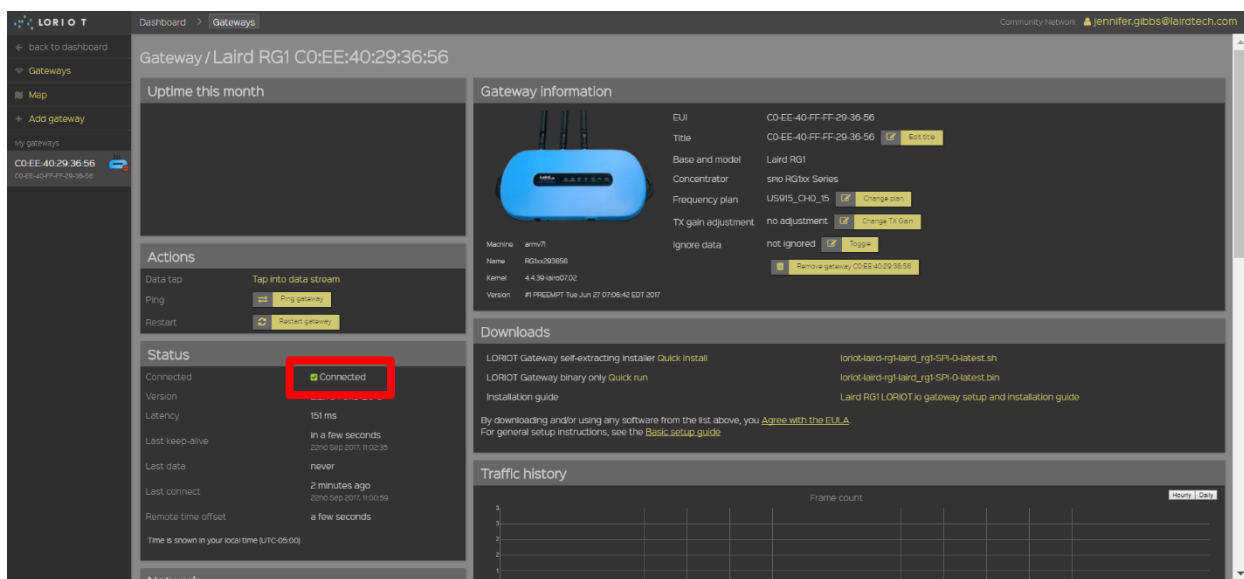

Figure 10: Connected status

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ADDING DEVICES TO THE EXISTING SAMPLE APPLICATION IN LORIOT

Note:	Each Loriot Community Tier Network account is allowed one application. On start, it is already set up for you and is called SampleApp.

To add devices to the sample application, complete the following steps:

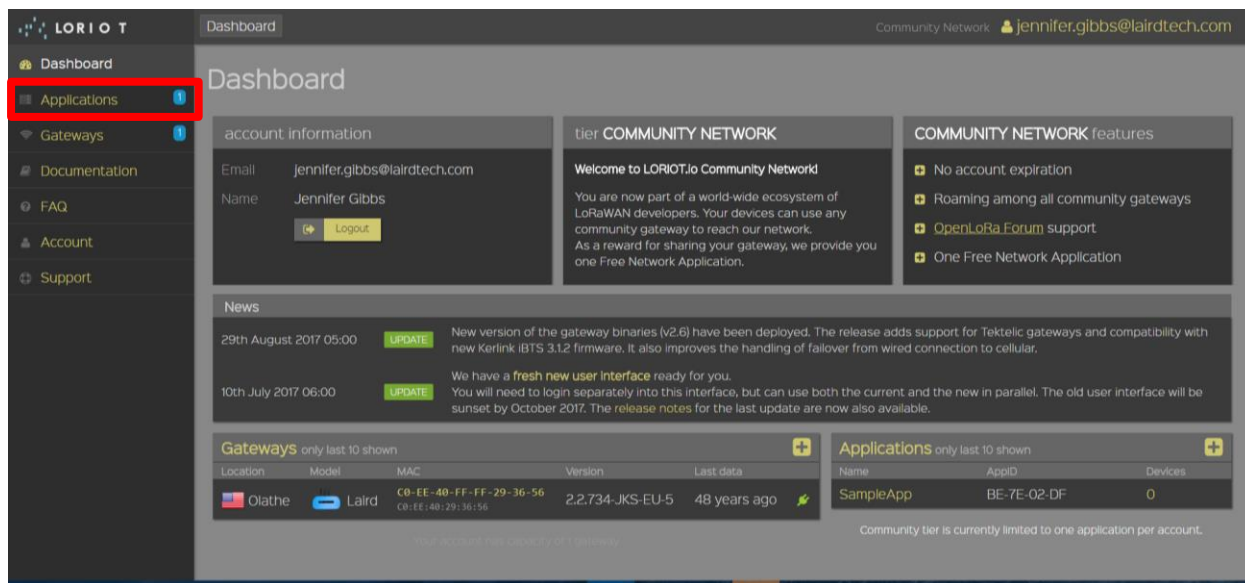1. Return to the Dashboard screen in Loriot and click **Applications** along the left-hand menu.

Figure 11: Applications menu in Loriot dashboard

On the Applications page, you'll see that there are 0 of 10 maximum devices registered for this application.

2. Click **SampleApp** to start adding devices.
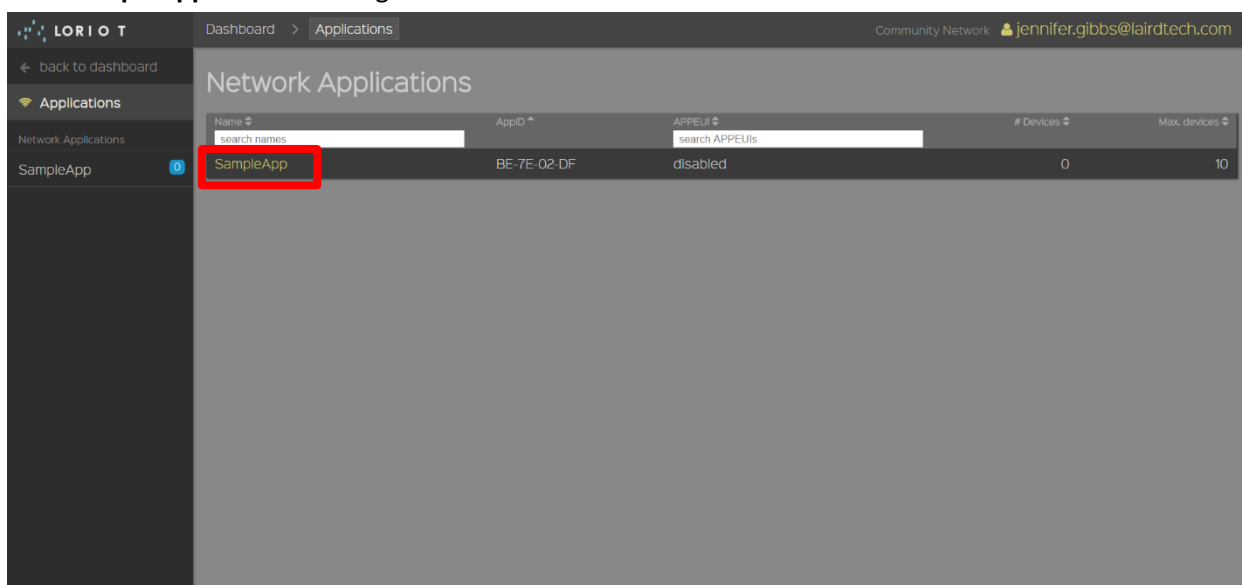
Figure 12: SampleApp in Loriot

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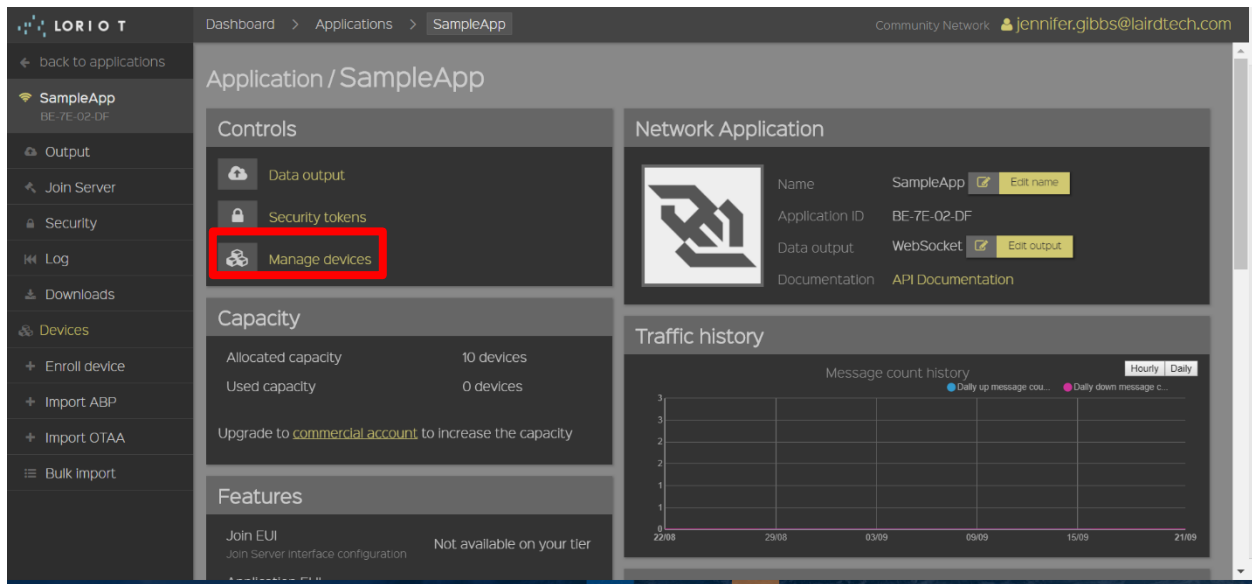3. Click **Manage devices** on the Application/SampleApp screen.

Figure 13: Choosing Manage Devices to add devices to application

4. On the Devices screen, you may either generate a new device or enroll a new device. If you want Loriot to generate a DEV_EUI for you, click **Generate new device.** If you have a DEV_EUI you would like to specifically add, click **Enroll new device**.
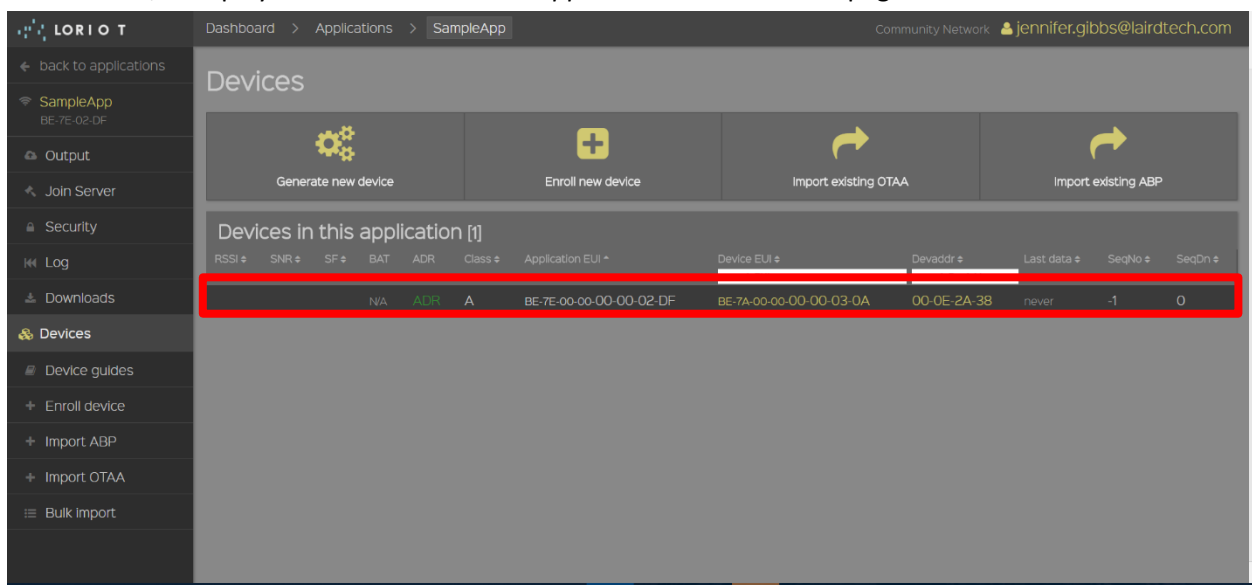5. Once added, it displays in the *Devices in this application* section of the page.

Figure 14: Devices in this application list

For OTAA activation for any device, you need the Application EUI, the Device EUI, and the AppKey. The first two are shown on the Devices page (Figure 14).

6. To get the AppKey, click the Device EUI to access the Device Details screen.
7. Scroll down the Device Details screen until you get to the *Device <EUI>* box, which lists the DevEUI, AppEUI, and DevAddr.

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8. Copy the DevEUI (big endian) and AppEUI (big endian); you need these to configure the DVK-RM1xx.
9. Directly below is the *LoRaWAN AES128 Keys* section. Click **Show application key** and copy the AppKey as you need it to configure the DVK-RM1xx.
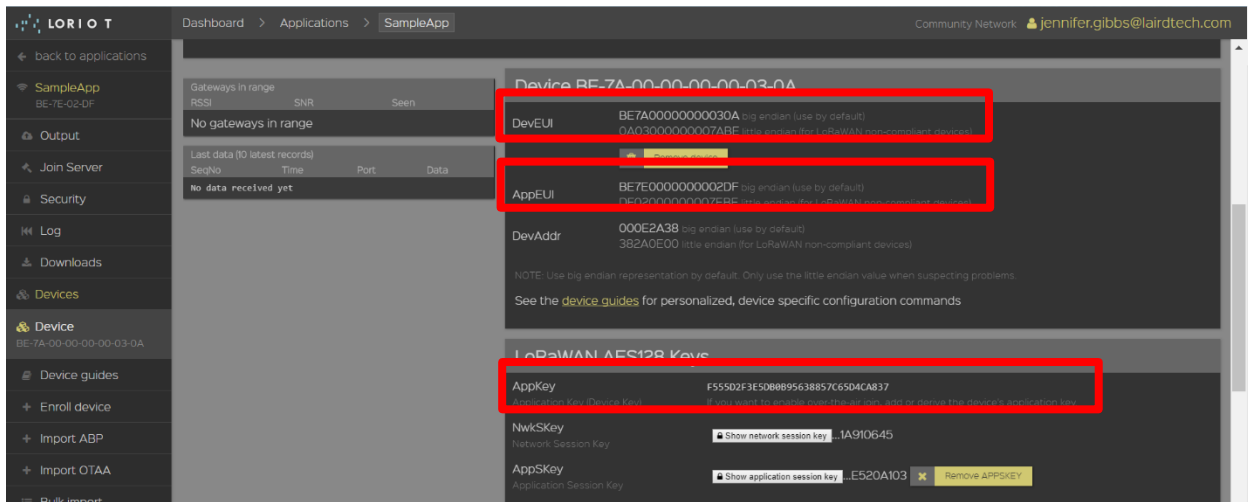

Figure 15: Device Details screen

SETTING UP THE DVK-RM1XX TO JOIN AND SEND DATA TO LORIOT

To set up the DVK-RM1xx to join and send data to Loriot, follow these steps:

1. Clear the file system and memory of the DVK-RM1xx by issuing the following command:

    AT&F*

2. Enter the AppEUI, DevEUI, and AppKey from the previous section into the DVK-RM1xx as follows (Table 1).

Table 1: DVK-RM1xx Configuration Commands

Command	In place of #####, enter:
`at+cfgex 1010 "######"`	Your DevEUI
`at+cfgex 1011 "######"`	Your AppEUI
`at+cfgex 1012 "######"`	Your AppKey

Note: Don't forget to issue a soft reset using *ATZ* after entering the keys so that they take effect.
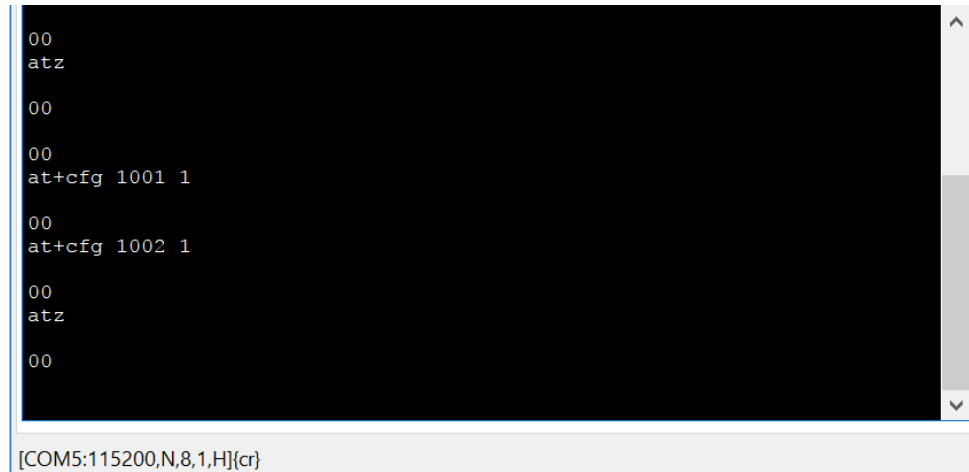
Figure 16: Configuring the DVK-RM1xx with keys

3. If you have not already, connect the RG1xx and connect with UwTerminalX.
4. Configure the gateway for sub-band 1 (to work with Loriot) using the AT+CFG 1001 and AT+CFG 1002 commands (if using FW v1xx.5.0.7 or later) or with the command AT+CFGEX 1009 (for FW prior to v1xx.5.0.7).

Note: Don't forget to issue a soft reset using *ATZ* after entering the keys so that they take effect.
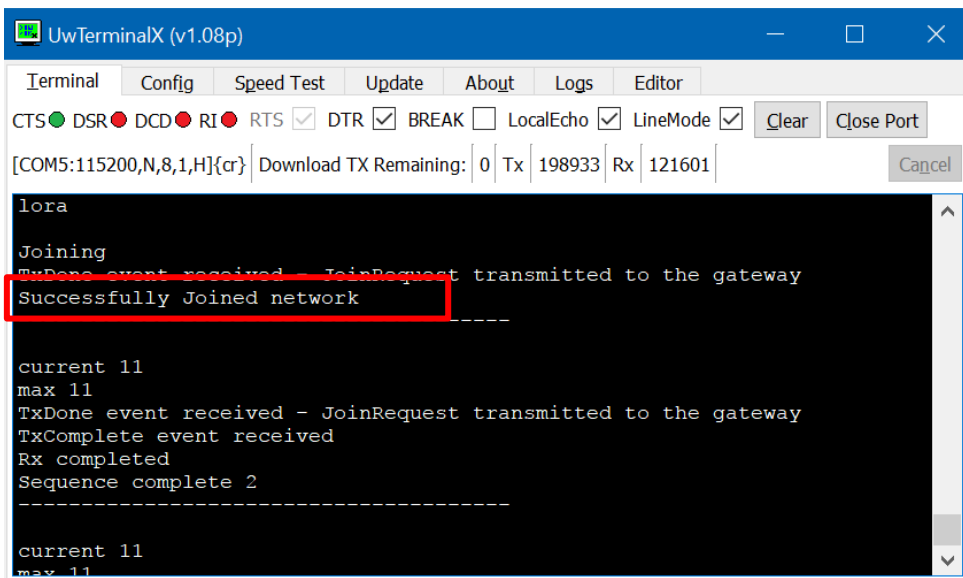

Figure 17: Configuring the RG1xx for sub-band 1

5. Load your *smart*BASIC application to the DVK-RM1xx (lora.app.us.sb, lora.app.eu.sb, cmd.loramac.rm1xx.sb, or any app that joins the LoRa network and transmits data).
6. Run the application.

   The application may join automatically on startup. If not, you may need to join manually (such as with cmd.loramac.rm1xx.sb). You should first see a *Successfully Joined Network* message of some sort before the device begins transmitting data, as shown in Figure 18 and Figure 19.

Figure 18: lora.app.us.sb example of Joining LoRa Network
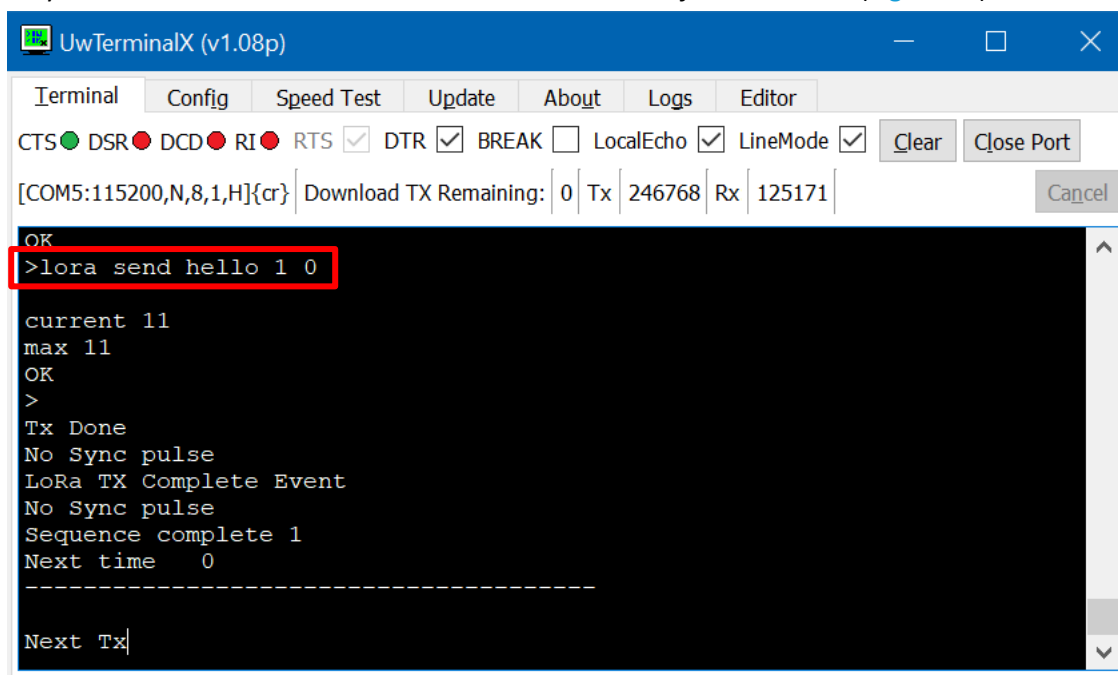
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Figure 19: cmd.lormac.rm1xx.sb example of Joining LoRa Network

7. If the application you loaded does not send packets automatically to the server (such as lora.app.us.sb and lora.app.eu.sb), send some packets now that you have joined. In the case of cmd.loramac.rm1xx.sb, you may use the command *lora send <data$> <nPort> <nConf>* as shown in (Figure 20).

Figure 20: Sending data with cmd.loramac.rm1xx.sb

VIEWING DATA PACKETS ON LORIOT NETWORK SERVER

To view the data your devices have sent to the Loriot application, complete the following:

1. From the Loriot Dashboards menu, click **Applications.**
2. On the Applications page, click **Sample App.** This is the only application available, the one configured in the section Adding Devices to the Existing Sample Application in Loriot.
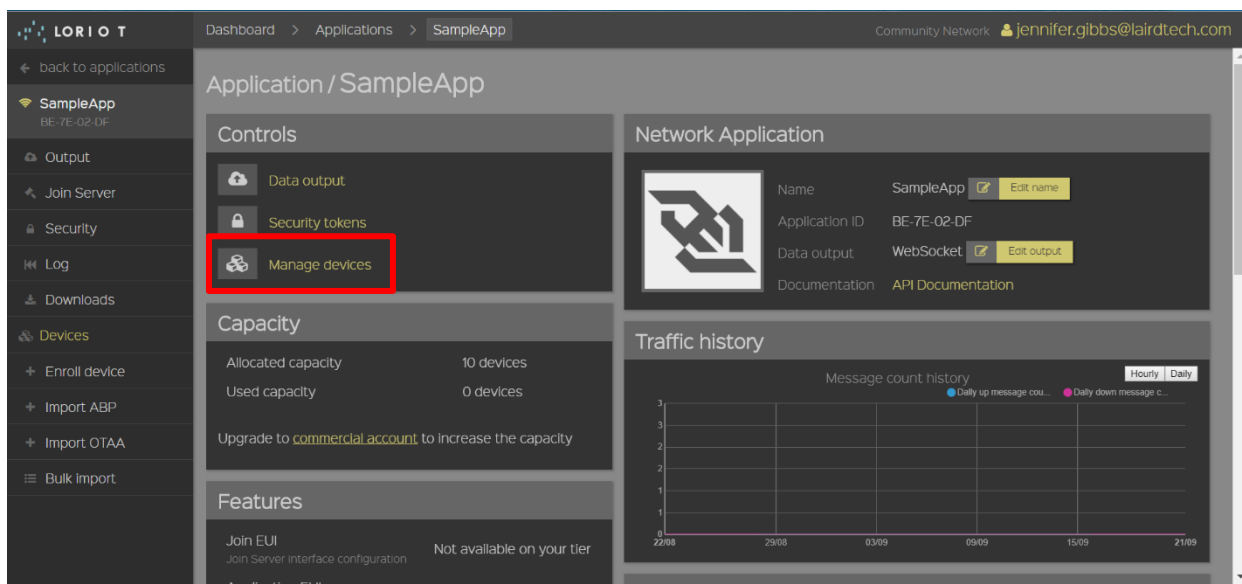3. On the Application/Sample App page click **Manage Devices**.

Figure 21: Manage Devices in the Loriot Sample App

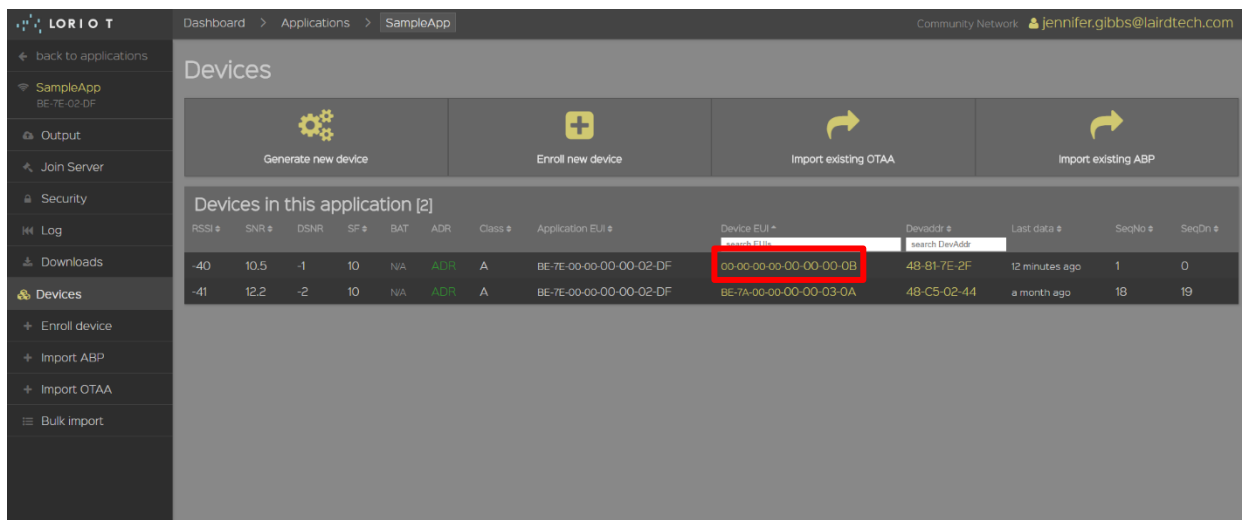4. Select the Device EUI that you used to set up your DVK-RM1xx board.

Figure 22: Selecting the device associated with the DVK-RM1xx

5. You are now on the *Device details* page where you can view the last ten packets received by the Loriot Network Server from this device.

   Note: The packets are not real time; you must reload the page to see the updated packets.

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REVISION HISTORY

Version	Date	Notes	Approver
1.0	19 Dec 2017	Initial Release	Jonathan Kaye

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