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How To Connect LoRa RAK811 To The Things Network V1.0

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1. Introduction

This document mainly gives a detailed introduction about how to connect RAK811(Lora) to The Things Network.

RAK811 Low-Power Long Range LoRa Technology Transceiver module, provides an easy to use, small size, low-power solution for long range wireless data transmission.

First, The RAK811 module complies with the latest LoRaWAN Class A & C protocol specifications, it is simple to access LWPA IOT platforms, such Actility etc. Second, it also support Lora Point to Point communications, this function can help customers implement their own private long range Lora network fast.

Module integrates semtech SX1276 and stm32L, offer user an serials At commands with UART Interface .It is easy to accomplish their applications, such as simple long range sensor data applications with external host MCU, low-power feature is suitable for battery applications.

I will introduce the following four parts in detail:

(1)Registered Account;

(2)Configuration the Gateway;

(3)Add Gateway to The Things Network;

(4)Create a Application;

(5)Add RAK811 to The Things Network;

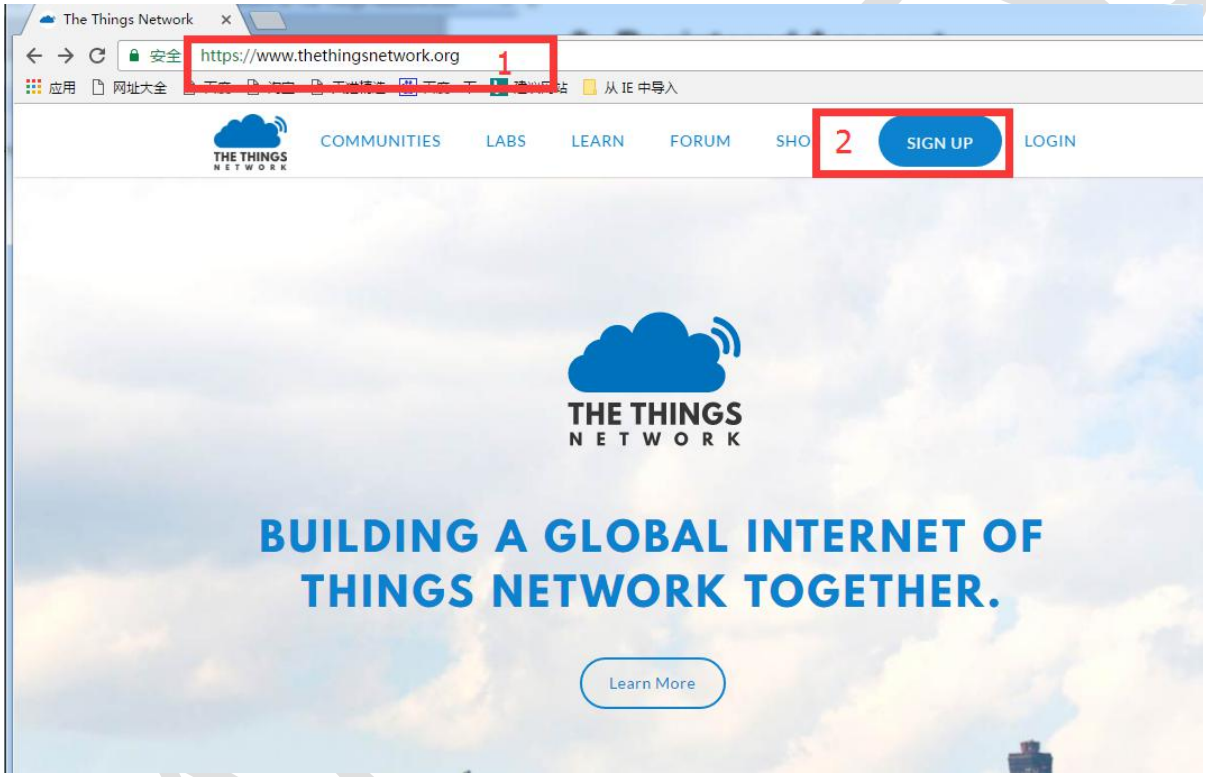
2. Registered Account

If you wanted connect the RAK811 to The Things Network,you need to register an account on The Things Network. Its website is https://www.thethingsnetwork.org/. Now,please follow the step below to register.

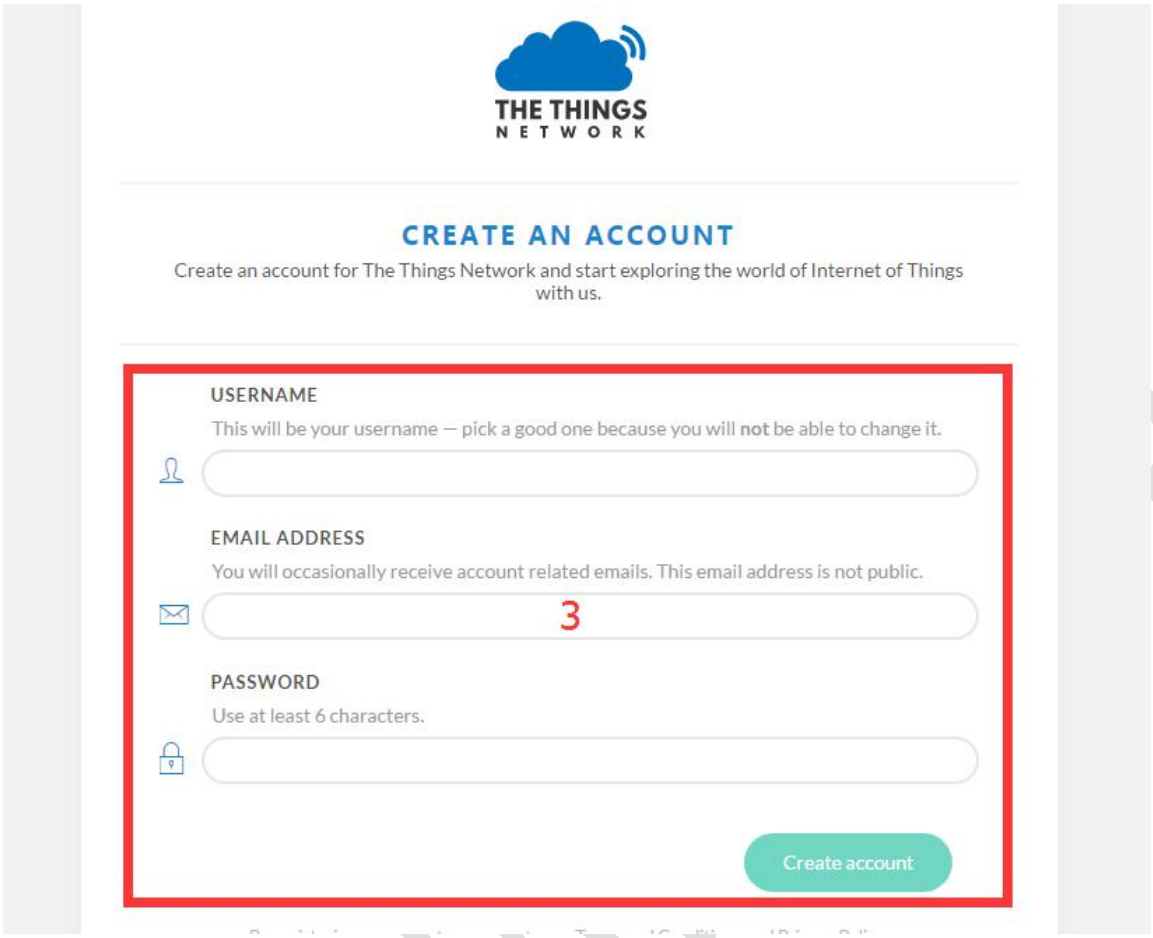
Please click the URL mentioned above,or copy and paste this URL and open with browser;

Step 1: Open this website;

Step 2: Click " SIGN UP";



Step 3: You will see a registration form, fill in the form as required. After filling,click "CREATE ACCOUNT" and complete registration;



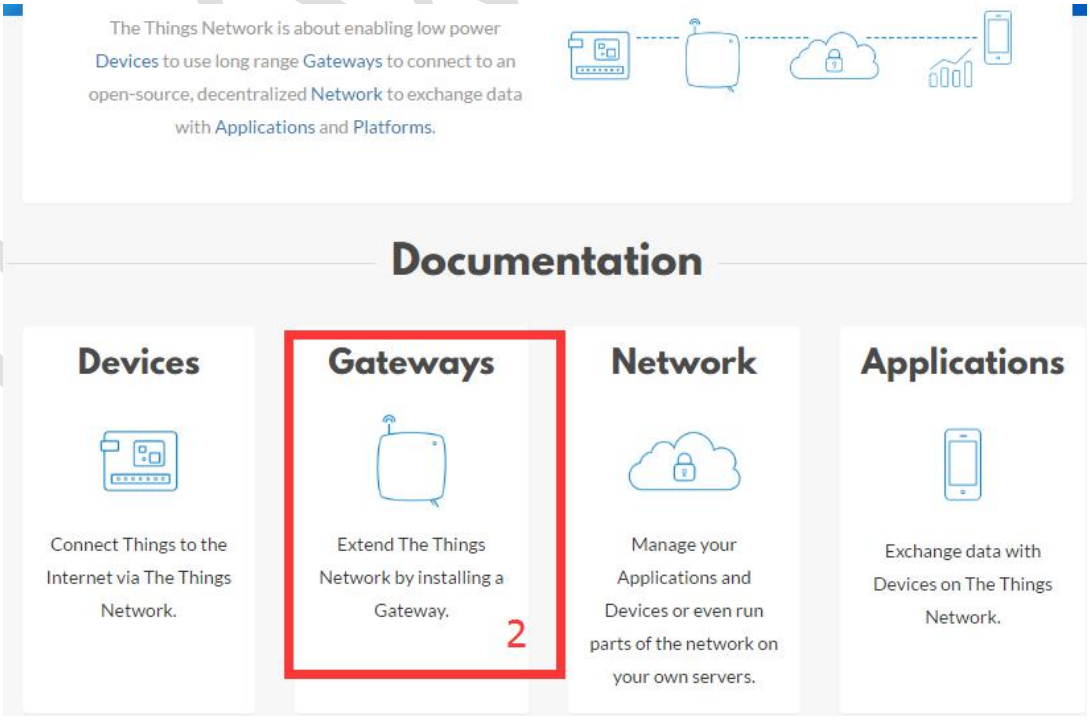
Step 4: Wating a moment you will received a email from The Things Network,it shown that you register account successfully.and click on "Activate account" in the email activate your account.

3. Configuration the Gateway

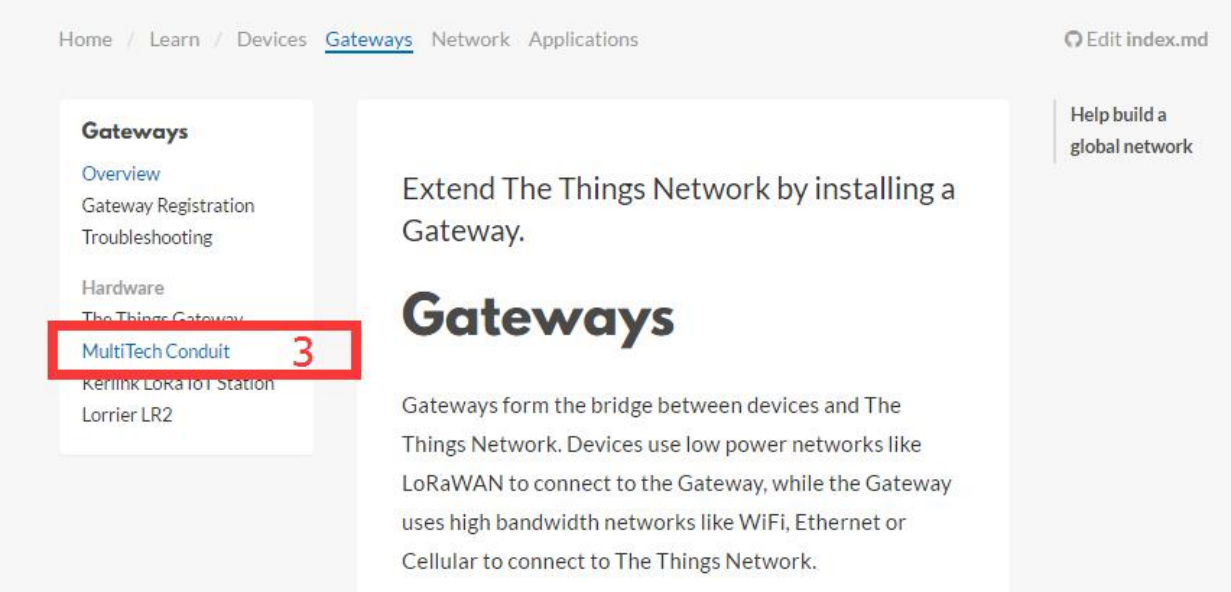
To add our gateway to The Things Network, we need to configuration the gateway. But how to configuration our gateway?

Step 1: Log in your account, and click on "LEARN";

Step 2: Click on "GATEWAYS";



Step 3: I am here to demonstrate the use of MultiTech Conduit mlinux module. So, click on "MultiTech Conduit" - "Configure mLinux model";



Step 4: Connect your gateway to a network that can access Google, then according to the content of the web page, start configuration your gateway;

Step 5: Implement "cat /var/config/lora/local_config.json",get the gateway EUI;

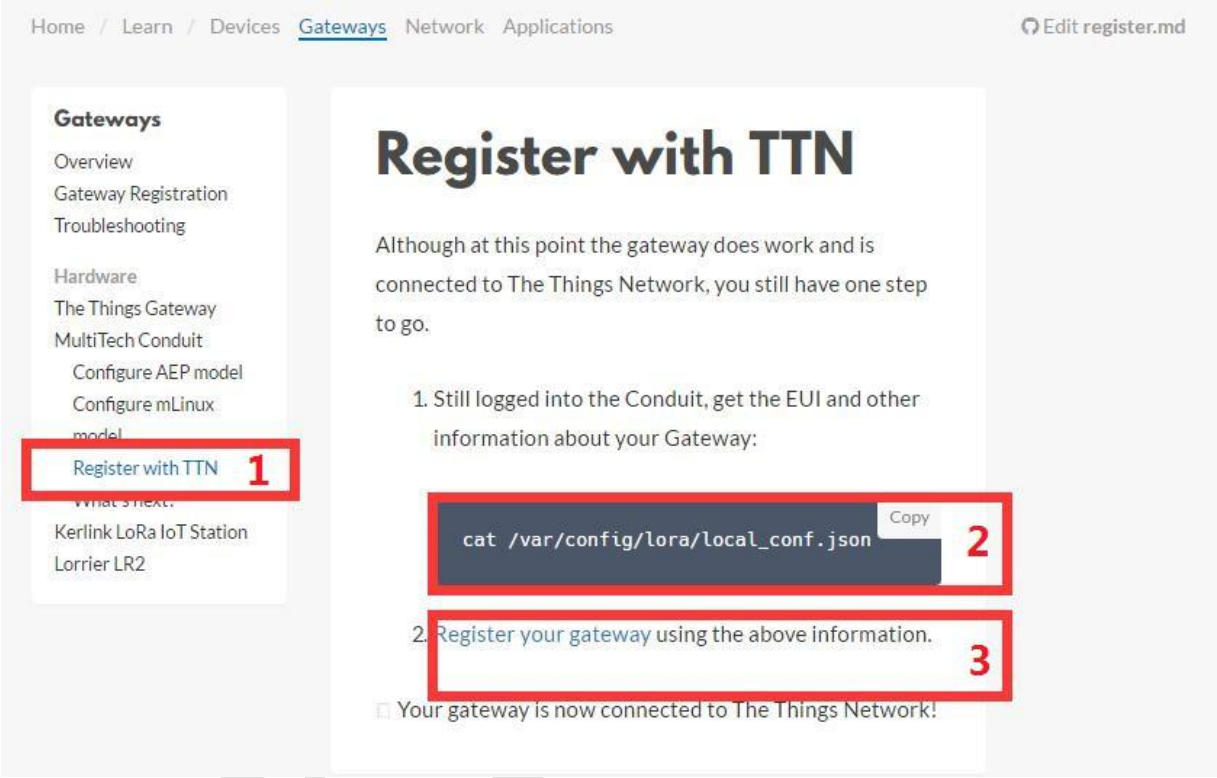
4. Add Gateway to The Things Network

After completing the gateway configuration. Now, we can start add Gateway to The Things Network;

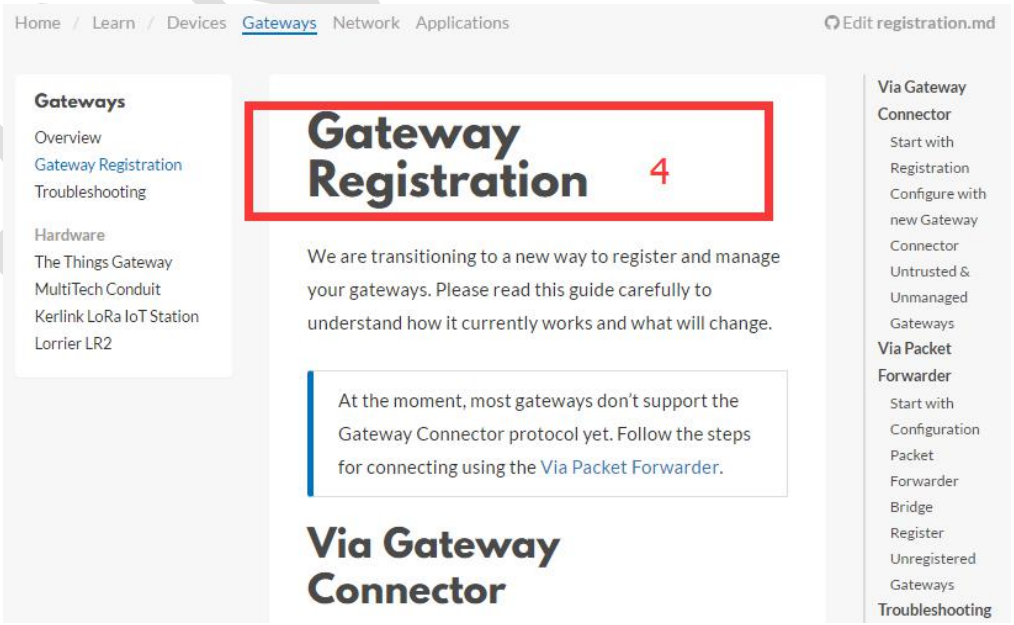
Step 1: Click on "Register with TTN";

Step 2: Implement "cat /var/config/lora/local_config.json",get the gateway EUI;

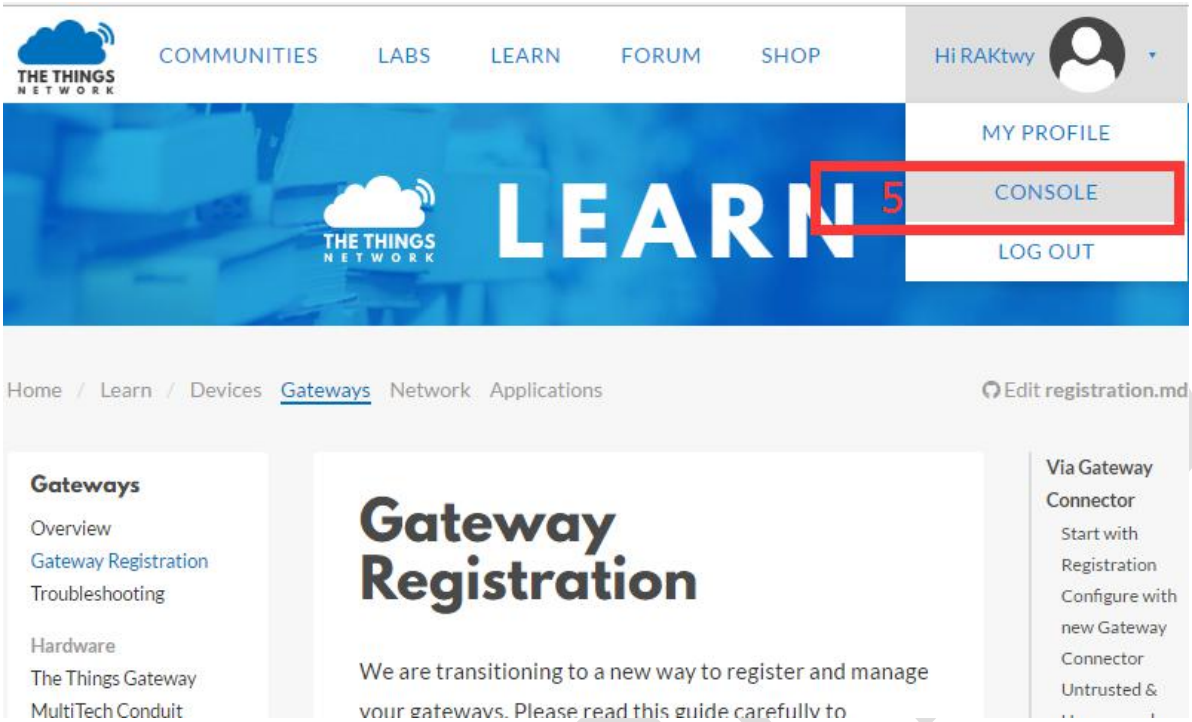
Step 3: Click on "Resister your gateway";



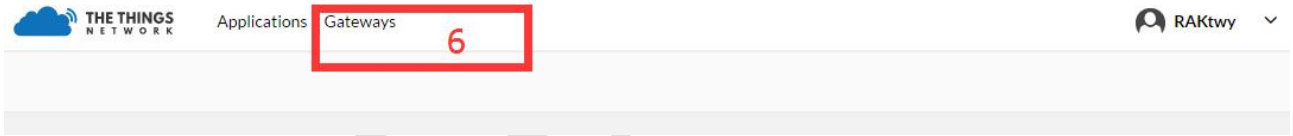
Step 4: Read the content on this web page;



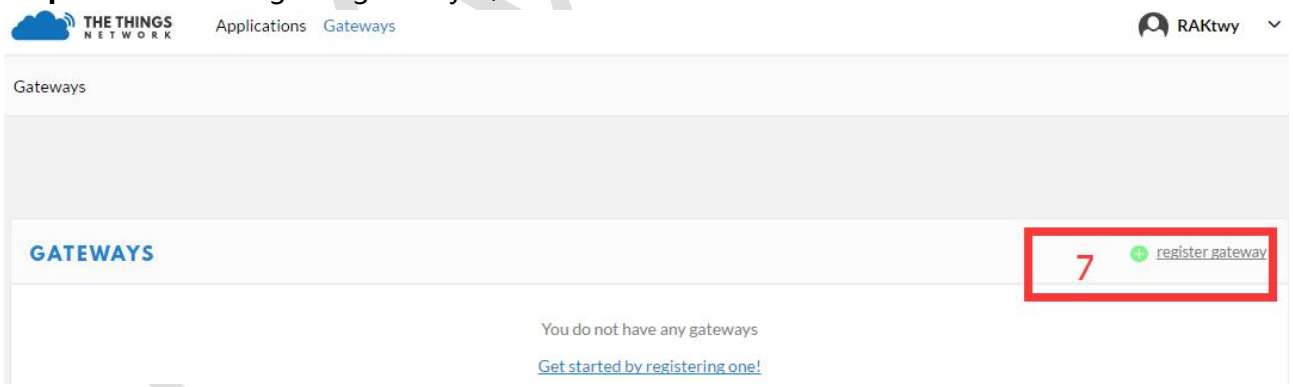
Step 5: Click on "CONSOLE";



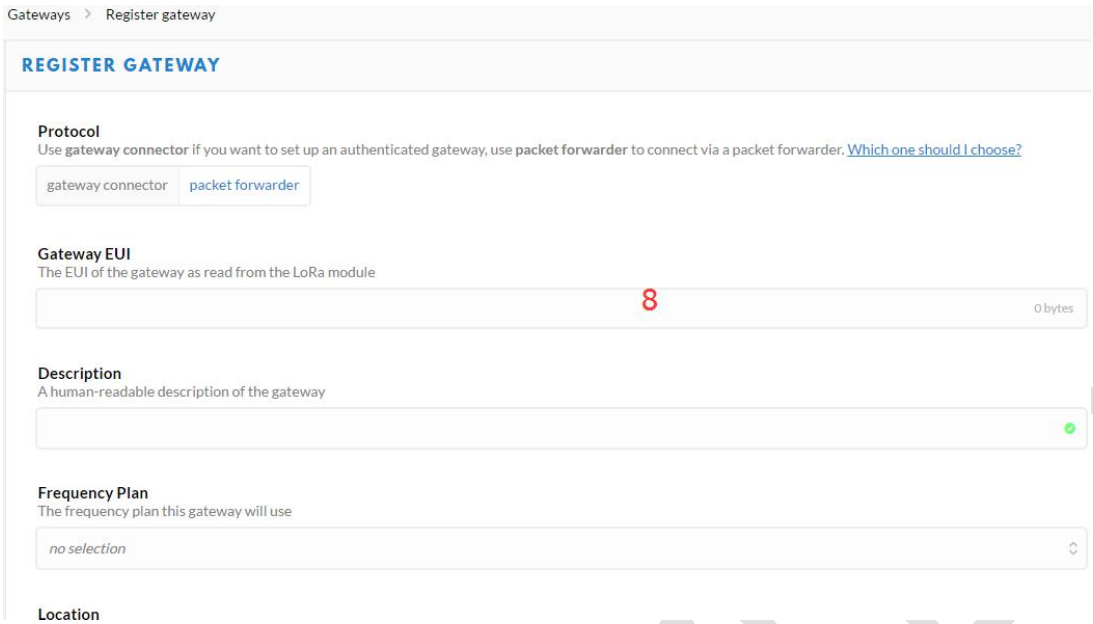
Step 6: Click on "Gateway";



Step 7: Click on "register gateway";

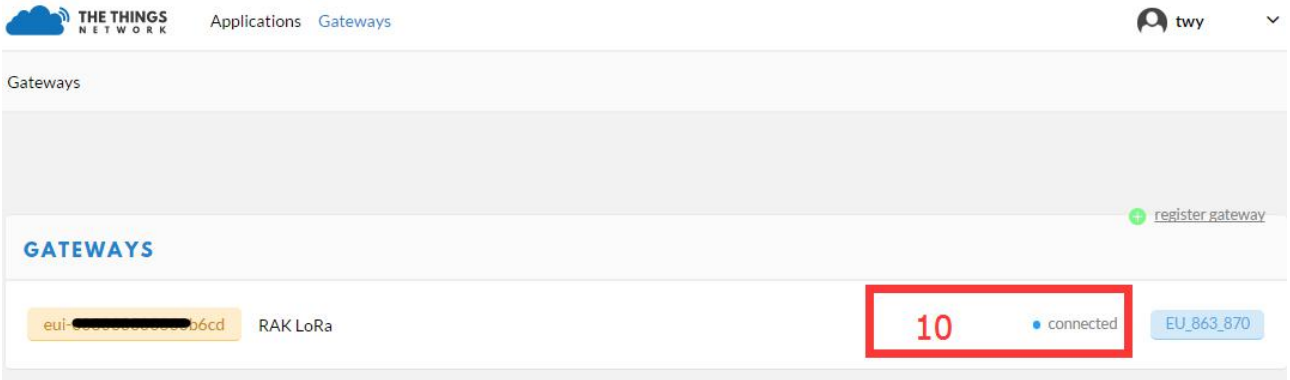


Step 8: You will see a registration form, fill in the form as required.



Step 9: Click on "Register Gateway", finish register;

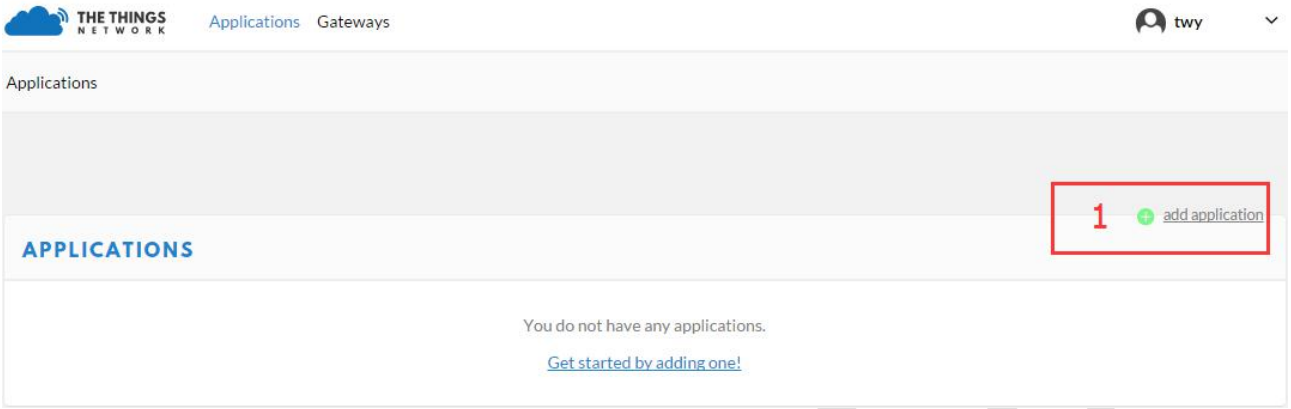
Step 10: Refresh the Gateways page . If it showing as the following picture, this indicates that we add the gateway to success



5. Create a Application

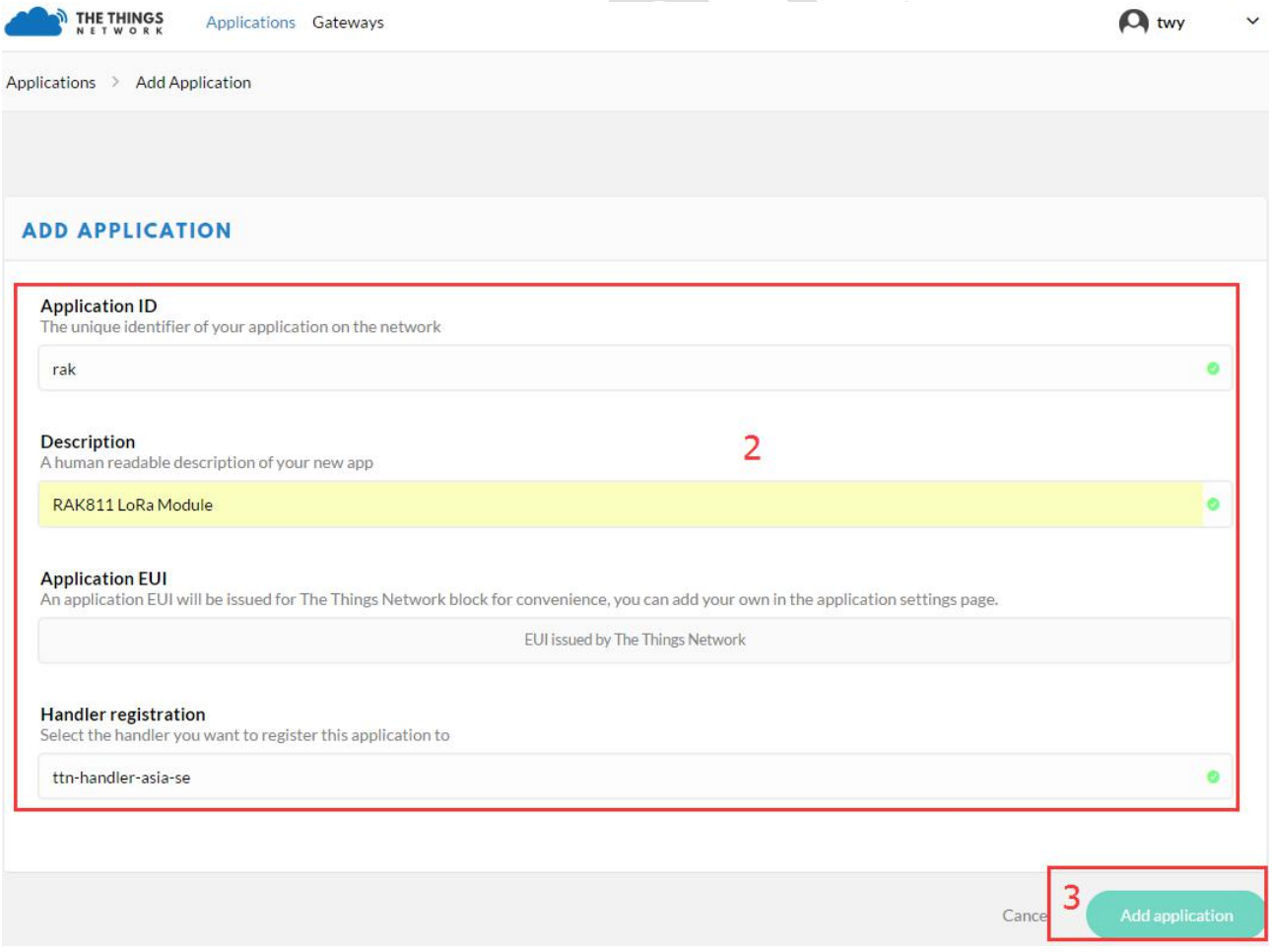
In this section, I will tell you how to create a application on TTN:

Step 1: Click on “add application”;

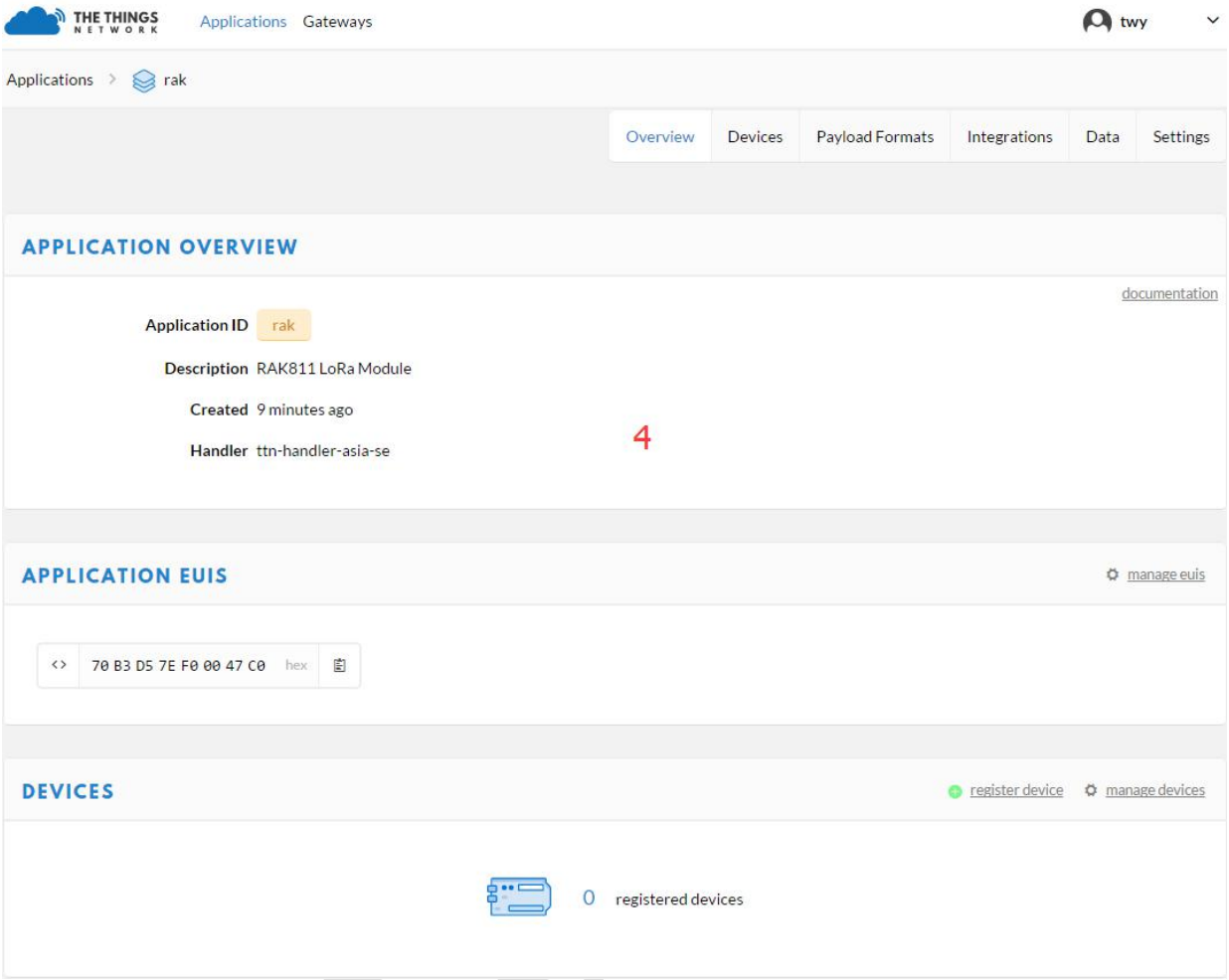


Step 2: Fill in the following form as required;

Step 3: After completing, click on “Add application”;

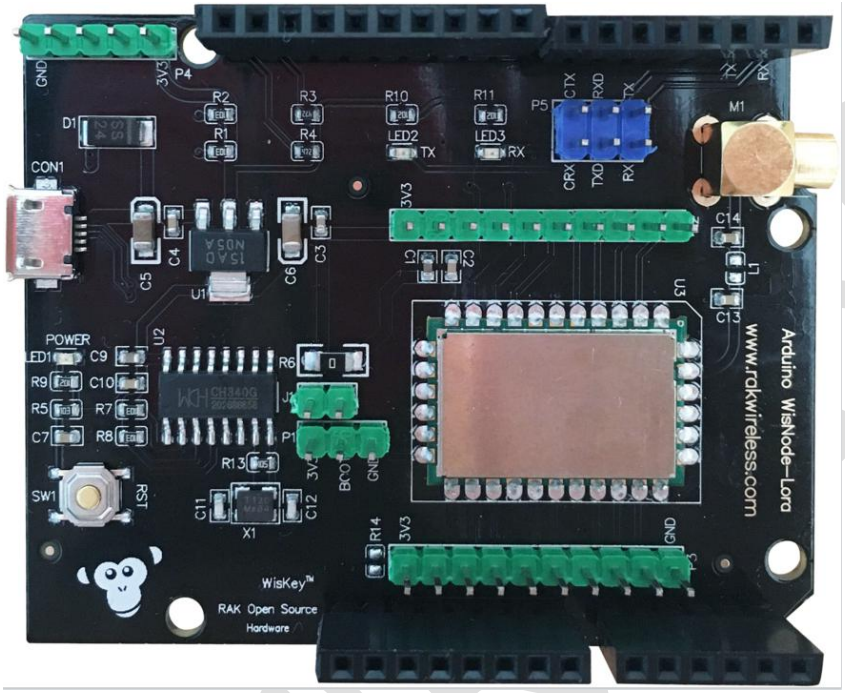


Step 4: It is a success add application “rak”;



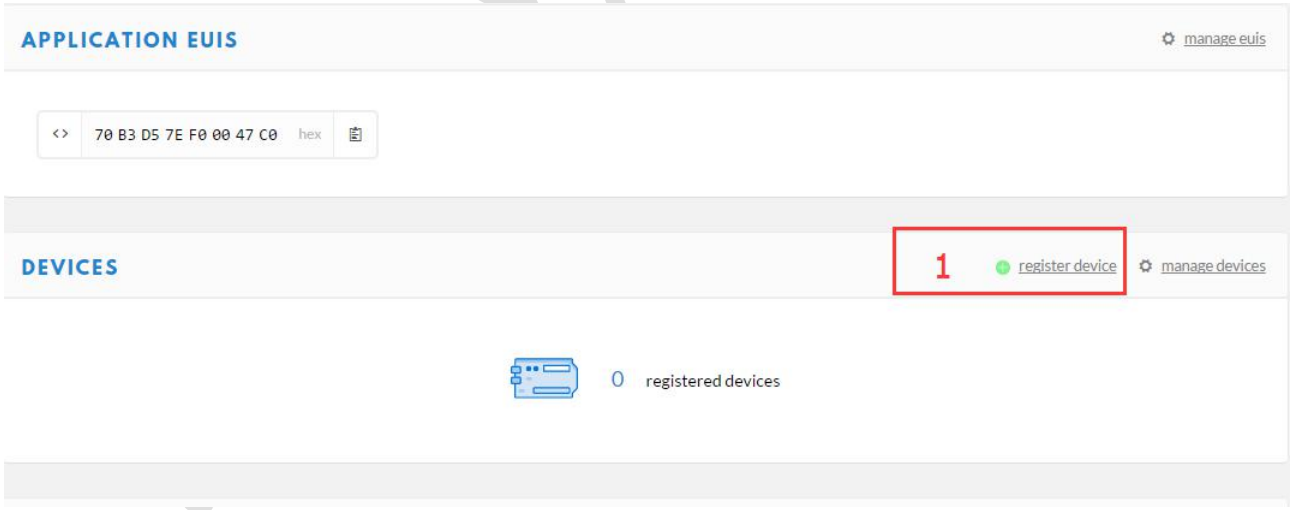
6. Add RAK811 to The Things Network

In this part, I will use WisNode-Lora EVB to demonstrate how to add our LoRa RAK811 module to TTN;



RAK WisNode-Lora EVB

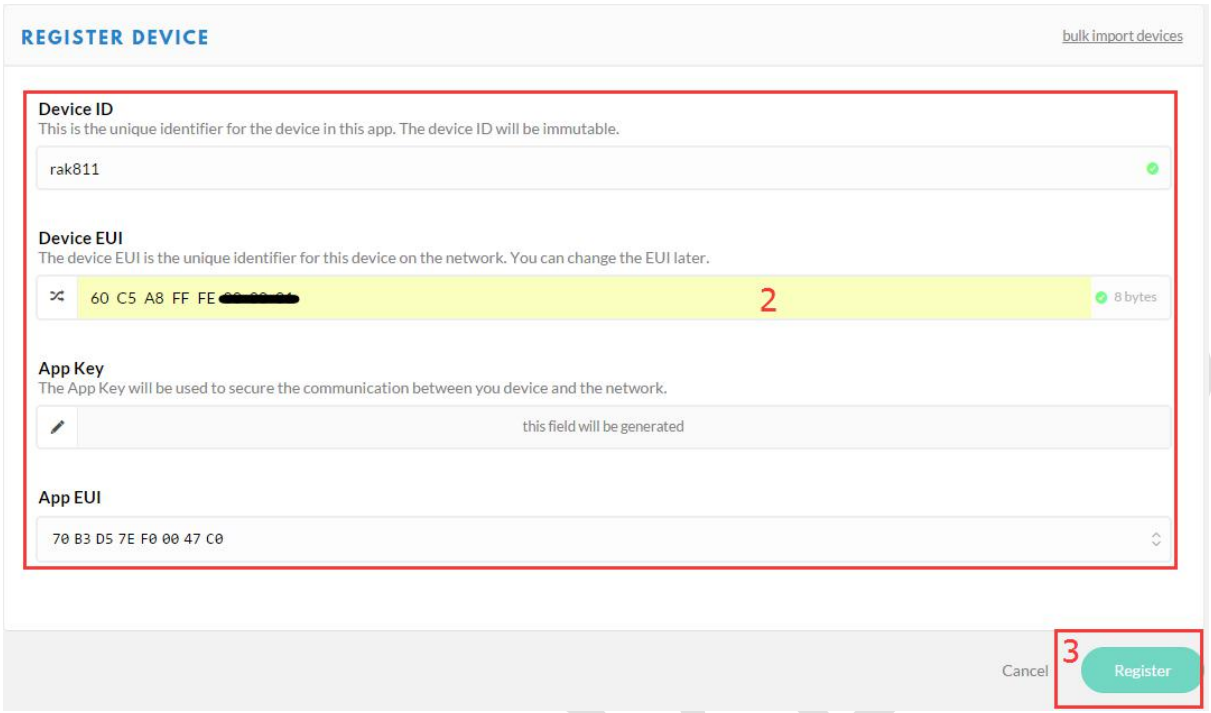
Step 1: Click on "register device", start to resister a RAK811 Lora module.



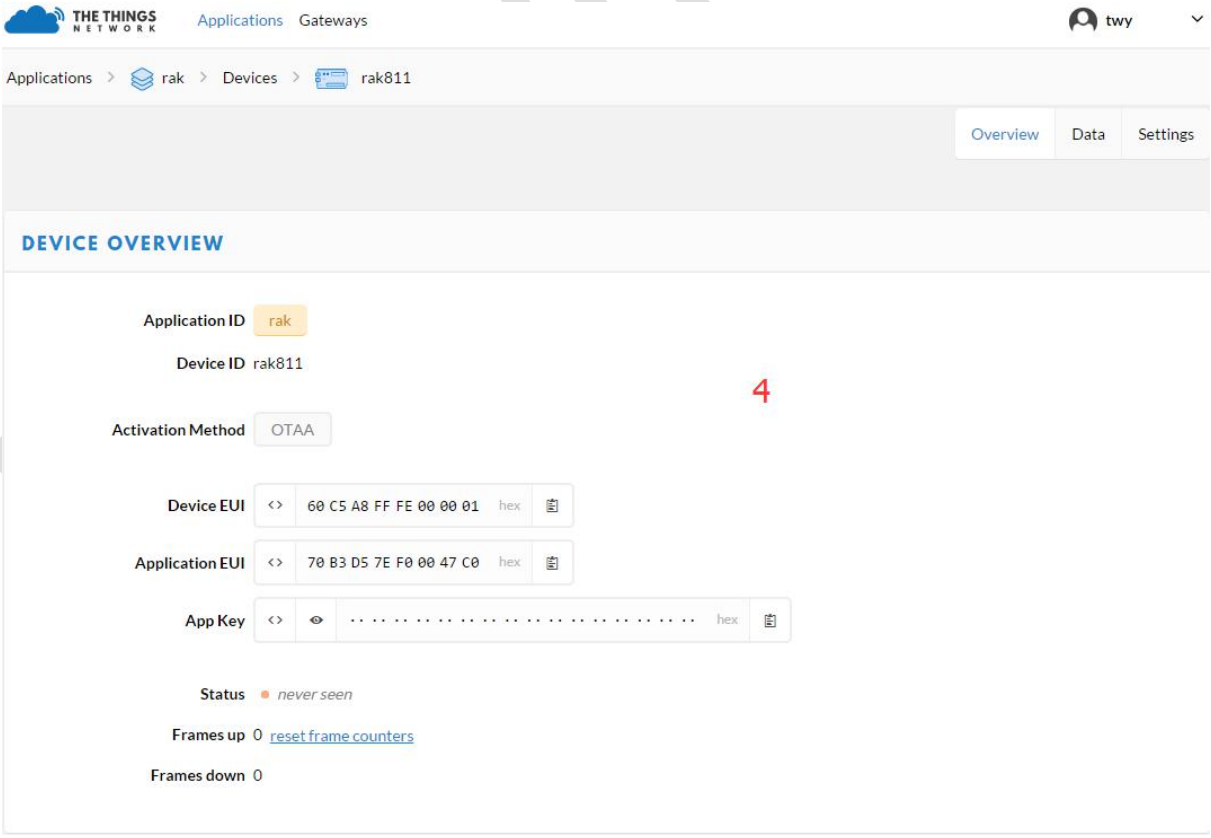
Step 2: Fill in the following form as required;

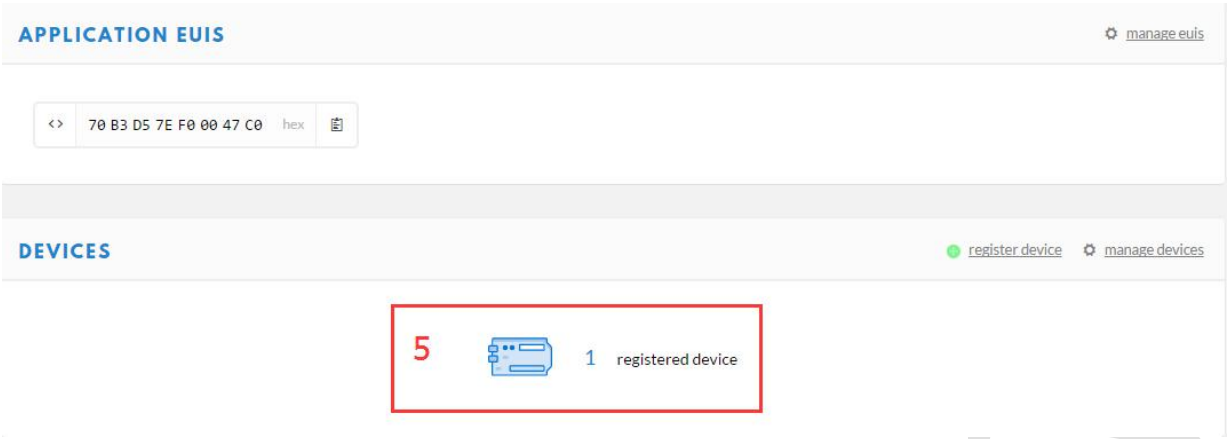
Step 3: After completing, click on "Register";

Device EUI: Enter the DevEUI for your device. This ID should come with the information included with your device, or can be found in the device use at+get_config=dev_eui.



Step 4 & Step 5: It is show that we register our RAK811 module successfully;





Step 6: Use Micro USB interface to supply the module power. One end of the serial line is connected to the module, and one end is connected to the computer. Then open the Uart AssistTool, send AT command to operate the module.

Step 7: Send the AT command to the module in the following order, make the RAK811 module join the OTAA;

Boot information : Welcome to RAK811

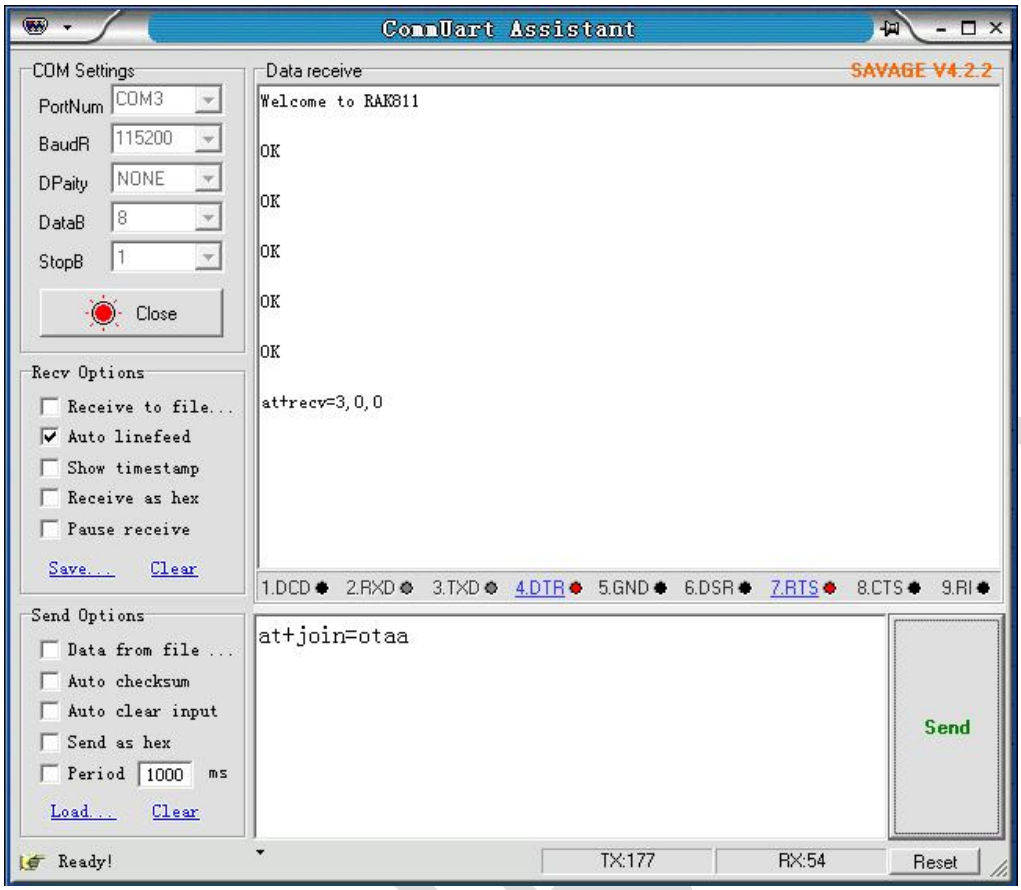
Send: at+mode=0 /* SET LoraWAN work mode */
Return: OK

Send:at+set_config=dev_eui:60C5A8FFFE000001
/* GET Dev_EUI check if NULL ,set the enter before information */
Return: OK

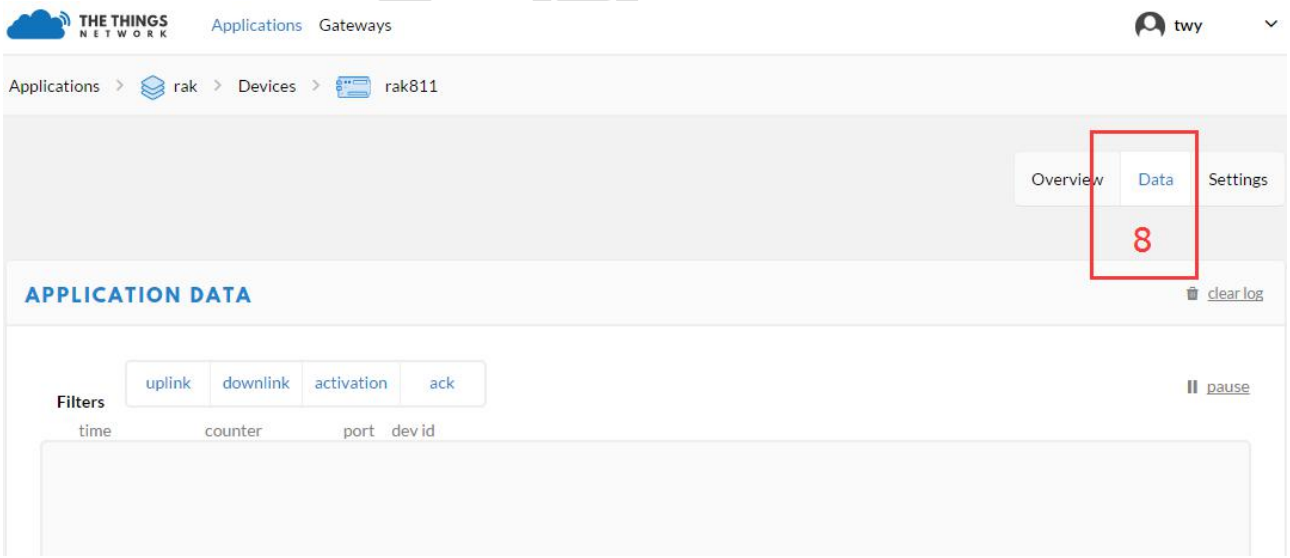
Send: at+set_config=rx2:3,869525000 /*rx2 datarate: SF9*/
Return: OK

Send:
at+set_config=app_eui:70B3D57EF00047C0&app_key:5D833B4696D5E01E2F8DC880E30BA5FE
/* SET Lora Gateway app_eui and apps_key, big endian*/
/*This data show on Step 4*/
Return: OK

Send: at+join=otaa /* Join otaa type*/
Return: OK



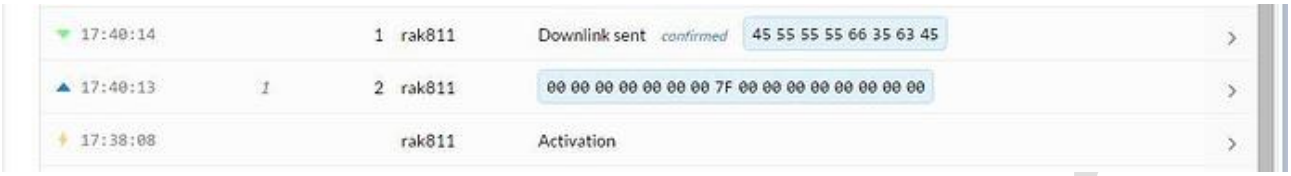
Step 8: After join otaa, then can use the following AT command send data to TTN, we can see our module send data on TTN successfully;



Send: at+send=0,2,000000000000007F0000000000000000
Return: at+recv=2,0,0 /*unconfirmed mean tx success*/
Or

Send: at+send=1,2,000000000000007F0000000000000000

Return: at+recv=1,0,0 /*confirmed mean receive ack from gateway*/



7. Modify Record

Version	Author	Data	Modify content
V1.0	Wenyong.tang	2017/04/24	Create Document