REYAX
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RYLR993 and Helium Network User Guide



1. What is LoRaWAN®?

The LoRaWAN® specification is a Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated 'things' to the internet in regional, national or global networks, and targets key Internet of Things (IoT) requirements such as bi-directional communication, end-to-end security, mobility and localization services. For more details, please refer to https://lora-alliance.org/

2. What is Helium Network

2.1 Helium Network is a globally distributed network of hotspots that creates public long-range wireless coverage for LoRaWAN® IoT devices. Helium blockchain network is an open-source public blockchain that create a decentralized wireless networks. For more details, please refer to https://www.helium.com/

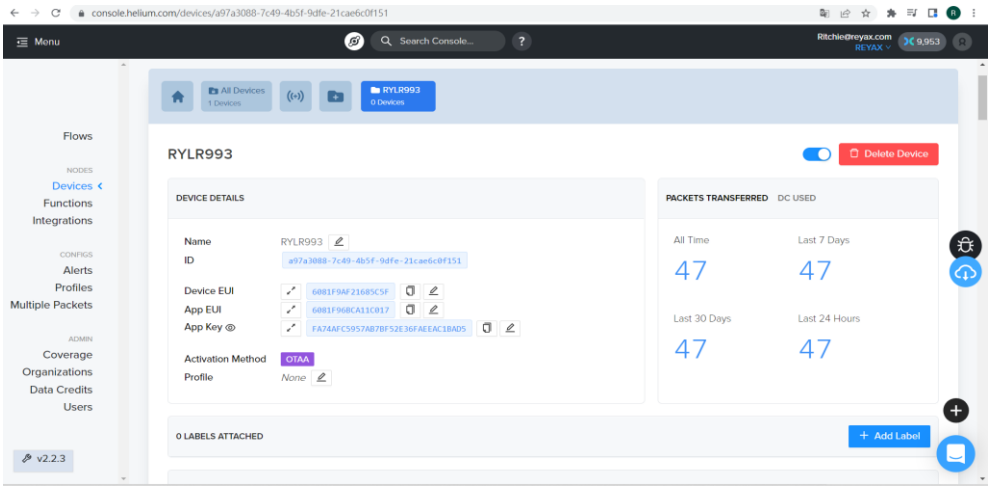
2.2 To Check the hotspot nearby, please refer to https://explorer.helium.com/

3. How to apply Helium Network service

To use Helium network service, you must pay to purchase DC (DATA CREDITS) for data transmission. Please refer to the website link below for applying Helium Network service.

https://docs.helium.com/use-the-network/console/quickstart

After applying, you can create a Device in console environment to get "Device EUI", "App EUI" and "App Key". These three data are the account ID and password that used by the RYLR993 module to connect to the Helium Network. You can go through https://console.helium.com/ to see the information. Usually, it will take a few hours for the sync after you create the Device



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4. Instruction of how to use RYLR993 and Helium Network for data transmission

The following describes the simple usage process. For advanced usage commands, please refer to the RYLR993 AT Command file.

4.1 Boot Information : The following strings will be occurred after you Boot or RESET:

BAND:US915 'Stands for the current frequency Band

+READY

4.2 Set Frequency Band : After sending "AT+BAND=0", RYLR993 will response as below

BAND:AS923

OK

4.3 Test the response of RYLR993 : After sending "AT", RYLR993 will response as below

OK

4.4 Set DEUI : After sending "AT+DEUI=60:81:F9:AF:21:68:5C:5F", RYLR993 will response as below

OK

4.5 Set APPEUI : After sending "AT+APPEUI=60:81:F9:6B:CA:11:C0:17", RYLR993 will response as below.

OK

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4.6 Set NWKKEY : Because Helium Network is an APP itself, therefore the NWKKEY in RYLR993 is, after APPKEY send “AT+NWKKEY=FA:74:AF:C5:95:7A:B7:BF:52:E3:6F:AE:EA:C1:BA:D5:”, RYLR993 will response as below

OK

4.7 Log in to Helium Network : After sending “AT+JOIN=1”, RYLR993 will response as below

OK

+EVT:JOINED ‘Successfully Login to Helium Network

+EVT:RX_1, DR 0, RSSI -19, SNR 8 ‘The quality of the signal status

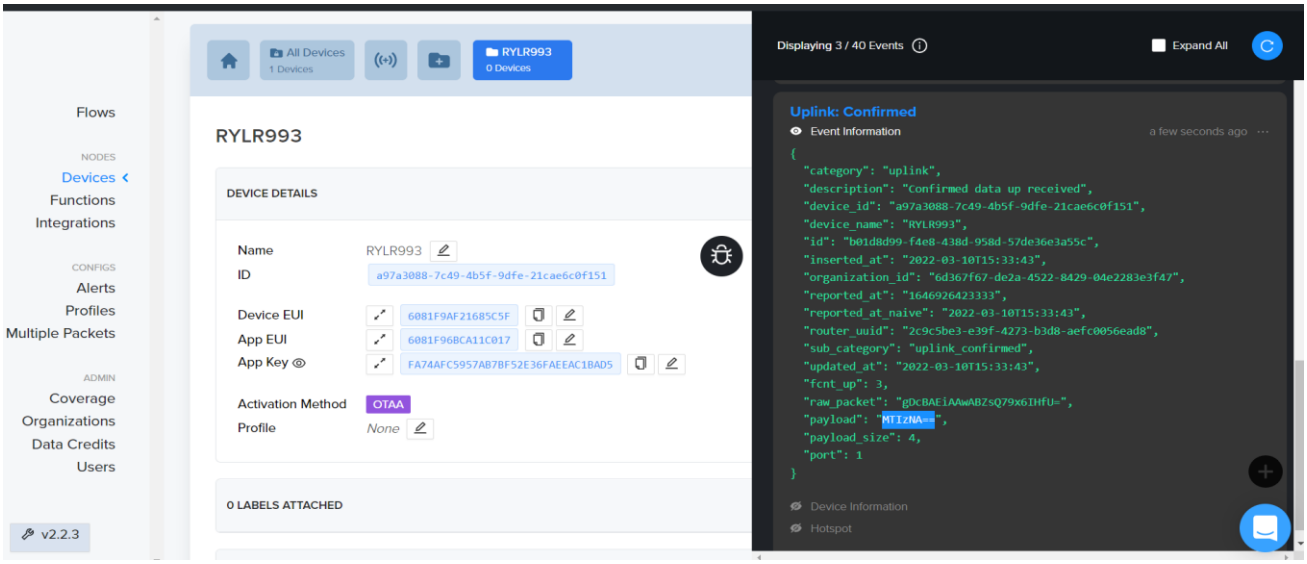
4.8 Sending data to Helium Network : After sending **“**AT+SEND=1:1:31323334”, RYLR993 will response as below

OK

+EVT:SEND_CONFIRMED ‘Confirmation of sending data successfully

+EVT:RX_1, DR 2, RSSI -18, SNR 7

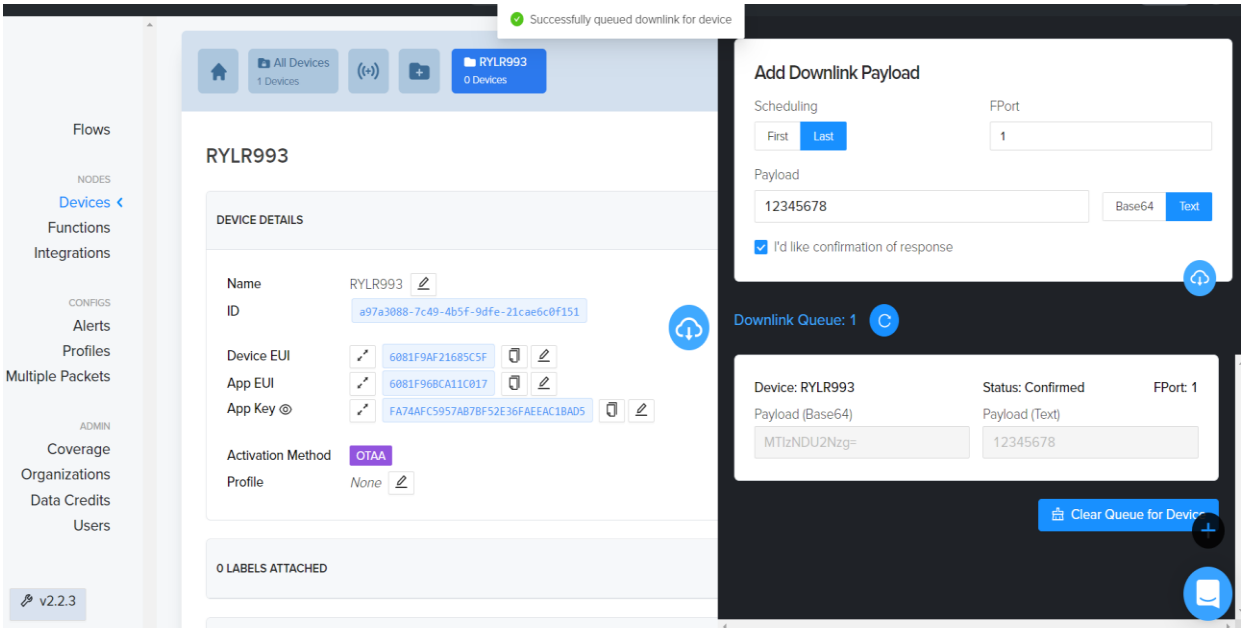
‘The payload field are the data that has been uploaded successfully, and the format is BASE64



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4.9 Receive the data transmitted from Helium Network to RYLR993:

As the figure shown below, 12345678 in Text format can be transferred to RYLR993



Due to Helium Network can only download the data when RYLR993 is uploading the data, therefore it is needed to send “AT+SEND=1:1:31323334:”, and RYLR993 will response as below

OK

+EVT:SEND_CONFIRMED

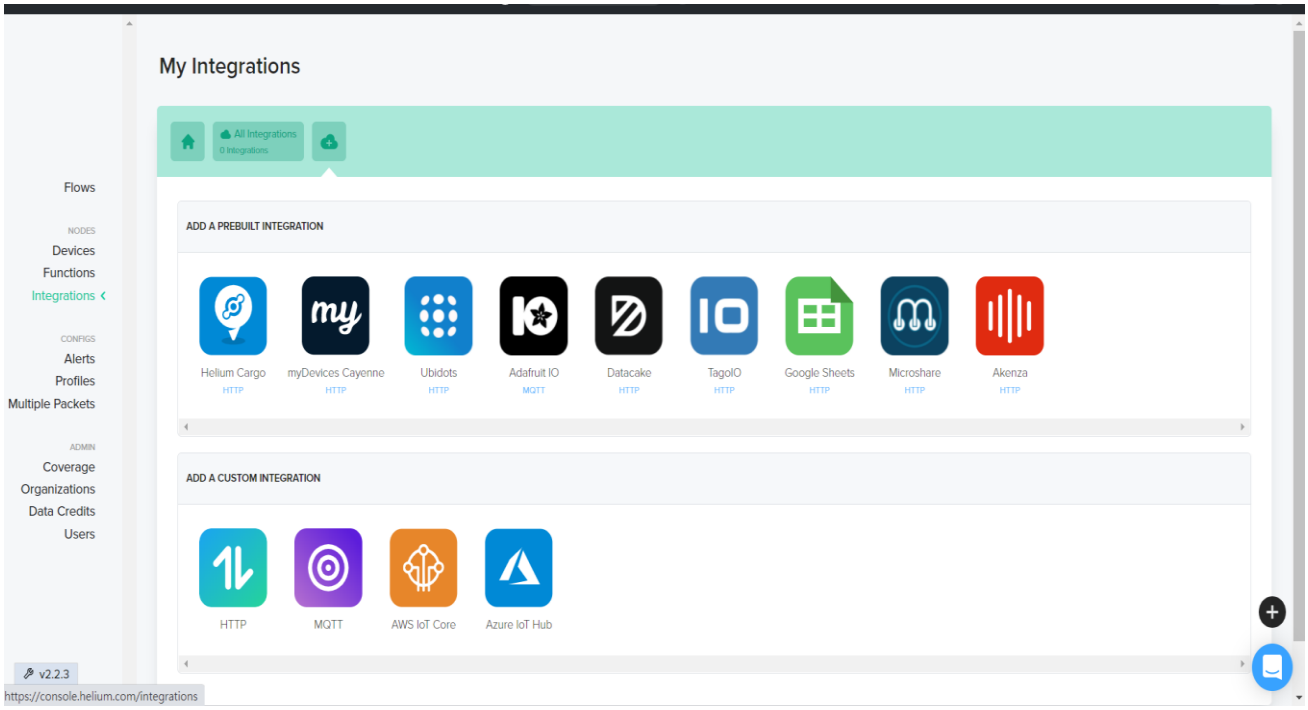
+EVT:1:08:3132333435363738 ‘Confirmation of sending data successfully

+EVT:RX_1, DR 2, RSSI -28, SNR 7

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5. Helium Network can be integraded with other service

Helium Network can also be integrated with other network protocols and services.



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