

How to connect Lansitec devices to AWS IOT Core for LoRaWAN

User Guide

Date	Version	Description
February 2022	0.1	First release

1. General Introduction

There are two steps to connect the Lansitec device to AWS IoT Core for LoRaWAN.

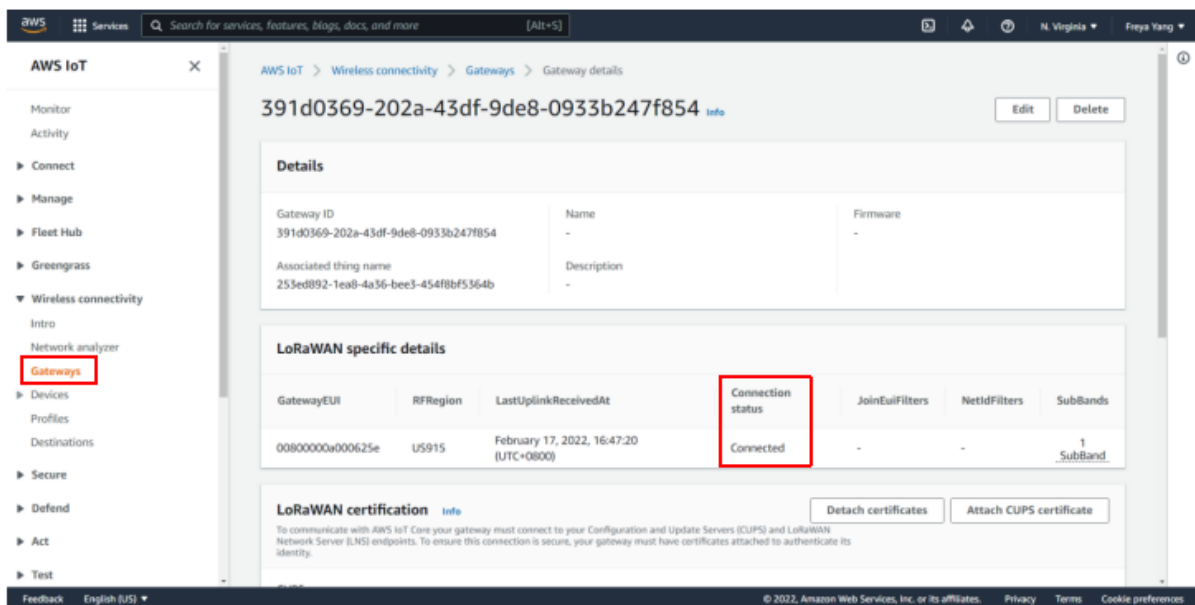
- Connecting a gateway
- Connecting a device

This document mainly introduces how to connect Lansitec LoRaWAN devices to AWS IOT Core for LoRaWAN. In addition, it will help you review the uplink message from your LoRaWAN device and downlink the message to your device. For details, please refer to the following sections.

Before you start, you need to verify the gateway connectivity and verify the device is set to the same frequency band as the gateway.

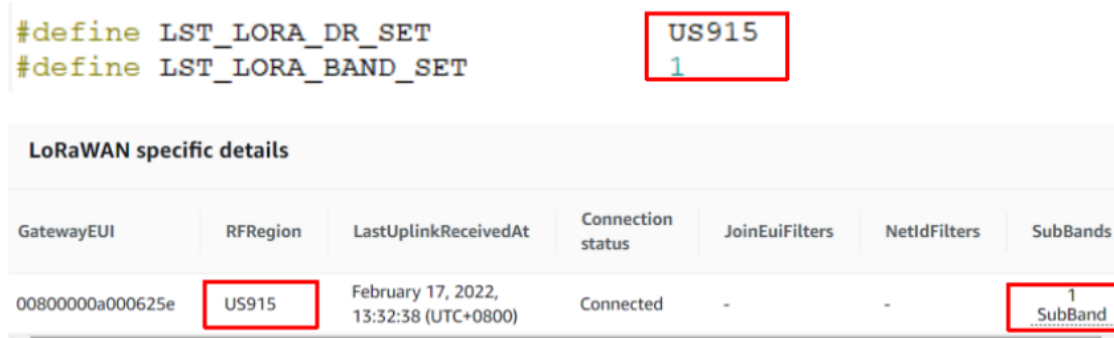
1.1 Verify the gateway connectivity

Open the AWS IoT Core Management console and change to "Gateways" overview. Select the existing gateway and ensure that the field "Connection Status" is populated, as illustrated below.



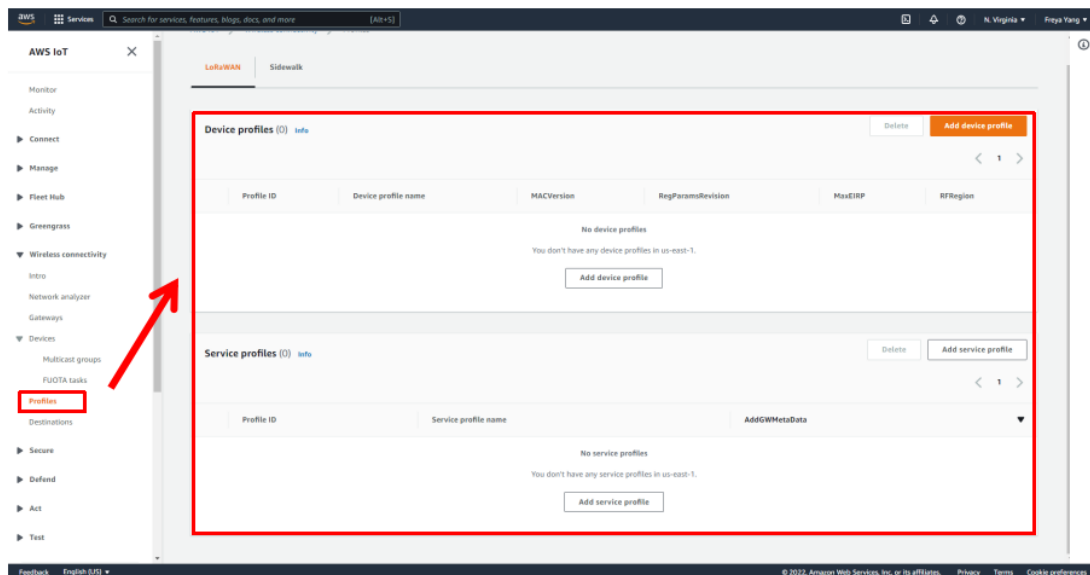
1.2 Verify frequency band consistency

As is shown in the figure, select the frequency plan US915 and the sub-band, which are the same as the gateway,

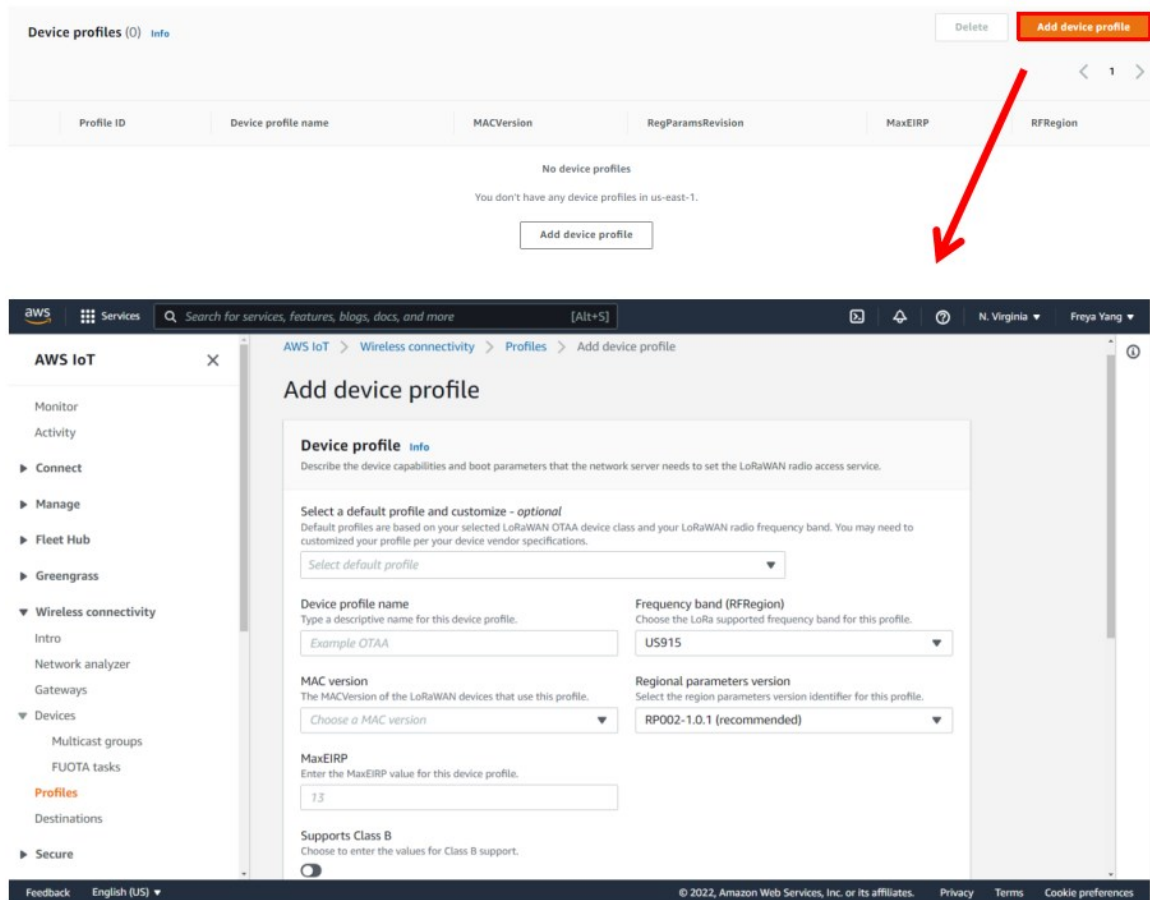


2. Create Device Profiles

2.1 Open the AWS IoT Core Management console and change to "Profiles" view



2.2 Click on "Add device profile" and a following overview shall appear



2.3 Provide device profile data

2.3.1 Select frequency band and LoRaWAN OTAA device class

The frequency plan needs to be set the same as the gateway and your device. In addition, most Lansitec devices are class A. Therefore, US915-A is selected here for Lansitec devices testing.

Select a default profile and customize - optional

Default profiles are based on your selected LoRaWAN OTAA device class and your LoRaWAN radio frequency band. You may need to customized your profile per your device vendor specifications.

US915 - A ▼

2.3.2 Add the device profile name

Device profile name

Type a descriptive name for this device profile.

test-dev-pro

2.3.3 Select the version of LoRaWAN specification

This parameter should specify the version of LoRaWAN specification supported by your device. Currently, most Lansitec devices use MAC version 1.0.2.

MAC version

The MACVersion of the LoRaWAN devices that use this profile.

1.0.2 ▼

2.3.4 Select the version of LoRaWAN Regional Parameter

This parameter should specify the version of LoRaWAN Regional specified in your device document. Currently, most Lansitec devices use LoRaWAN Regional version v1.0.2rB.

Regional parameters version

Select the region parameters version identifier for this profile.

Regional Parameters v1.0.2rB ▼

2.3.5 Select support class

Most Lansitec devices select class A, and you can use class B or class C if your device supports it.

Supports Class B

Choose to enter the values for Class B support.

☐

Supports Class C

Choose to enter the values for Class C support.

☐

Supports Join

Choose to enter the values for Join support (OTAA) or not (ABP).

☒

2.4 Click on "Add device profile" and review the added device profile

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

You don't have any tags attached to this resource.

Add new tag

You can add up to 50 tags.

Cancel

Add device profile

Device profiles (1)
[Info](#)

Delete

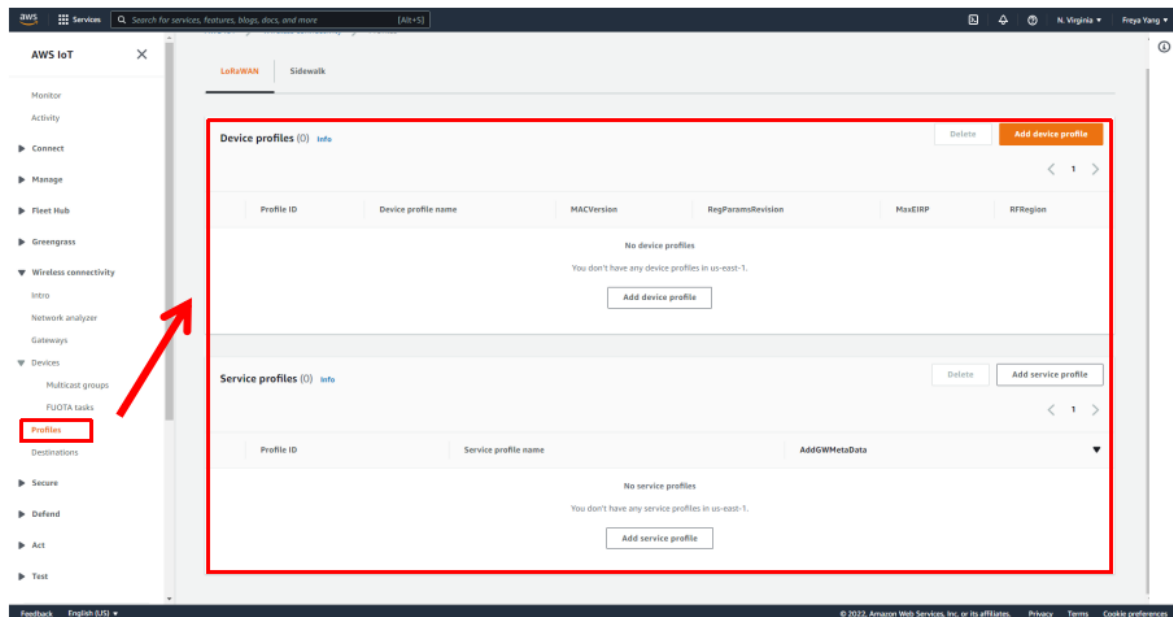
Add device profile

< 1 >

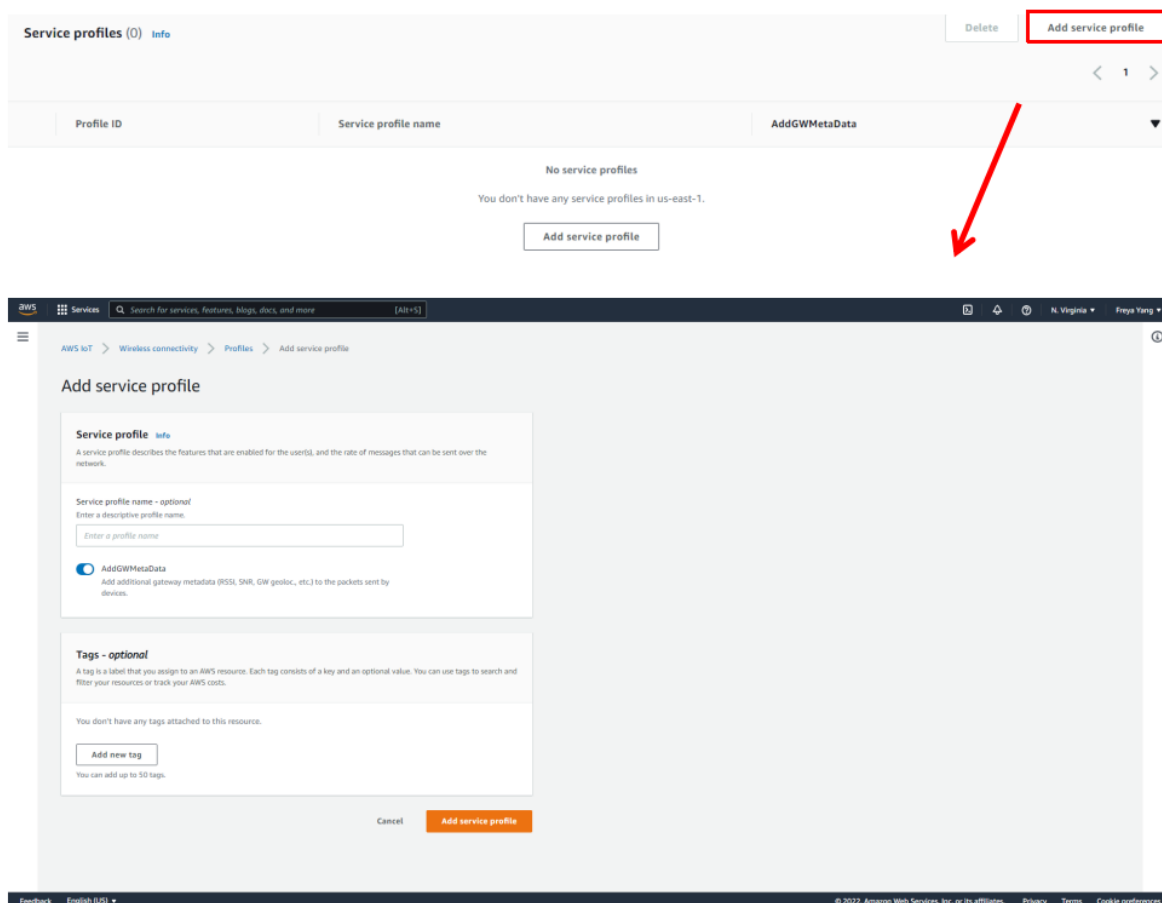
	Profile ID	Device profile name	MACVersion	RegParamsRevision	MaxEIRP	RFRRegion
☐	29603fb4-bdbd-46d4-93b7-762667b8338e	test-dev-pro	1.0.2	Regional Parameters v1.0.2r8	13	US915

3. Create Service Profiles

3.1 Open the AWS IoT Core Management console and change to "Profiles" view



3.2 Click on "Add service profile" and a following overview shall appear



3.3 Provide service profile data

3.3.1 Add the service profile name

Service profile name - *optional*

Enter a descriptive profile name.

3.3.2 Ensure that AddGWMetaData parameter is enabled.

Enabling this parameter can receive additional metadata like RSSI and SNR.



AddGWMetaData

Add additional gateway metadata (RSSI, SNR, GW geoloc., etc.) to the packets sent by devices.

3.4 Click on "Add device profile" and review the added service profile

Tags - *optional*

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

You don't have any tags attached to this resource.

Add new tag

You can add up to 50 tags.

Cancel

Add service profile

Service profiles (1) [Info](#)

Delete

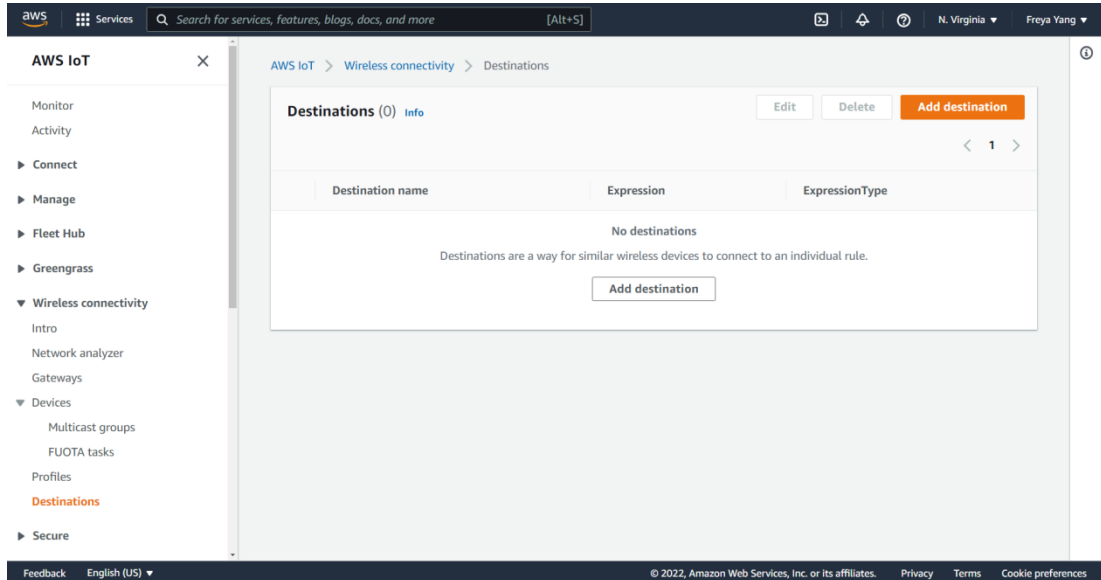
Add service profile

< 1 >

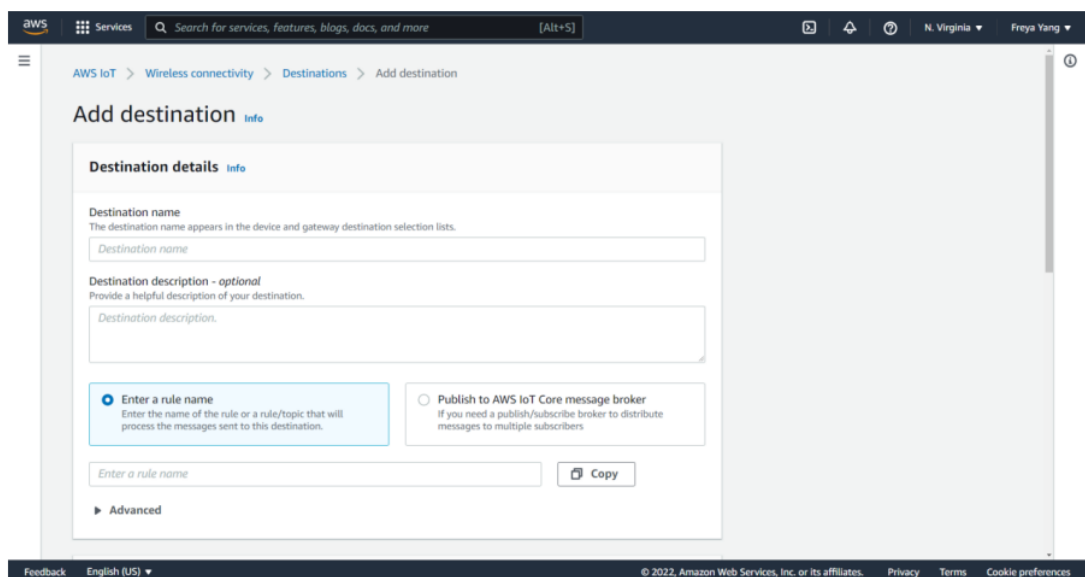
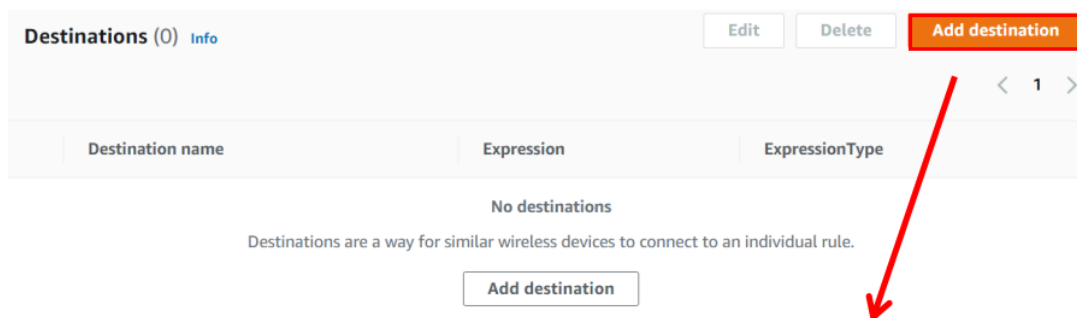
Profile ID	Service profile name	AddGWMetaData
694c36ae-971d-4c6c-aa13-10be689fac38	test-sev-pro	On

4. Create Destination

4.1 Open the AWS IoT Core Management console and change to the "Destinations" view



4.2 Click on the "Add destination" menu and the following overview shall appear



4.3 Provide destination details

4.3.1 Add the destination name

Destination name

The destination name appears in the device and gateway destination selection lists.

4.3.2 Assign the message to the broker

Select to publish the data to the message broker and create a topic for the MQTT client to subscribe.

☐ Enter a rule name

Enter the name of the rule or a rule/topic that will process the messages sent to this destination.

☒ Publish to AWS IoT Core message broker

If you need a publish/subscribe broker to distribute messages to multiple subscribers

 Copy

4.3.3 Choose an IAM role for destinations

Choose an existing IAM role for destinations to provide AWS IoT Core for LoRaWAN the permissions necessary to send to the MQTT client. If the role is not already defined, you need to define it to appear in the list of roles.

Permissions

☐ Create a new service role

☒ Select an existing service role

Select a role

Role ARN: arn:aws:iam::185329803724:role/service-role/IoTWirelessGatewayCertManagerRole

☒ Attach policy to role

[View policy permissions](#)

4.4 Click on "Add destination" menu and review the created destination

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

You don't have any tags attached to this resource.

[Add new tag](#)

You can add up to 50 tags.

[Cancel](#)

[Add destination](#)

Destinations (1) [Info](#)

[Edit](#)

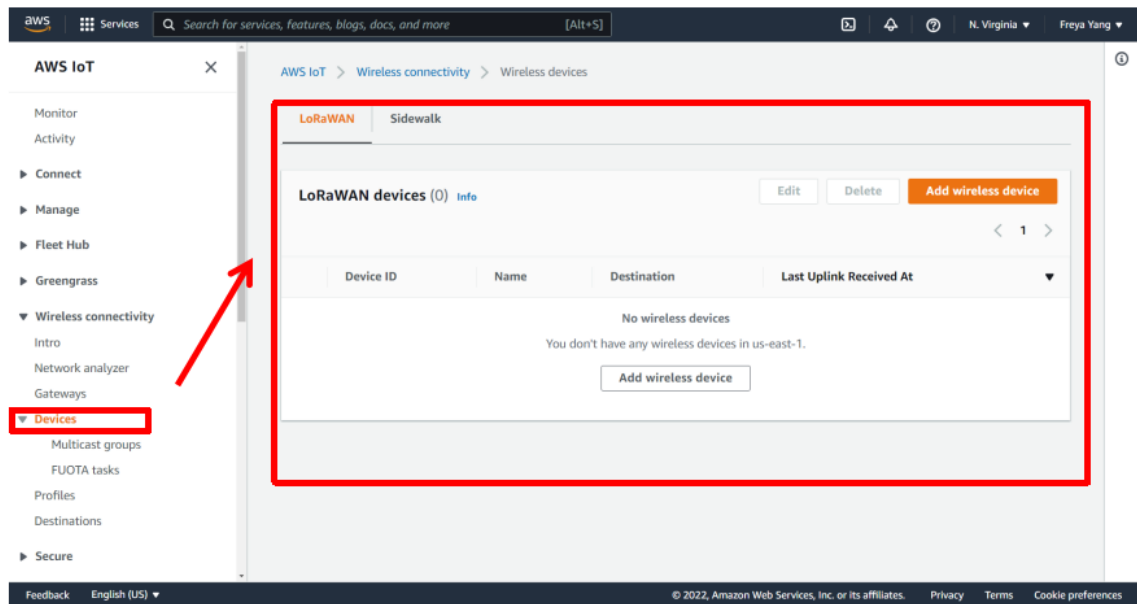
[Delete](#)

[Add destination](#)

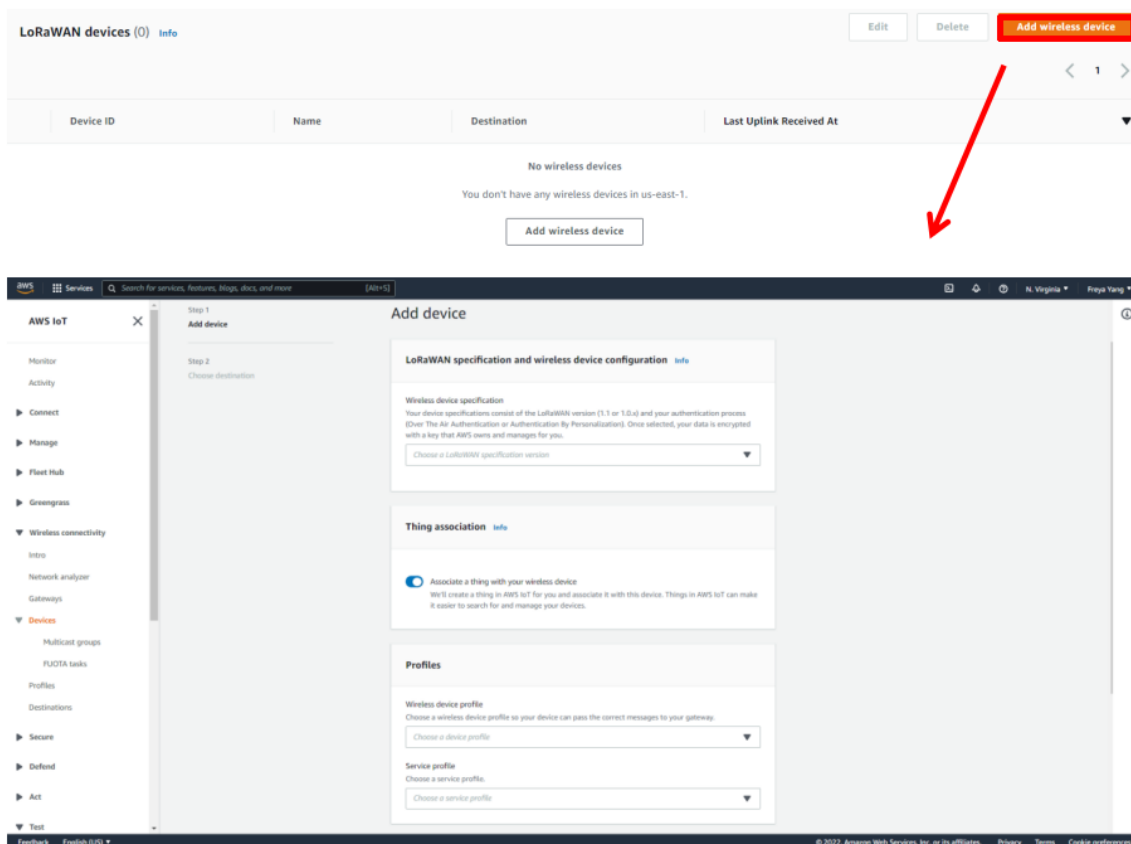
Destination name	Expression	ExpressionType
☐ test-des	test-topic	MqttTopic

5. Create wireless device

5.1 Open the AWS IoT Core Management console and change to the "Devices" view



5.2 Click on "Add wireless device," and the following overview shall appear



5.3 Provide device data

5.3.1 Select the wireless device specification version

Most Lansitec devices select DevEUI、AppKey、AppEUI as identified keys and use OTAA mode to join a network. Therefore, you need to select OTAA V1.0.X as the wireless device specification.

Wireless device specification

Your device specifications consist of the LoRaWAN version (1.1 or 1.0.x) and your authentication process (Over The Air Authentication or Authentication By Personalization). Once selected, your data is encrypted with a key that AWS owns and manages for you.

OTAA v1.0.x

5.3.2 Input the root keys

DevEUI, AppEUI, and AppKey are stored in Lansitec devices.

DevEUI

70b3d5a4d311004d

The 16-digit hexadecimal DevEUI value found on your wireless device.

Confirm DevEUI

70b3d5a4d311004d

Reenter the DevEUI.

AppKey

772d0172c07332e60e4931b850581e97

The 32-digit hexadecimal AppKey value that your wireless device vendor provided.

Confirm AppKey

772d0172c07332e60e4931b850581e97

Reenter the AppKey.

AppEUI

2C26C50211000003

The 16-digit hexadecimal AppEUI that your wireless device vendor provided.

Confirm AppEUI

2C26C50211000003

Reenter the AppEUI.

5.3.3 Add a device name

Wireless device name - *optional*

test-dev

A descriptive name to make the wireless device easier to locate.

5.3.4 Select device and service profile

Select the wireless profile and device profile you created in the previous steps.

Profiles

Wireless device profile

Choose a wireless device profile so your device can pass the correct messages to your gateway.

test-dev-pro

Service profile

Choose a service profile.

test-sev-pro

5.3.5 Click on "Next" and choose a destination

Select the destination you created in the previous steps.

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

You don't have any tags attached to this resource.

Add new tag

You can add up to 50 tags.

Cancel

Next

Choose destination

Destination name

Destinations route LoRaWAN messages from your wireless device to other AWS services.

test-des

5.4 Click on "Add device" and review the added device

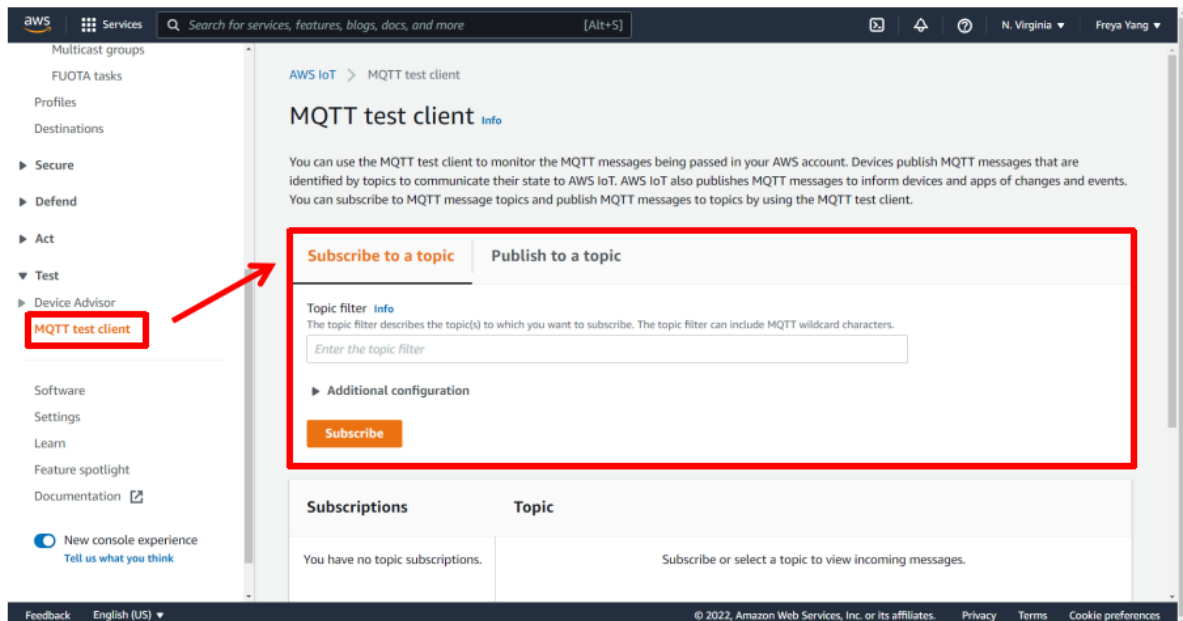
Ensure that the "Last Uplink Received At" field is populated as illustrated below.

The screenshot shows the AWS IoT console interface. On the left is a navigation menu with options like Monitor, Activity, Connect, Manage, Fleet Hub, Greengrass, and Wireless connectivity. The main panel is titled 'AWS IoT > Wireless connectivity > Wireless devices'. It has tabs for 'LoRaWAN' and 'Sidewalk'. Under 'LoRaWAN devices (1)', there is a table with one device. The table has columns for Device ID, Name, Destination, and Last Uplink Received At. The device's Name is 'test-dev' and its Destination is 'test-des'. The 'Last Uplink Received At' field is populated with the timestamp 'February 17, 2022, 16:49:21 (UTC+0800)'. Above the table are buttons for 'Edit', 'Delete', and 'Add wireless device'.

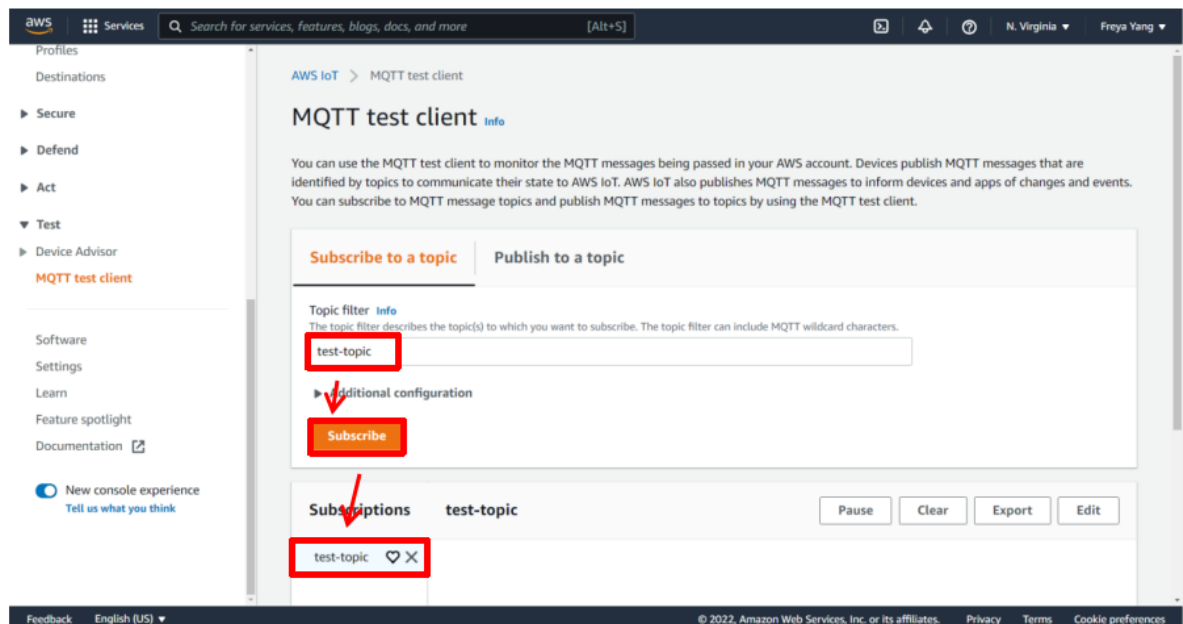
Device ID	Name	Destination	Last Uplink Received At
63ba2588-e011-404e-b4f4-96c27943bc78	test-dev	test-des	February 17, 2022, 16:49:21 (UTC+0800)

6. Verify data ingestion

6.1 Open the AWS IoT Core Management console and change to "MQTT test client" view



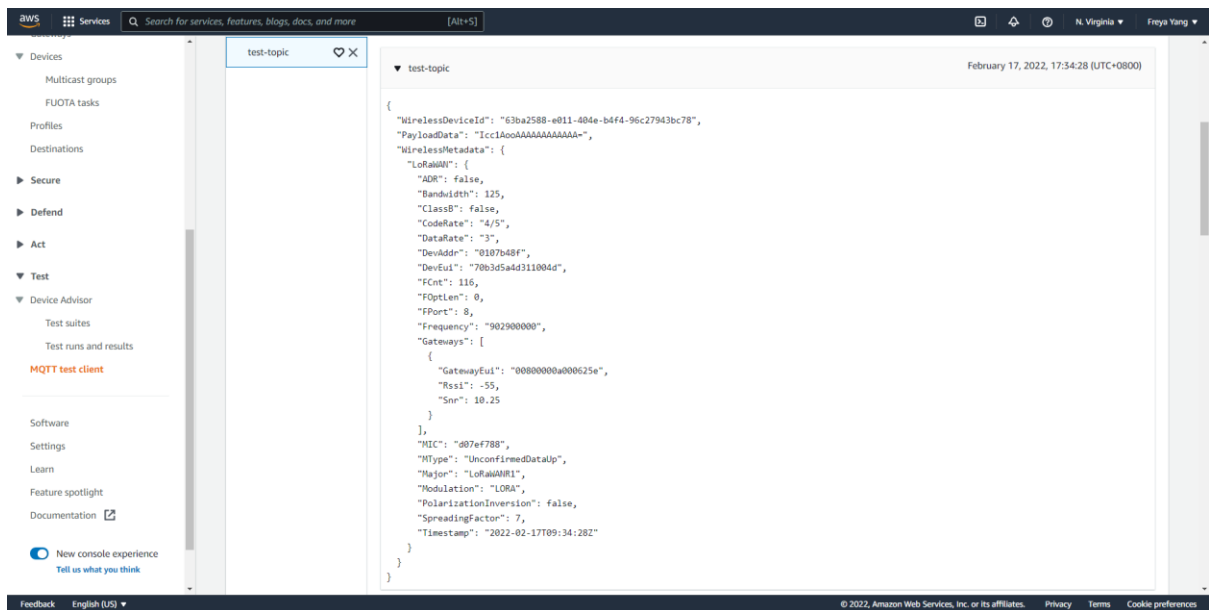
6.2 Subscribe to a topic you created in the previous steps



6.3 View incoming messages

The window will display messages sent from your device. Whatever the device is, the uplink message consists of some sections:

- **WirelessDeviceId:** The deviceId generated by AWS
- **PayloadData:** Base64-encoded payload from the device
- **WirelessMetadata:** Information on per gateway and used by the device



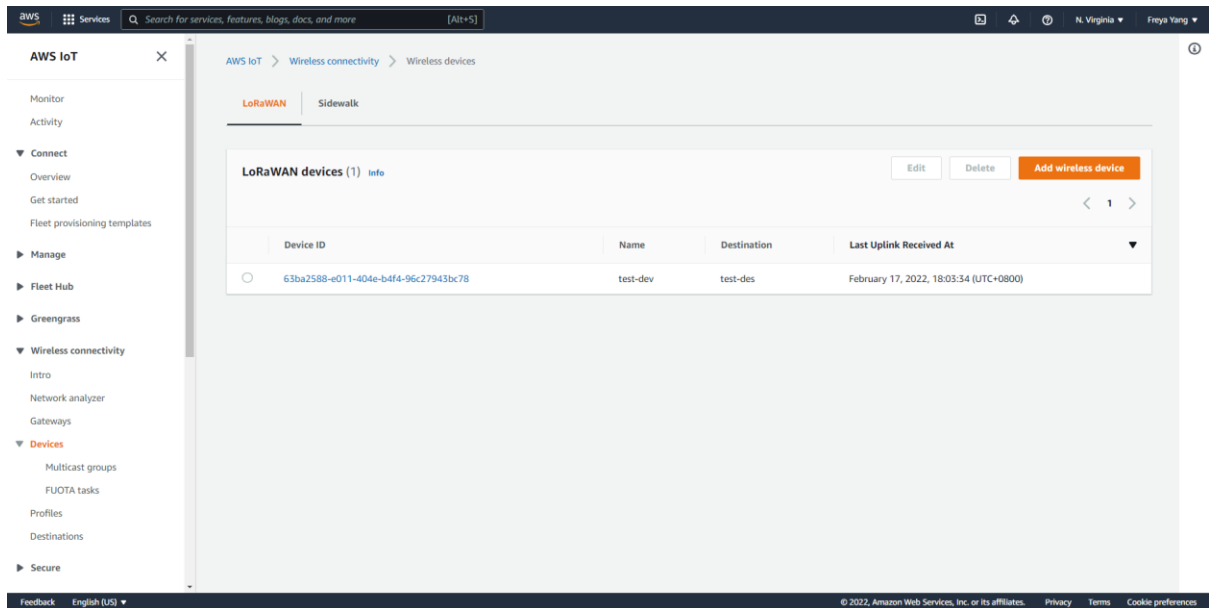
6.4 Decode Base64 data into hexadecimal representation

As you see, the message(e.g. lcc1AooAAAAAAAAAAAAA=)from the LoRaWAN device is binary-encoded and needs to be decoded before it can be further processed.

Refer to the Lansitec device datasheet for further information when you decode successfully.

7. Verify data downlink

7.1 Open the AWS IoT Core Management console and change to the "Devices" view



AWS IoT > Wireless connectivity > Wireless devices

LoRaWAN | Sidewalk

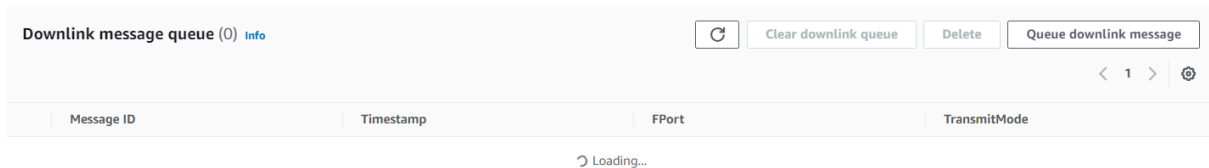
LoRaWAN devices (1) [Info](#) [Edit](#) [Delete](#) [Add wireless device](#)

< 1 >

Device ID	Name	Destination	Last Uplink Received At
63ba2588-e011-404e-b4f4-96c27943bc78	test-dev	test-des	February 17, 2022, 18:03:34 (UTC+0800)

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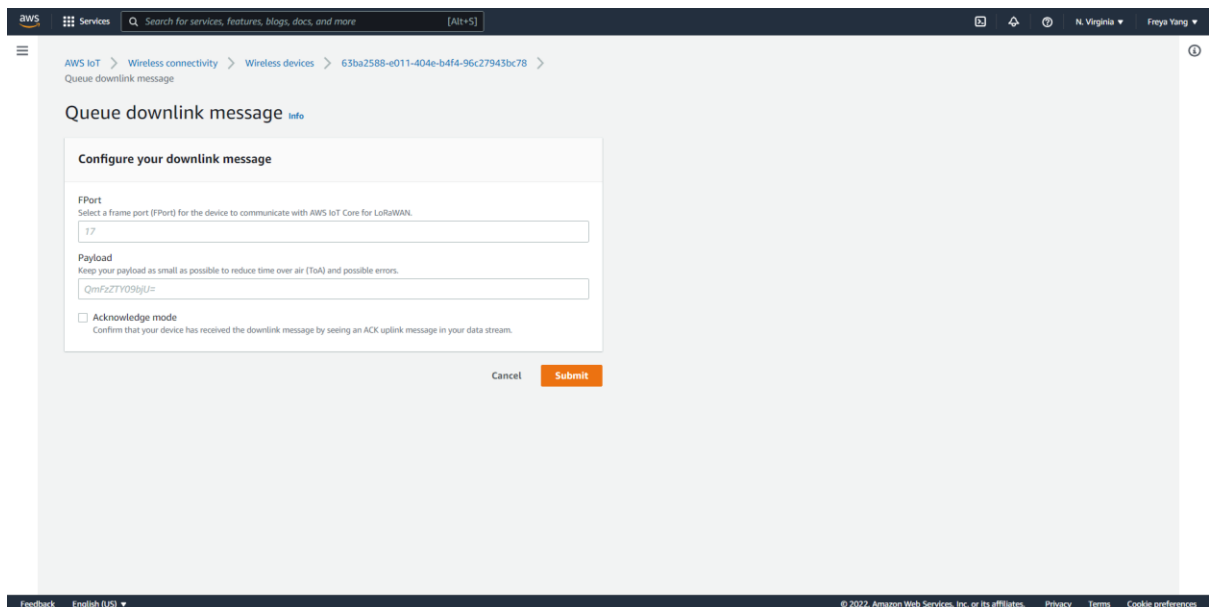
7.2 Select the device and click on "Queue downlink message"



Downlink message queue (0) [Info](#) [Refresh](#) [Clear downlink queue](#) [Delete](#) [Queue downlink message](#)

< 1 > [Settings](#)

Message ID	Timestamp	FPort	TransmitMode
Loading...			



AWS IoT > Wireless connectivity > Wireless devices > 63ba2588-e011-404e-b4f4-96c27943bc78 > Queue downlink message

Queue downlink message [Info](#)

Configure your downlink message

FPort
Select a frame port (FPort) for the device to communicate with AWS IoT Core for LoRaWAN.
17

Payload
Keep your payload as small as possible to reduce time over air (ToA) and possible errors.
QmFzZTY09hjU=

☐ Acknowledge mode
Confirm that your device has received the downlink message by seeing an ACK uplink message in your data stream.

[Cancel](#) [Submit](#)

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7.3 Configure your downlink message

7.3.1 Select a frame FPort to communicate

FPort

Select a frame port (FPort) for the device to communicate with AWS IoT Core for LoRaWAN.

2

7.3.2 Select acknowledged mode for confirming message received

☒ Acknowledge mode

Confirm that your device has received the downlink message by seeing an ACK uplink message in your data stream.

7.3.3 Enter in Base-64 payload referred to your product datasheet

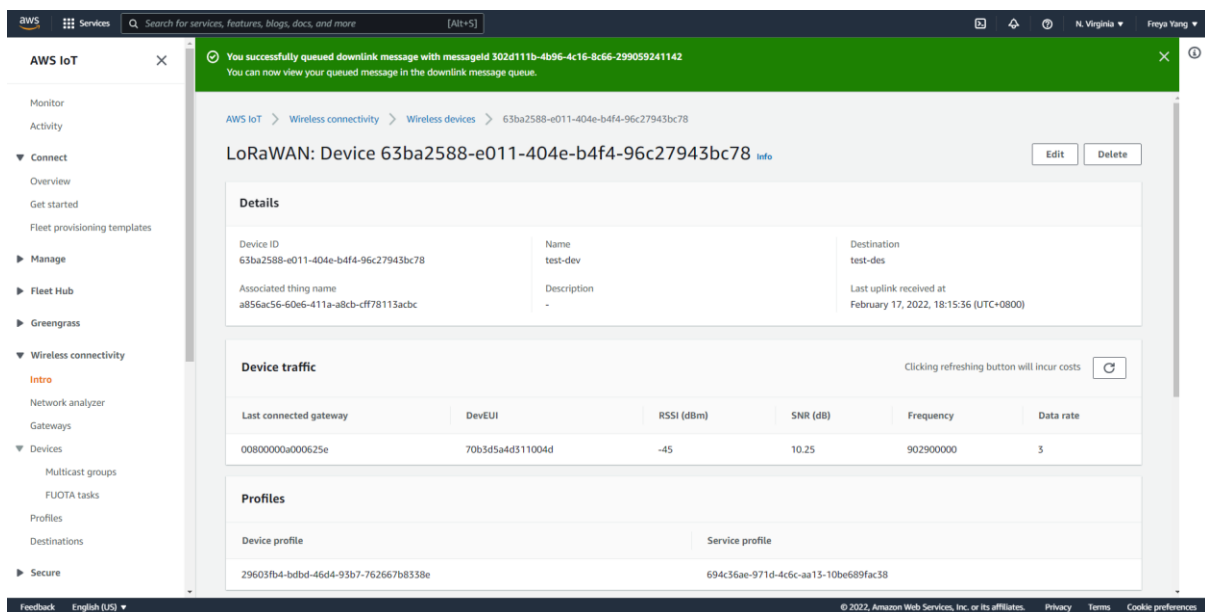
Payload

Keep your payload as small as possible to reduce time over air (ToA) and possible errors.

ogA=

7.4 Verify message downlink

You will receive the following popup if your downlink message is successful. Meanwhile, the device will execute the command, which also can help you verify.



AWS IoT

You successfully queued downlink message with messageId 302d111b-4b96-4c16-8c66-299059241142. You can now view your queued message in the downlink message queue.

AWS IoT > Wireless connectivity > Wireless devices > 63ba2588-e011-404e-b4f4-96c27943bc78

LoRaWAN: Device 63ba2588-e011-404e-b4f4-96c27943bc78 [Info](#) [Edit](#) [Delete](#)

Details

Device ID 63ba2588-e011-404e-b4f4-96c27943bc78	Name test-dev	Destination test-des
Associated thing name a856ac56-60e6-411a-a8cb-ef78113acbc	Description -	Last uplink received at February 17, 2022, 18:15:36 (UTC+0800)

Device traffic Clicking refreshing button will incur costs [Refresh](#)

Last connected gateway	DevEUI	RSSI (dBm)	SNR (dB)	Frequency	Data rate
00800000a000625e	70b3d5a4d311004d	-45	10.25	902900000	3

Profiles

Device profile	Service profile
29603fb4-bdbd-46d4-93b7-762667b8338e	694c36ae-971d-4c6c-aa13-10be689fac38

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