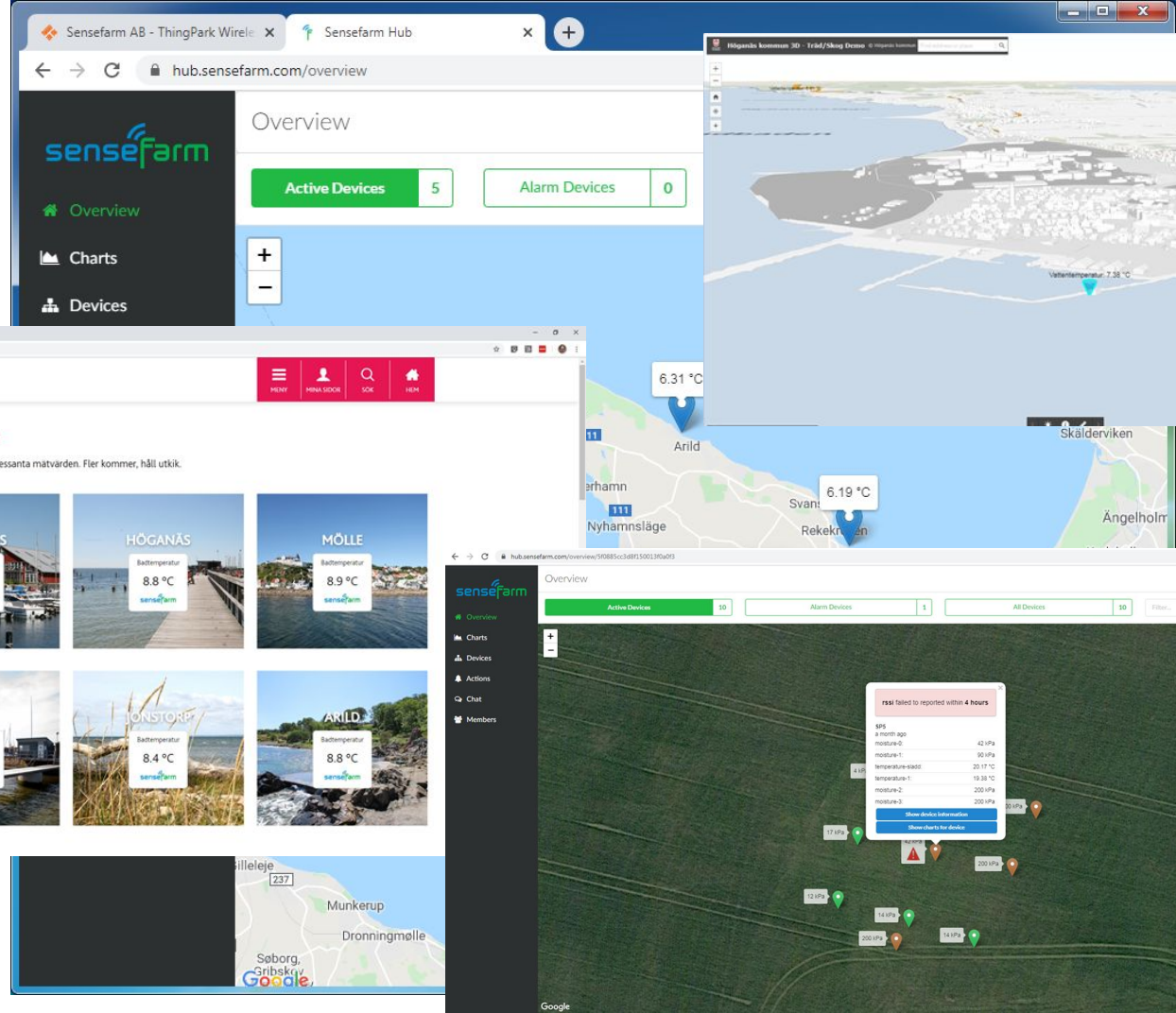


LoRaWAN server configuration examples

© Sensefarm November 2020

Example usage of the CUBE02 sensor serie with different LoRaWAN servers and operators



Content

- Finding the encryption keys
 - <https://hub.sensefarm.com>
- Actility
 - <https://stadshubb.thingpark.com/portal/web/>
- Talkpool
 - <https://apps.talkpool.com/>
- Netmore
 - <https://portal.blink.services/home>
- Chirpstack
 - <https://www.chirpstack.io/>

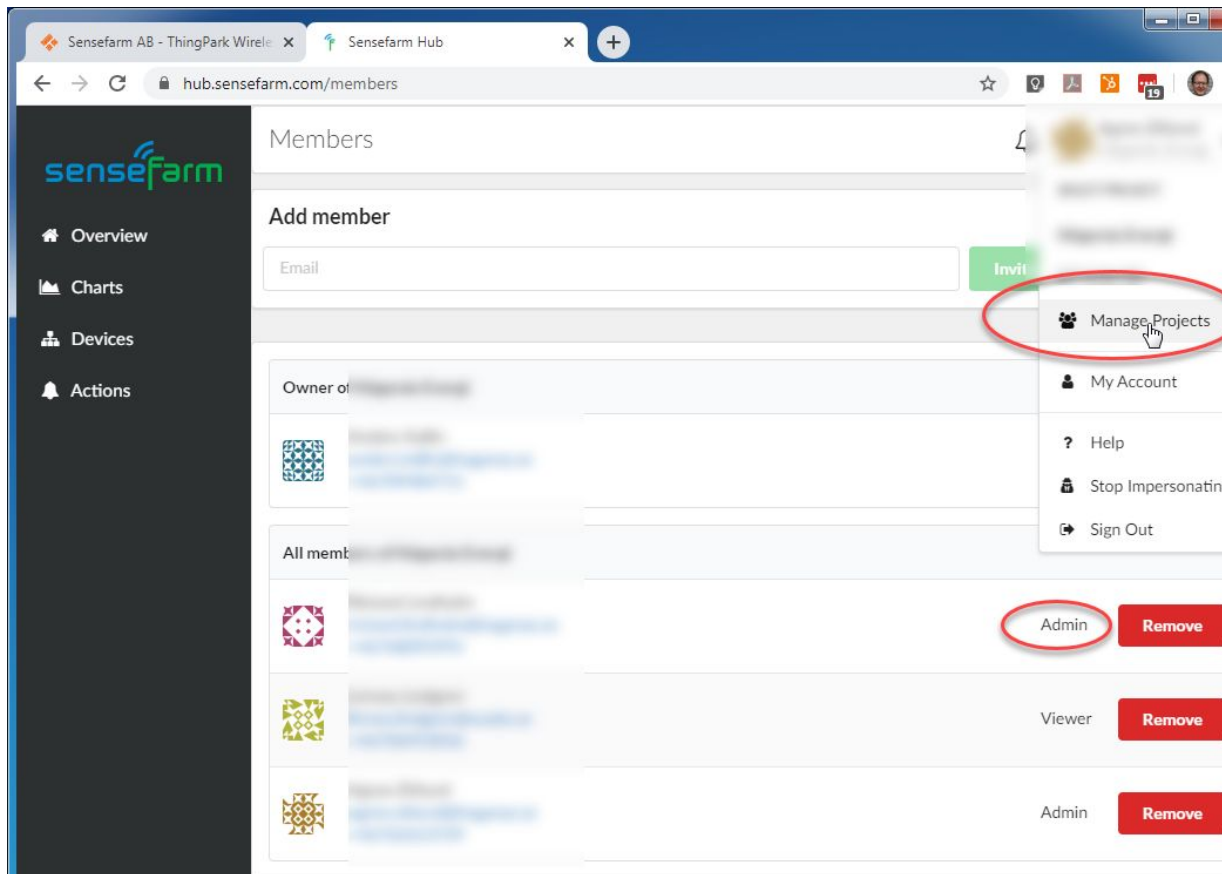
Finding device encryption keys - 1 of 2

Keys are printed on the lid of the device



They are easier to copy from
Hub.sensefarm.com

Project roles needed
for access to keys:
Owner, Admin



Finding device encryption keys - 2 of 2

Hub.sensefarm.com

Find device

Press Edit

Settings needed for ABP

devEUI

devAddr

appSKey

nwkSKey

The screenshot shows the Sensefarm web interface. On the left is a dark sidebar with navigation links: Overview, Charts, **Devices** (highlighted with a red circle), Actions, Chat, and Members. The main content area is titled 'Halmstadgården Norr centrum 205'. It contains an 'Admin area' section with a 'Project (Owner)' field. Below this is the 'Device information' section, which lists various details about the device. A red circle highlights the 'Hide Advanced Info' button. Below this button, the 'Keys' section is visible, showing the following information:

| Join Type | Class | devAddr | nwkSKey | appSKey |
|-----------|-------|----------|---------------|----------|
| ABP | A | 01000205 | 42E3F01B1C73D | 224C1246 |

At the bottom of the keys section, there is a link for 'Uplink Payload (Raw Data)'.

Cube02 sensors are locked down to use ABP and SF12 due to their outdoor field usage.

OTAA and ADR requires good bi-directional radio coverage which can not be guaranteed all year around due to plants, sudden rain and quick underground sensor placement.

Actility configuration

<https://stadshubb.thingpark.com/portal/web/>

Adding a device

Manufacturer - Generic
Model - very important to
get correct, many similar
variants:

LoRaWAN 1.0.2 rev B
Class A
Rx2_SF12
eu868

The screenshot displays the 'stadshubb.thingpark.com/deviceManager/' web interface. On the left, a sidebar menu has 'Devices' circled in red. The main area shows a 'New device' modal form. Several fields in this form are circled in red to indicate important configuration steps:

- Administrative data:**
 - Device name: Test - 70B3D55460000EFB
 - Marker: (Location pin icon)
 - Administrative info: (Empty text field)
 - Administrative location: 55° 43' 1" N 13° 13' 30" E
 - Motion indicator: Random
- Device identification:**
 - Manufacturer: Generic
 - Model: LoRaWAN 1.0.2 revB - class A - Rx2_SF12 eu868
 - Device activation: Activation By Personalization (ABP)
 - DevEUI: 70B3D55460000EFB
 - DevAddr: 01000EFB
 - NwkSKey: E32 5E0A5F4
- Network parameters:**
 - Connectivity plan: ORESUNDSKRAFT Connectivity Supplier / ORESUNDSKRAFT Bas (999)
- Application layer handling:**
 - Application server routing profile: sensefarm-cube02
 - AppSKeys: D7D! 04E8

At the bottom right of the page, the version 'v10.18.3-8337ec824' and copyright '©2019 Activity' are visible.

Security

The device frame counter used by the crypto inside the device is reset to Zero upon reset of CUBE01 and CUBE02 (Should be done when battery is changed)

Thus options such as “Disable frame-counter validation” should be set on all LoRa-WAN servers for easy operation.

Actility has a button called “Reset security context” for this.

The screenshot shows a web browser window with the URL `stadshubb.thingpark.com/deviceManager/`. The page is titled "Sensefarm AB [Subscriber]" and "Anders Hed" is logged in. The left sidebar shows a tree view of the device configuration, with "Settings" highlighted under the "CUBE02-70B3D554600000C8" device. The main content area is titled "Node settings" and contains two sections: "Alarm Settings" and "Troubleshooting". The "Alarm Settings" section has a heading "No uplink activity alarm settings." and two rows of settings for "Activate threshold1" and "Activate threshold2". The "Troubleshooting" section has a heading "Security context" and a button labeled "Reset security context". Both the "Settings" item in the sidebar and the "Reset security context" button are circled in red.

Sensefarm AB - ThingPark Wireless x Sensefarm Hub x +

← → ↻ stadshubb.thingpark.com/deviceManager/

Sensefarm AB [Subscriber] Anders Hed

ThingPark Wireless

Devices

- CUBE02-70B3D554600000C8
 - Network
 - Settings
 - Alarms (5)
 - History
 - Multicast groups
 - Connectivity plans
 - AS routing profiles
 - sensefarm-cube01-tw
 - Application servers
 - sensefarm-cube02
 - sensefarm-cube01-tw
 - test
 - Settings

Node settings

Alarm Settings

No uplink activity alarm settings.

☐ Activate threshold1 Trigger: After 2 days of inactivity Action: Raise Alarm Level to Warni

☐ Activate threshold2 Trigger: After 7 days of inactivity Action: Raise Alarm Level to Major

Troubleshooting

Security context

Reset security context

v10.18.3-8337ec824 ©2019

Set up connection to hub.sensefarm.com - 1 of 2

The screenshot shows the 'stadshubb.thingpark.com/deviceManager/' web interface for Sensefarm AB. The left sidebar contains a tree view with 'Application servers' highlighted. The main area displays a table of existing application servers and a 'New application server' dialog box.

Application servers table:

| Name | ID | Status | Type |
|---------------------|------------------------|--------|-----------------------------------|
| sensefarm-cube01-tw | TWA_100039957.39645.AS | Active | HTTP Application Server (LoRaWAN) |
| sensefarm-cube02 | TWA_100039957.39642.AS | Active | HTTP Application Server (LoRaWAN) |

New application server dialog:

The dialog box has a 'Name' field and a 'Type' dropdown menu. The 'Type' dropdown is open, showing the following options:

- HTTP Application Server (LoRaWAN)
- HTTP Application Server (LoRaWAN)
- HTTP Application Server (Cellular)
- Kafka Cluster

Red circles highlight the '+ Create' button in the 'Add application servers' section and the 'HTTP Application Server (LoRaWAN)' option in the 'Type' dropdown.

Set up connection to hub.sensefarm.com - 2 of 2

Currently implemented
API's -

<https://activity.sensefarm.com/CUBE02>

<https://activity.sensefarm.com/CUBE01-TW>

Use the correct one for the devices you have.
CUBE version is printed on device label and
available on hub.sensefarm.com device page
under "Factory defaults".

The "Tunnel interface authentication key" is
Available for customers upon request, but
turned off by default.

The screenshot shows the 'Application server' configuration page for a device named 'sensefarm-cube02'. The interface includes a sidebar with a tree view of device settings, a main configuration area, and a 'Destinations' dialog box.

Application server configuration:

- Name: sensefarm-cube02
- ID: TWA_100039957.39642.AS
- Content Type: JSON
- Type: HTTP Application Server (LoRaWAN)
- Status: Active

Uplink/downlink security configuration:

- Status: Active
- AS ID: hub-cube02
- Max timestamp deviation: 60 seconds

Destinations configuration:

- Destination: <https://activity.sensefarm.com/CUBE02>

Uplink/downlink security configuration dialog (bottom left):

- AS ID: hub-cube02
- Tunnel interface authentication key: BE-C4-99-C6-9E-9C-93-9E-41-3B-66-39-61-63-6C-61
- Max timestamp deviation (seconds): 60

Feeding sensor data to multiple applications from Actility

Only needed if sensor packets should be sent to more services than hub.sensefarm.com (requestinspector.com is a nice debugging tool as an example)

Add an extra application server.

Add the application to the routing profile used.

The top screenshot shows the 'Application server' configuration page. The left sidebar lists the navigation menu with 'Application servers' highlighted. The main panel shows the configuration for 'Request Inspector' with the following details:

- Name: Request Inspector
- ID: TWA_100039957.45432.AS
- Content Type: JSON
- Type: HTTP Application Server (LoRaWAN)
- Status: Active

The 'Uplink/downlink security' section shows 'Status: Inactive' and 'Max timestamp deviation: -'. The 'Route' section shows 'Source ports: *' and 'Routing strategy: Blast'. The 'Destinations' section shows a single destination: 'https://requestinspector.com/p/01e62007pkde0ttmgea5a1jmf'.

The bottom screenshot shows the 'AS routing profile' configuration page. The left sidebar lists the navigation menu with 'AS routing profiles' highlighted. The main panel shows the configuration for 'sensefarm-cube01-tw' with the following details:

- Name: sensefarm-cube01-tw
- ID: TWA_100039957.34218
- Type: LoRaWAN
- Is default: ☐

The 'Destinations' table lists the following destinations:

| Type | Destination |
|--------------------------|---------------------|
| Local application server | sensefarm-cube01-tw |
| Local application server | Request-inspector |

Talkpool configuration with hub.sensefarm.com

<https://apps.talkpool.com/>

Talkpool

apps.talkpool.com

Https URL:

<https://talkpool.sensefarm.com>

Include radio parameters = Yes

The screenshot displays the Talkpool web application interface. The browser's address bar shows the URL `apps.talkpool.com/#/application/70-B3-D5-54-60-00-00-00/customer_servers`. The application's left sidebar contains navigation links for Home, Applications, and Network Activity. The main content area is titled 'SensefarmTest (70-B3-D5-54-60-00-00-00)' and features a 'Customer Servers' tab. Below this, the 'Edit Customer Server' form is visible, containing the following fields and controls:

- Customer Server Name:** A text input field with the value 'SensefarmHub'.
- Include Radio Parameters:** A toggle switch set to 'Yes'.
- Protocol Type:** A dropdown menu with 'HTTP(S)' selected.
- HTTP(S) URL:** A text input field with the value 'https://talkpool.sensefarm.com'.
- Buttons:** 'Update' and 'Cancel' buttons at the bottom right of the form.

Below the form, the 'Customer Servers' section displays a table of existing servers. The table has columns for Name, Include Radio Parameters, Protocol Type, Configuration Data, and Actions. One entry is shown:

| Name | Include Radio Parameters | Protocol Type | Configuration Data | Actions |
|--------------|--------------------------|---------------|-------------------------------------|-----------------|
| SensefarmHub | Yes | HTTP | URL: https://talkpool.sensefarm.com | [Edit] [Delete] |

At the bottom of the table, it indicates 'Showing 1 to 1 out of 1 entries' and provides pagination controls: First, Previous, 1, Next, Last.

Talkpool - Adding a device.

“:” “-” must be inserted into EUI and Address fields

The screenshot displays the Talkpool web interface. The top navigation bar includes a user profile for Anders Hedberg. The left sidebar shows the 'admin area' with options for 'Owner', 'Device information', and 'Network Activity'. The main content area is titled 'SensefarmTest (70-B3-D5-54-60-00-00-00) / Personalised Devices'. It features a form to 'Add New Personalised Device' with the following fields:

- Device EUI:** 8 pairs of hexadecimal numbers separated by hyphen(-). The value entered is 70-B3-D5-54-60-00-01-C1.
- Network Address:** 4 pairs of hexadecimal numbers separated by colon(:). The value entered is 0100:01C1.
- Application Session Key:** Hexadecimal String of size 32. The value entered is C5487683D17389DF731111.
- Network Session Key:** Hexadecimal String of size 32. The value entered is E0FD04CC14779F0D7B5FAD.

Buttons for 'Add Device' and 'Cancel' are at the bottom of the form. Below the form, a section titled 'Personalised Devices Configured to the Application' shows a table with columns for Device EUI, Network Address, Application Session Key, Network Session Key, and Actions.


At the bottom left, a JSON response is shown with several fields circled in red, corresponding to the values entered in the form:

```
{
  "uniqueId": "333747073636373734004800",
  "devEUI": "70B3D554600001C1",
  "appEUI": "70B3D554600001C1",
  "appKey": "2A749B3488D5997101CE",
  "devAddr": "010001C1",
  "appSKey": "C5487683D17389DF731111",
  "nwksKey": "E0FD04CC14779F0D7B5FAD",
  "generated": "2020-05-13T08:05:30.142Z",
  "abp": true,
  "evp": true
}
```

Talkpool

Devices must be tagged “CUBE02” for hub.sensefarm.com to accept them.

← → ↻ apps.talkpool.com/#/device/70-B3-D5-54-60-00-01-83/settings



- Home
- Applications
- Network Activity

Home / Devices / 70-B3-D5-54-60-00-01-83 / Settings

CUBE02 (70-B3-D5-54-60-00-01-83)

Info Traffic Downlink Settings

Identification Info Build Info

Device Build Info

Vendor

Alphanumeric String (Max 50 Characters). Allowed Special Characters (-)

Enter Vendor

Model

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

CUBE02

Firmware

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Firmware

Serial Number

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Serial Number

Lora Version

Alphanumeric String (Max 50 Characters). Allowed Special Characters (- @ . : _)

Enter Lora Version

Netmore configuration with hub.sensefarm.com

<https://portal.blink.services/home>

We really recommend the batch creation

Do one sensor manually, check that it works. ***Some hidden values can only be set by Netmore support!***

Then do the batch creation:

Create Sensor, Select batch, Fetch the template, Open it in excel, Fill it with values, re-import

netmore LoRaWAN

Anders

Welcome to netmore LoRaWAN

Create Sensor

+

≡+

FETCH TEMPLATE

IMPORT FILE

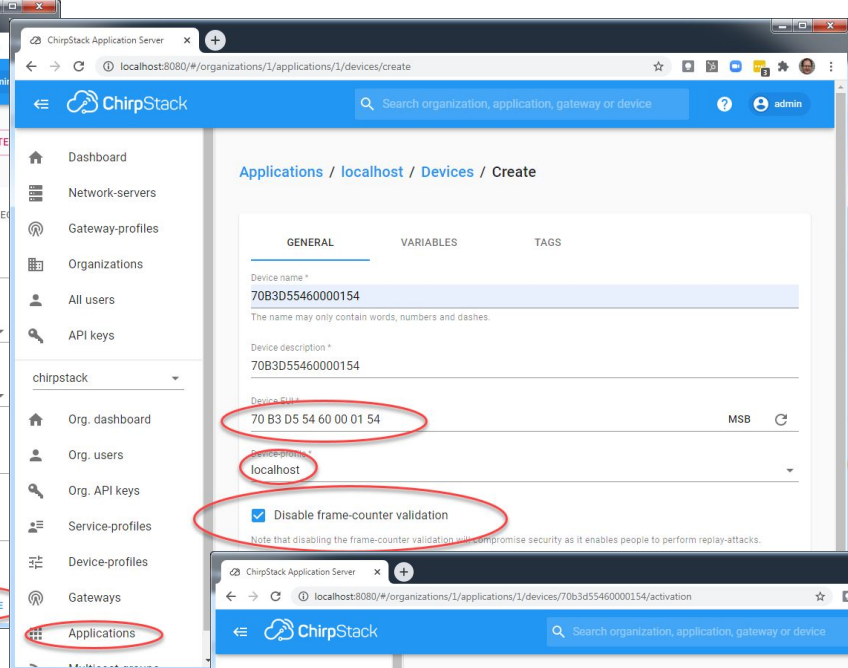
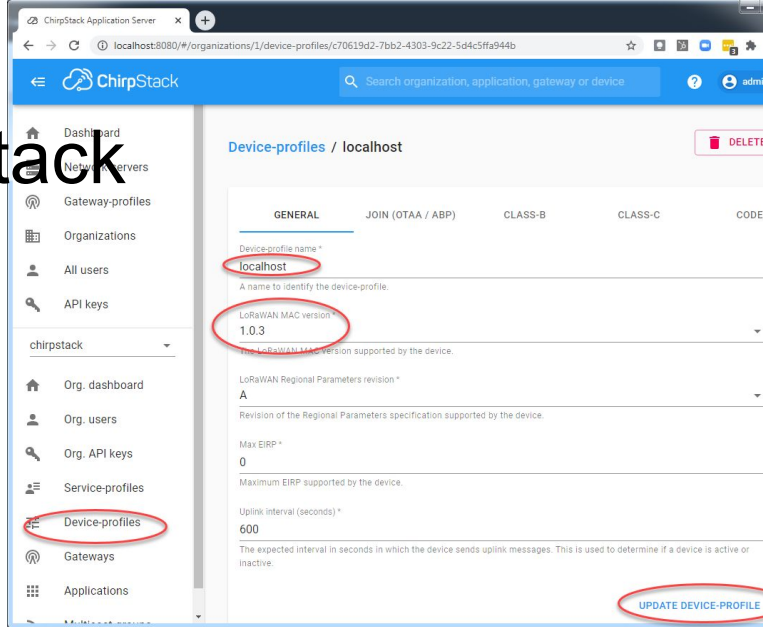
or Import Template

| | Serial Number | Activation Method | Class | Sensor Type | Active | Service Provider | Customer | Value Export | Billing Cycle |
|----------|------------------|-------------------------------------|---------|-------------|--------|------------------|----------|------------------|-----------------|
| 6000013D | 70B3D5546000013D | ABP - Activation by Personalization | Class A | Other | Yes | | | Default ActiveMQ | Up to 24 months |
| 60000144 | 70B3D55460000144 | ABP - Activation by Personalization | Class A | Other | Yes | | | Default ActiveMQ | Up to 24 months |

Chirpstack

<https://www.chirpstack.io/>

Chirpstack



Create a device profile

1.0.3 protocol (or less)

Application

Mark “Disable frame-counter-validation” !

Activation-tab will show for ABP keys entering

