LoRaWAN Configuration

V2.0 07/25

inBiot

Table of Contents

First steps

Read before starting

1. To complete this configuration, you will need to install the inBiot Setup app on your mobile device.

Download on the App Store

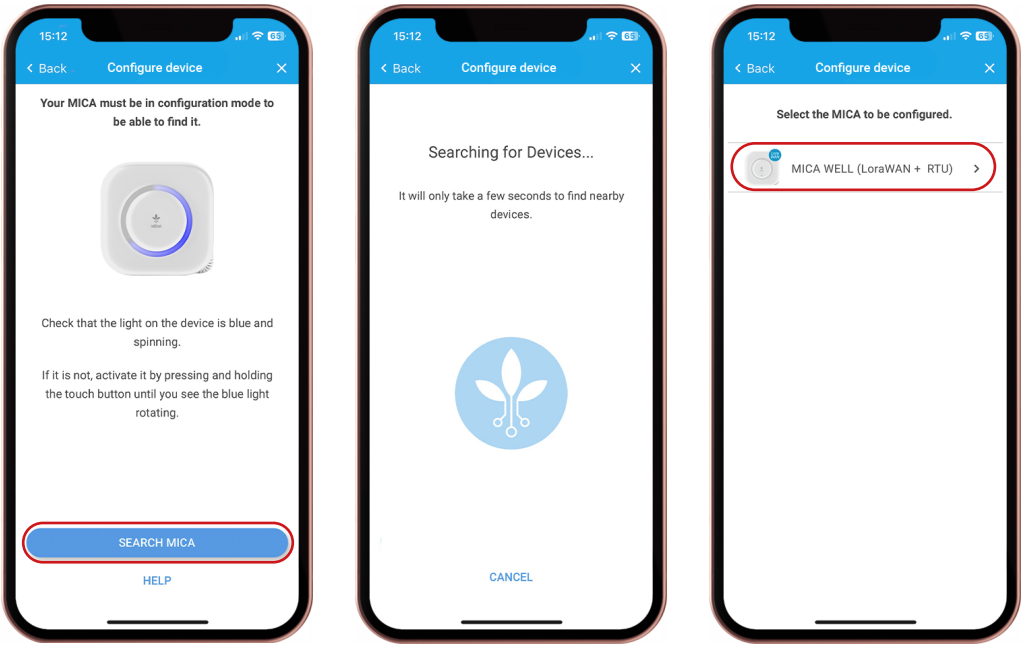
GET IT ON Google Play

2. You will also need access to the LoRaWAN server, preferably using a different device (computer/laptop/tablet).

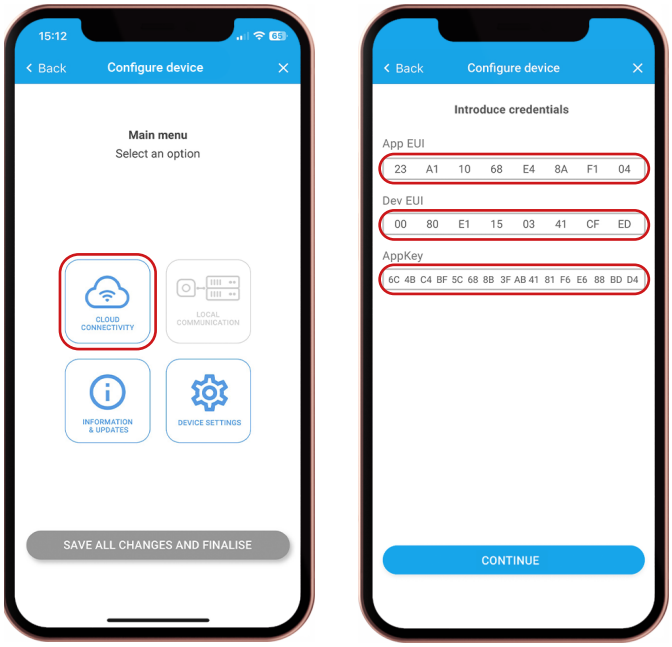
3. Before beginning the configuration, ensure that the device is in access point mode: This happens automatically the first time the MICA is powered on. If not, press the touch button located on the MICA logo until the light turns blue and begins to rotate.

Configuration

1. Open the inBiot Setup application on your mobile device. Follow the on-screen instructions to complete the initial configuration of the device.



2. In the main menu, select the “Cloud Connectivity” option and locate the “Device EUI” field. Carefully note down this unique and immutable value, as it is crucial for the device’s configuration on the LoRaWAN server. On the same screen, you will find the “App EUI” and “AppKey” fields with default values. You can modify these values if you wish, as long as they match the ones configured on your LoRaWAN server. Do not press “Continue” until you have completed step number 3.



Default values

App EUI

23 A1 10 68 E4 8A F1 04

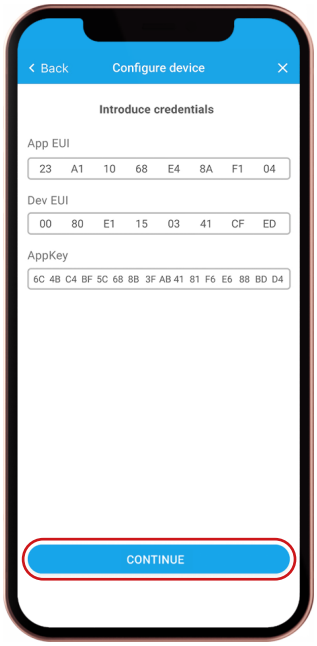
AppKey

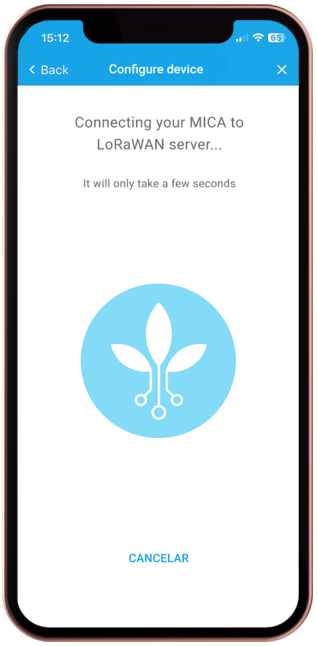
6C 4B C4 BF 5C 68 8B 3F AB 41 81 F6 E6 88 BD D4

3. Access your LoRaWAN server and start the process of registering a new end device. In the “DevEUI” field, enter the values you obtained in step 2 of the guide. In the “AppEUI” and “AppKey” fields, enter the values you configured or found as default in the configuration application (make sure they match the device exactly).

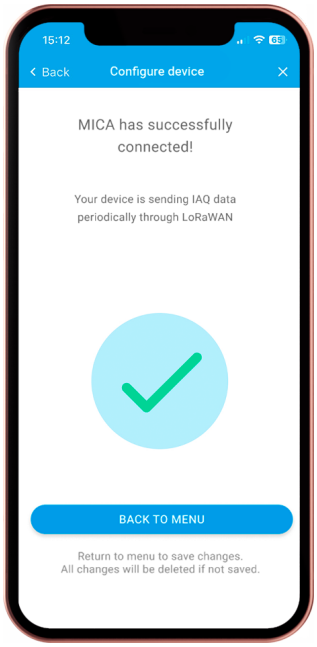
4. Save the device configuration on your LoRaWAN server.

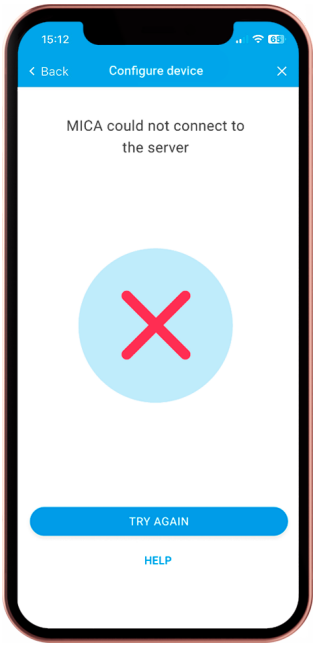
5. Once the device is registered, continue with the LoRaWAN configuration and verify the device’s proper connection to the server.



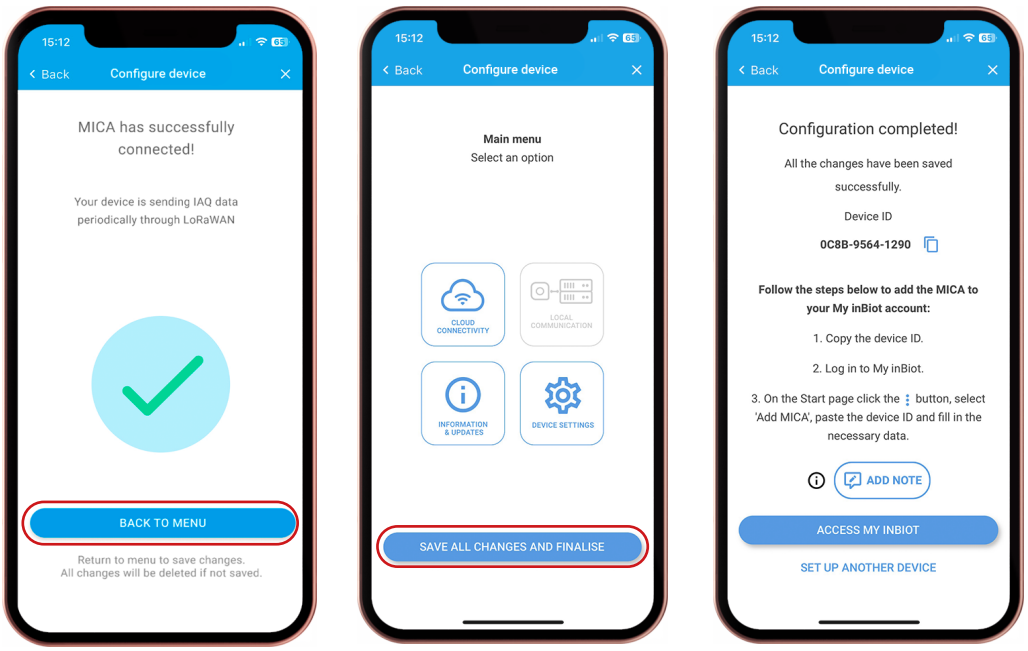


6. If MICA has sufficient coverage and the credential configuration has been done correctly, you will see a green flashing light indicating a successful connection to the server. If not, the flashing will be red, and you will need to check the configured credentials or the network coverage range.





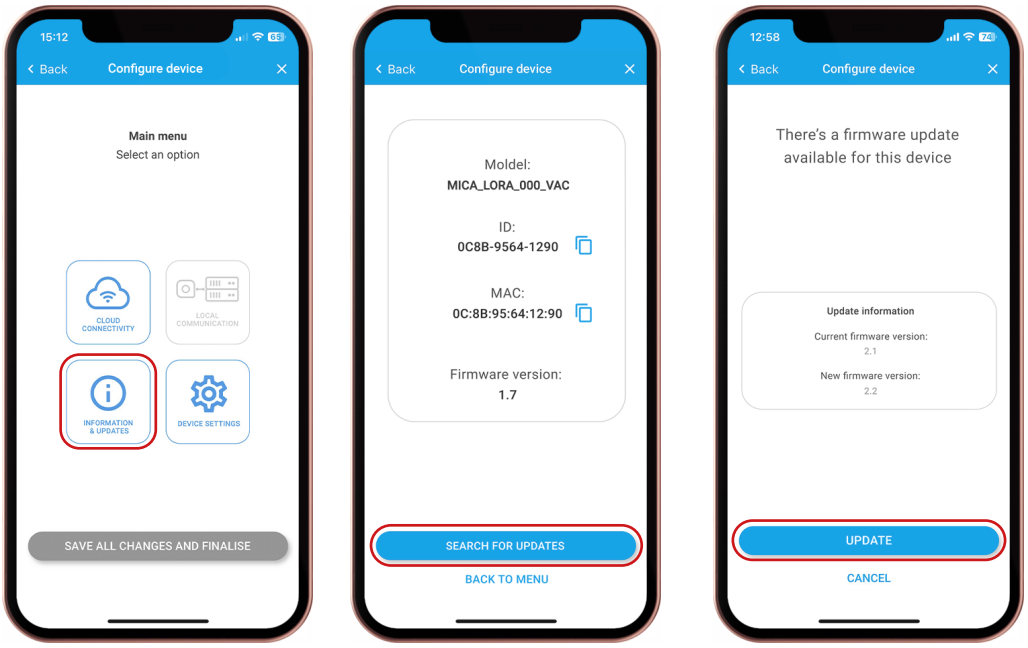
7. After validating the proper connection of the device to the server, return to the main menu and save the changes made to finalize and exit the access point. At this point, your MICA device should be correctly configured and connected to your LoRaWAN server.



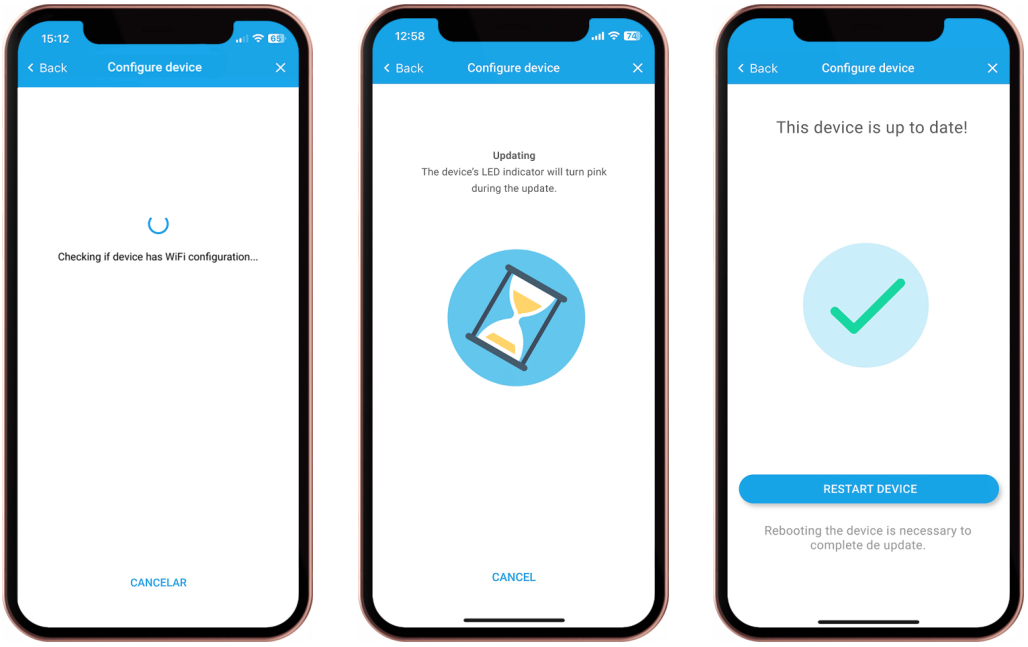
Software update

Update steps

1. In the main menu of the inBiot Setup app, select the “Information & Updates” option, then click on “Check for Updates,” and then select “Update”.



2. The device will check the internet connection. If it is not connected, you should follow the steps to configure a Wi-Fi network. Otherwise, the device will update automatically.



Downlink

This section outlines the configurable parameters that can be transmitted to the MICA device via LoRaWAN downlink messages. Parameters can be sent individually or combined into a single message, either using a supported JSON encoder or directly in raw byte array format.

1. JSON-Based Configuration (via Encoder)

A custom encoder is available to convert JSON-formatted commands into the appropriate byte payload. This encoder is compatible with Chirpstack v3/v4, The Things Network (TTN), and Milesight LoRaWAN gateways.

Supported parameters

`ledStatus` - Enable/Disable device LED

Type: `boolean`

Values:

- `true`: Enable LED
- `false`: Disable LED

Example: `{"ledStatus": true}`

`timeToSend` - Uplink transmission interval (in minutes)

Type: `uint8`

Values: 0 to 60

- `0`: Default interval (15 minutes)
- `1 - 60`: Custom interval in minutes

Example: `{"timeToSend": 30}`

`ventilation` - CO_2 auto-calibration cycle

Type: `uint8`

Options:

- `1`: Every 48 hours - Manual ventilation
- `2`: Every 24 hours (default) - Mechanical ventilation
- `3`: Every 7 days - Low ventilation
- `4`: Every 15 days - No ventilation
- `5`: Disabled

Example: `{"ventilation": 3}`

`ledConfiguration` - LED indicator mode

Type: `uint8 (0-15)`

Modes:

- `0`: Ventilation Efficiency (default)
- `1`: Thermohygrometric Comfort
- `2`: Temperature
- `3`: Humidity
- `4`: CO_2
- `5`: TVOC
- `6`: PM2.5
- `7`: PM10
- `8`: Virus Spread Risk
- `9`: Indoor Air Quality (IAQ)
- `10`: PM1.0
- `11`: PM4.0
- `12`: Formaldehyde (CH_2O)
- `13`: Ozone (O_3)
- `14`: Nitrogen Dioxide (NO_2)
- `15`: Carbon Monoxide (CO)
- `16`: Mold Persistence

Example: `{"ledConfiguration": 9}`

`touchEnable` - Enable/Disable capacitive touch button

Type: `boolean`

Values:

- `true`: Enable touch button
- `false`: Disable touch button

Example: `{"touchEnable": true}`

`ADREnable` - Enable/Disable Adaptative data rate

Type: `boolean`

Values:

- `true`: Enable ADR (default)
- `false`: Disable ADR

Example: `{"ADREnable": true}`

`DR` - Data Rate

Type: `uint8 (0-5)`

Modes:

- `0`: LoRa SF12 / 125 kHz, bit rate 250 bit/s
- `1`: LoRa SF11 / 125 kHz, bit rate 440 bit/s
- `2`: LoRa SF10 / 125 kHz, bit rate 980 bit/s
- `3`: LoRa SF9 / 125 kHz, bit rate 1760 bit/s
- `4`: LoRa SF8 / 125 kHz, bit rate 3125 bit/s
- `5`: LoRa SF7 / 125 kHz, bit rate 5470 bit/s

Example: `{"DR": 5}`

`sendRetransmissions` - Confirmed / Unconfirmed uplink retransmissions

Type: `uint8`

Valid range: `0 to 15`

- `5`: Default value

Example: `{"sendRetransmissions": 10}`

`confirmationEnable` - Enable/Disable uplink confirmation

Type: `boolean`

Values:

- `true`: Enable confirmation (default)
- `false`: Disable confirmation

Example: `{"confirmationEnable": true}`

`resetDevice` - Software reset the device

Type: `boolean`

Values:

- `true`: Reset device
- `false`: No reset needed

Example: `{"resetDevice": true}`

Full example

```
{
"ledStatus": true,
"timeToSend":30,
"ventilation":1,
"ledConfiguration":4,
"touchEnable":true,
"ADREnable":false,
"DR":2,
"sendRetransmissions":5,
"confirmationEnable":true,
"resetDevice": false
}
```

Note: Parameter order within the JSON object is irrelevant. The encoder will handle correct arrangement and packing.

2. Raw Byte Array Format

In platforms where JSON encoders are not supported, parameters may be sent directly as a byte array. Each parameter is structured using the format:

`[ <Command ID>, <Length>, <Value(s)> ]`

Multiple parameter blocks can be concatenated to create a composite payload.

Parameter Byte Structures

	Parameter	Command ID	Length	Values (Hex)
1	ledStatus	0x01	0x01	0x01: enable, 0x00: disable
2	timeToSend	0x02	0x01	0x0F: default (15min), or custom uint8 value
3	ventilation	0x03	0x01	0x00: 24h (default), 0x01: 48h, 0x03: 7d, etc
4	ledConfiguration	0x04	0x01	0x00 to 0x010 per available modes
5	touchEnable	0x05	0x01	0x01: enable, 0x00: disable
6	ADREnable	0x09	0x01	0x01: enable, 0x00: disable
7	DR	0x0A	0x01	0x00 to 0x05 per available options
8	sendRetransmissions	0x0B	0x01	0x00 to 0x0F per available values
9	confirmationEnable	0x0D	0x01	0x01: enable, 0x00: disable
10	resetDevice	0x0F	0x01	0x01: reset, 0x00: no reset

Example

To configure the device with:

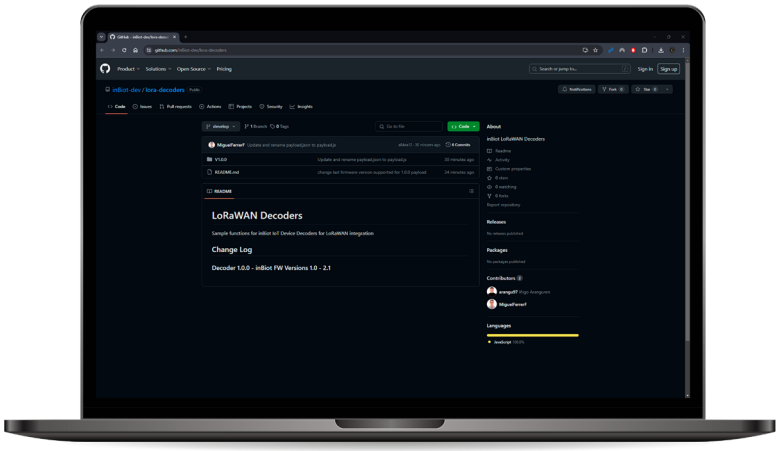
- LED enabled
- Uplink interval: 30 minutes
- CO_2 calibration every 7 days
- LED mode: IAQ indicator
- Touch button disabled
- ADR Disable
- DR 2 (SF 10)
- 9 Retransmissions
- Uplink confirmation enabled
- No reset device

Payload:

```
[0x01, 0x01, 0x01,  0x02, 0x01, 0x1E,  0x03, 0x01, 0x03,  0x04, 0x01,
0x09,  0x05, 0x01, 0x00, 0x10, 0x01, 0x00, 0x0A, 0x01, 0x02, 0x0B,
0x01, 0x09, 0x0D, 0x01, 0x01, 0x0E, 0x01, 0x00]
```

Payload Encoders/Decoders Repository

The decoding (Uplink) and encoding (Downlink) scripts used by this device are publicly available in the following repository:



LoRaWAN ENCODERS/DECODERS
ACCESS

These scripts enable proper interpretation of the data sent by the device (Uplink payloads) and the generation of valid commands to be sent from the network to the device (Downlink payloads), in compliance with the communication protocol format defined by the device's LoRaWAN specification.

Compatibility

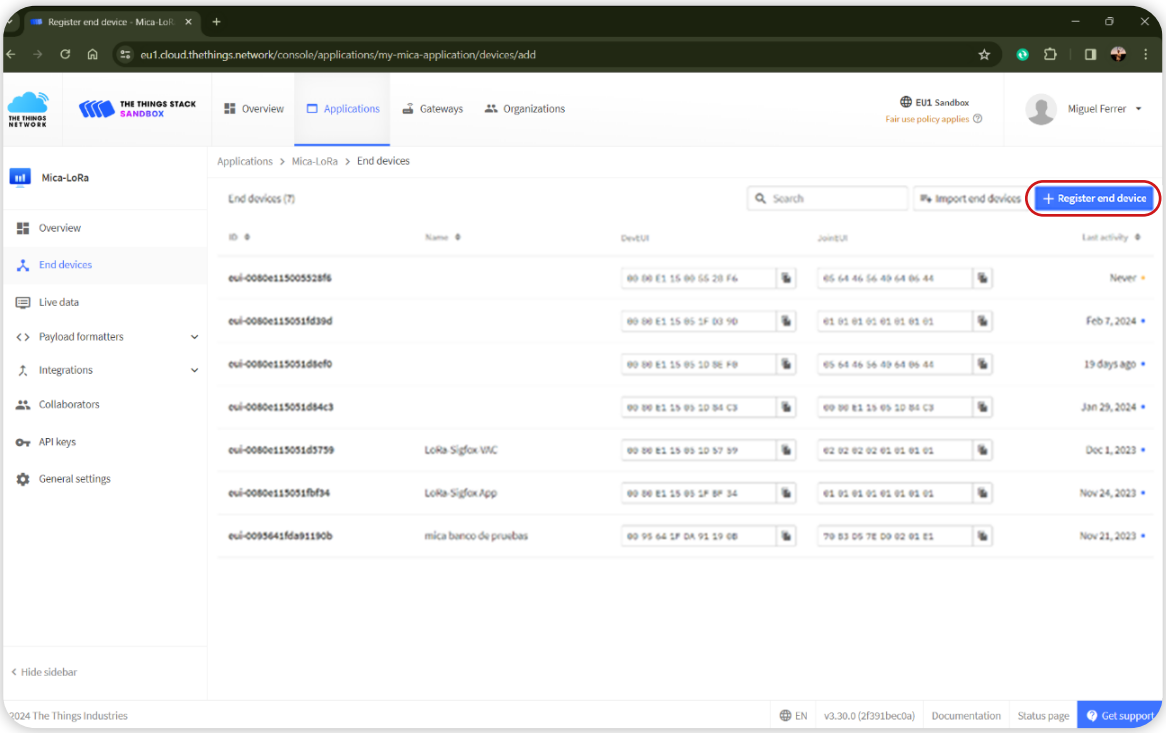
The scripts are ready for direct use on platforms such as:

- The Things Network
- Chirpstack v3 / Chirpstack v4
- Milesight DeviceHub V2

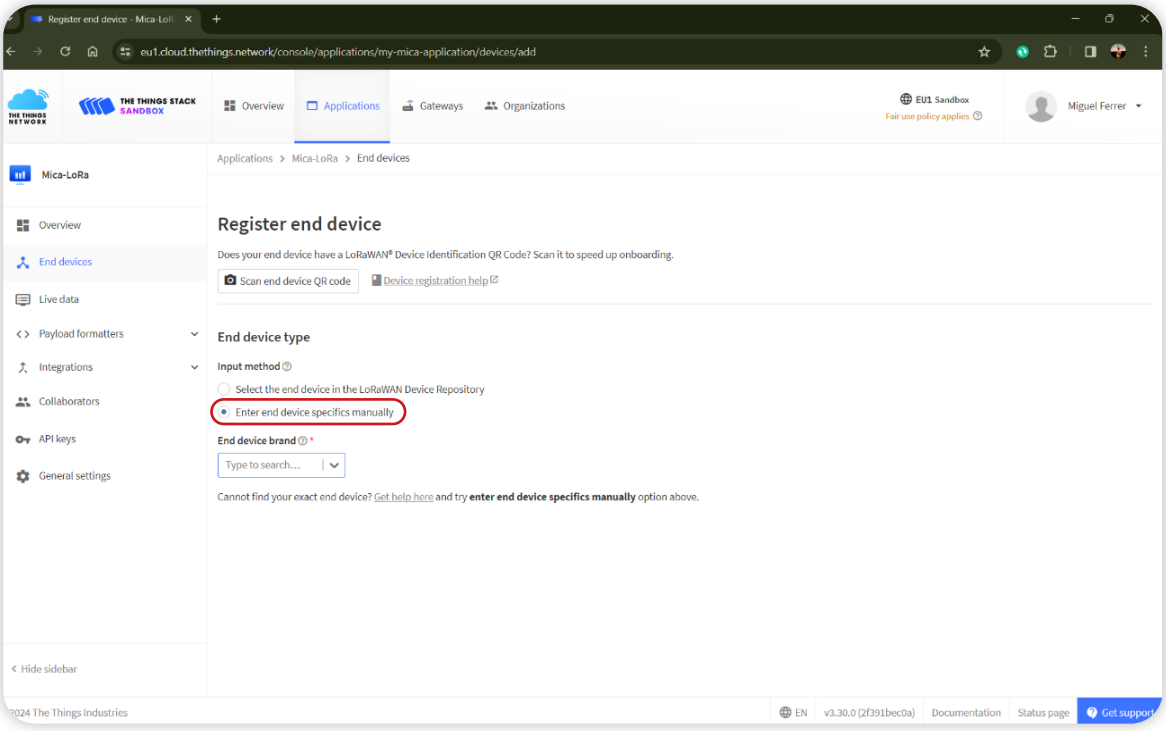
Annex I: TTN Server

Example of configuring the LoRaWAN server with TTN

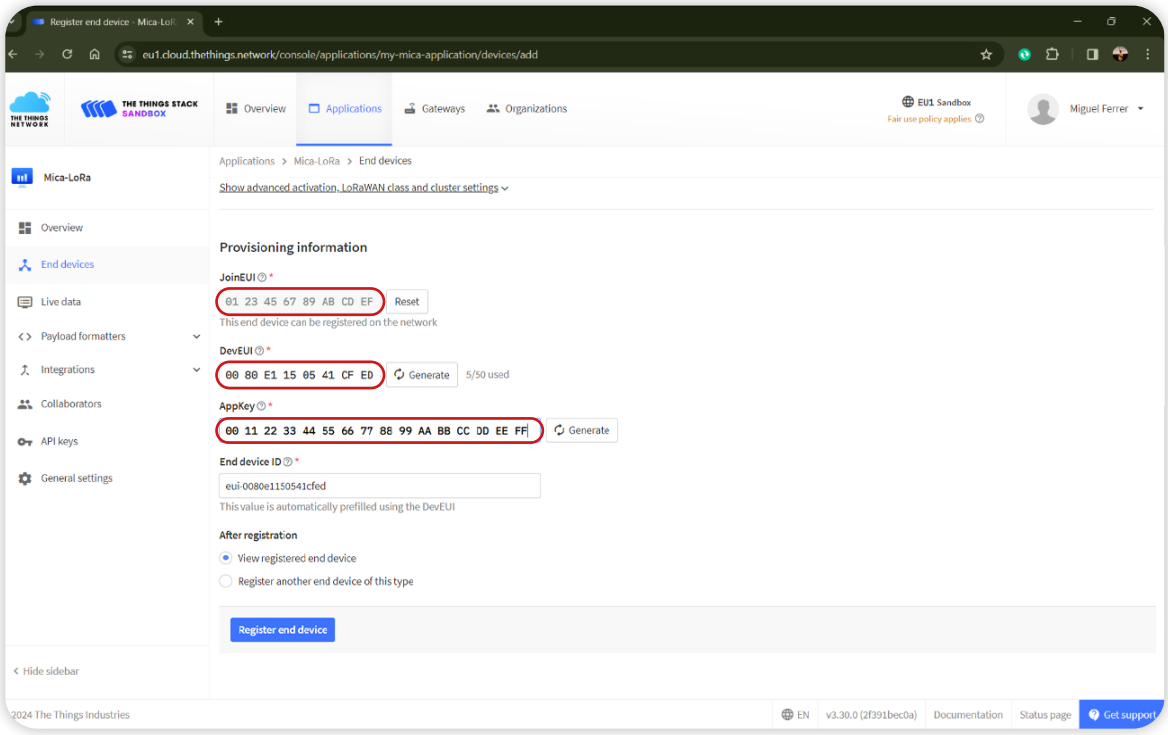
After checking the LoRaWAN credentials through the inBiot Setup configuration app, you can proceed to register the device on the TTN platform.



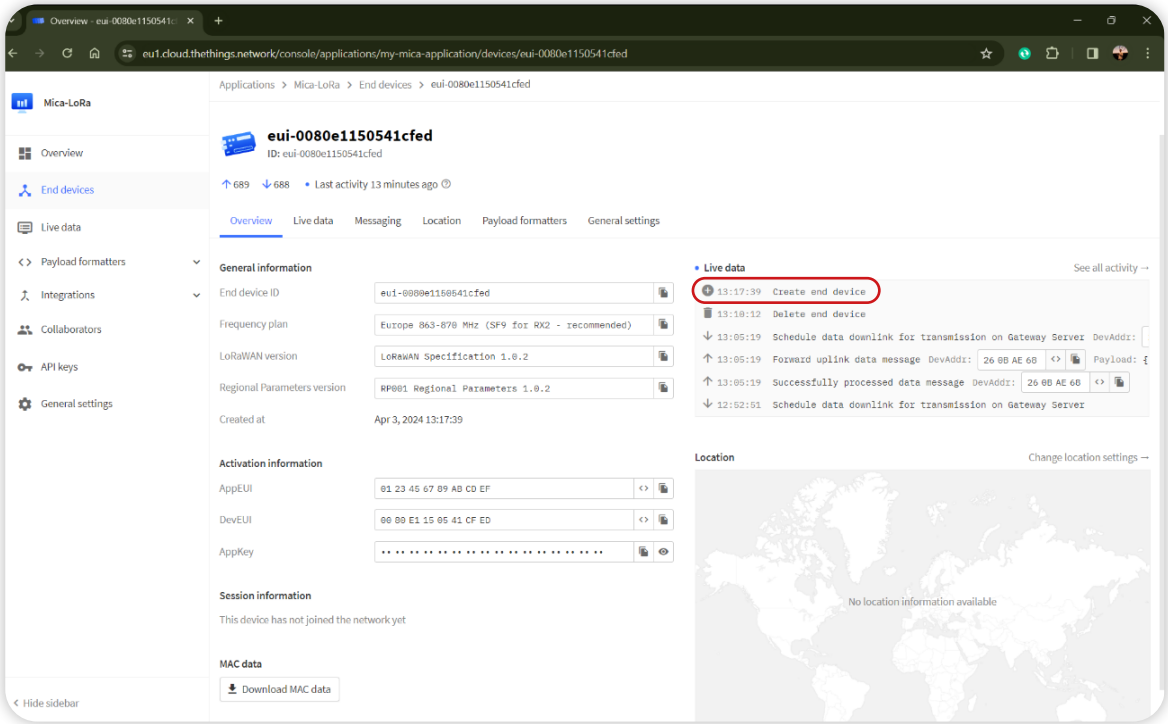
In this new tab, select “Enter end device specifics manually” to configure the credentials of your MICA.



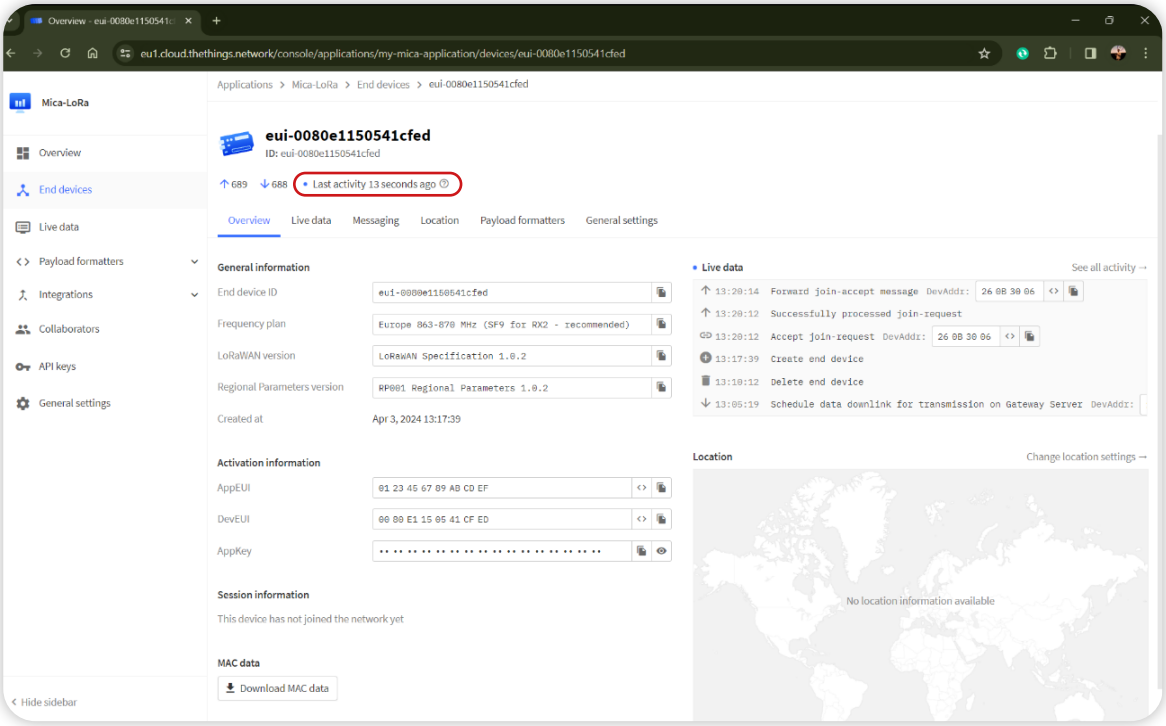
Enter the credentials for the device you are registering.

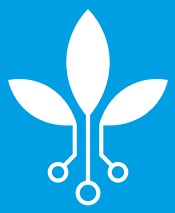


Once you have set up the credentials you want and created the device on the LoRaWAN server, you can complete the configuration of the MICA from the configuration app.



After validating the device's connection from the inBiot Setup application, you will be able to observe the device's activity, and it will begin to send information periodically.





www.inbiot.es
support@inbiot.es