



LoRaWAN Sensor Node

Multi-interface Platform for Connecting Sensors

UC11-N1
V1.3



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1. Preface

Thank you for choosing Ursalink UC11-N1. This user guide will present in detail all the functions and features of the product. The UC11-N1 is designed for both industrial and commercial applications and helps devices stay connected. The product should be used under the guidance of this user guide, referring to parameters and technical specifications. The UC11-N1 is a compact, high-performance device that offers LoRaWAN connectivity for remote access and easy management of machines and equipment over the LoRaWAN gateway.

We bear no liability for property loss or physically injury arising from abnormal or incorrect usage of this product.

2. Introduction

UC11-N1 is a smart wireless module featuring LoRaWAN protocol. Supporting the most widely used industrial communication network protocols. UC11-N1 covers industries like industrial automation, building automation and smart agricultural applications, to provide network capability in remote or factory floor environments. It can also connect 4-20mA/0-10V analog devices, the most commonly deployed devices in industrial environments.

This user guide is intended to provide detailed technical specifications and explanations to basic users as well as the technically-minded groups. It is a live document, and will be updated from time to time. Please ensure that you have the latest version, by checking our website at: <https://www.ursalink.com/en/documents-download/>

Note: Please contact Ursalink or the original battery manufacturer to replace the battery!

2.1 Features

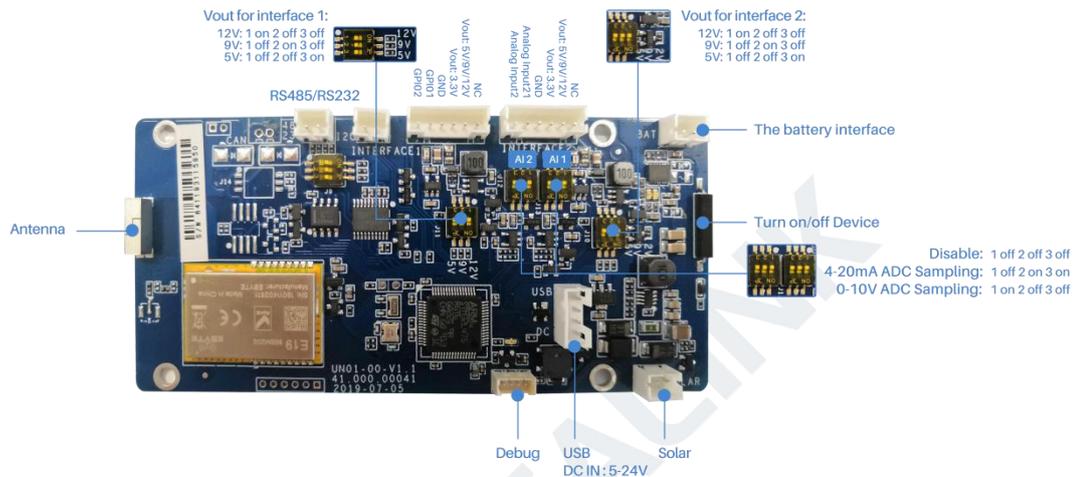
- Add or change a device probe in seconds
- Multiple interfaces including serial and I/Os
- Battery powered and DC powered with solar panel option
- Battery life: 5 years life under LoRaWAN Class A mode
- Support Frequency: EU433/CN470/EU868/RU864/IN865/US915/AU915/AS923/KR920
- Robust waterproof IP67 enclosure
- LoRa wireless module included, up to 11km communicate range

2.2 Specification

LoRaWAN	
Frequency	EU433/CN470/IN865/EU868/RU864/US915/AU915/KR920/AS923
Tx Power	20dBm
Sensitivity	-147dBm @300bps
Mode	OTAA/ABP
Interfaces	
Interface Type	M12 A-Coded Male
IO	
Ports	2 × GPIO
Logical Level	Low: 0~0.9V, High: 2.5~3.3V
Work Mode	Digital input, Digital output, Pulse Counter (only GPIO2 supported in N1-DC)
Serial Port	
Ports	1 × RS232 or RS485 (Switchable)
Baud Rate (bps)	1200, 2400, 4800, 9600, 57600, 115200
Protocol	Transparent (RS232), Modbus RTU (RS485)
Analog Input	
Ports	2 × Analog input
Resolution	12 bit
Input Range	4~20mA or 0~10V (Switchable)
Power Output	
Ports	2 × 3.3 V, 2 × 5/9/12 V (Switchable)
Configuration Interface	
Ports	1 × USB
Physical Characteristics	
Operating Temperature	-20°C to +70°C
Ingress Protection	IP67
Dimension	120.1 × 120.1 × 55.4 mm (4.73 × 4.73 × 2.18 in)
Power Input	1. 19000mAh replaceable Li-SOCL2 battery

	2. 5-24 VDC with 4900mAh battery backup
Power Connector (DC version)	M12 A-Coded 4-pin Male

2.3 Terminal Description



2.4 Turn on/off the Device

Put a magnet close to the reed switch to turn on or turn off the device.
 Buzzer rings for 2 seconds: power on.
 Buzzer rings for 6 seconds: power off.



3. Configuring via PC

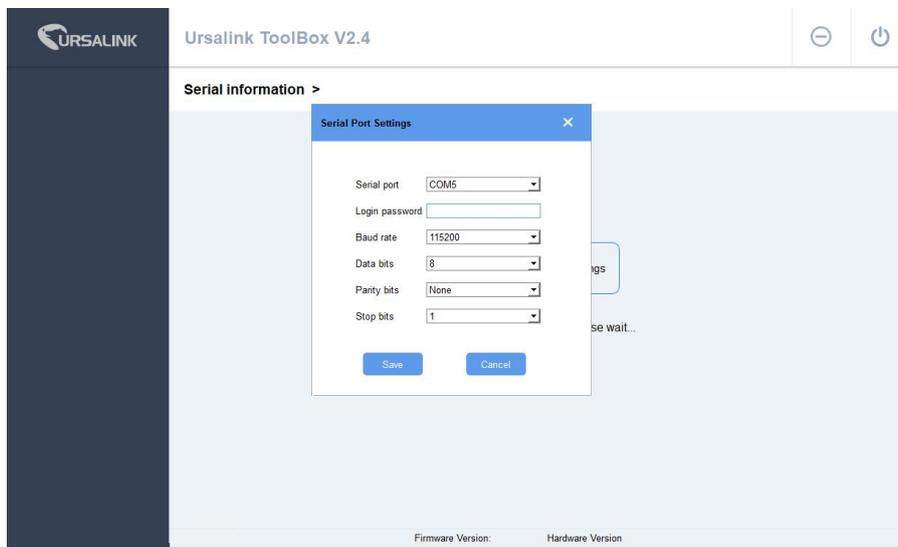
3.1 Configuring via ToolBox

Follow these steps:

Step 1: Connect the Ursalink UC11-N1 to PC via USB port.

Step 2: Power on the Ursalink UC11-N1.

Step 3: Run the Ursalink ToolBox.



Serial Port Settings		
Item	Description	Default
Serial Port	Select the serial port for data transmission.	Null
Login Password	Enter the correct password to login.	123456
Baud Rate	Select from "9600", "57600", "115200".	57600
Data Bit	Select from "5", "7", "8".	8
Parity Bit	Select from "Even", "Odd", "None".	None
Stop Bit	Select from "1", "2".	1

If the serial port parameter is correct, it will display: Serial port is connected.



3.2 Status

Click "Status" to see the basic status information of this device:



URSALINK Toolbox V5.19

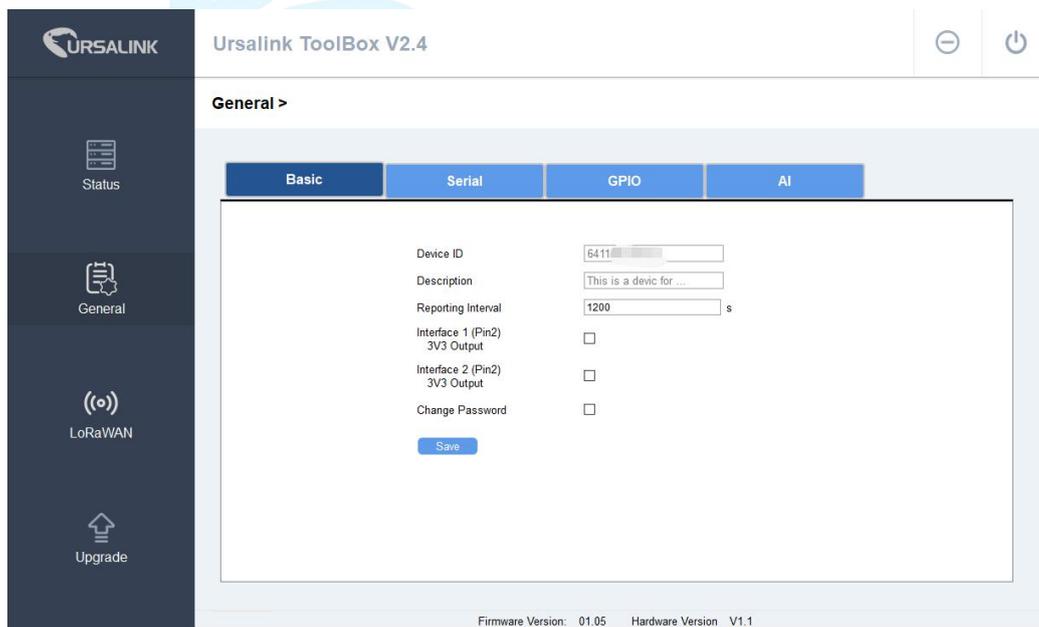
Status >

Model:	UC11-N1-EU868
Serial Number:	64119310
Firmware Version:	01.29
Hardware Version:	1.1
Join Status:	De-Activate
RSSI/SNR:	-108/-11
Battery:	100%
Channel Mask:	0007
Counter Value:	0
Uplink Frame-counter:	0
Downlink Frame-counter:	0

Firmware Version: 01.29 Hardware Version: 1.1

3.3 General

3.3.1 Basic



URSALINK Ursalink Toolbox V2.4

General >

Basic Serial GPIO AI

Device ID	6411
Description	This is a devic for ...
Reporting Interval	1200 s
Interface 1 (Pin2) 3V3 Output	<input type="checkbox"/>
Interface 2 (Pin2) 3V3 Output	<input type="checkbox"/>
Change Password	<input type="checkbox"/>

Save

Firmware Version: 01.05 Hardware Version: V1.1

Basic Settings		
Item	Description	Default
Device ID	Show the Serial Number of this device.	The identifier of this device.
Description	Enter the description of this device.	Null
Reporting Interval	The UC11-N1 reports the collected data at regular intervals. Range: 30-86400 (s)	1200
Interface 1 (Pin2) 3V3 Output	Enabled: UC11-N1 will provide power to device connected to Interface 1 (pin2). Voltage is 3.3V.	Disabled
Interface 2 (Pin2) 3V3 Output	Enabled: UC11-N1 will provide power to device connected to Interface 2 (pin2). Voltage is 3.3V	Disabled
Change Password	Enable: Change Toolbox login password.	Disabled

3.3.2 Serial-RS485 (Modbus Master)

On this page, you can enable the serial ports and set the parameters of RS485 (Modbus Master).



General >

Serial

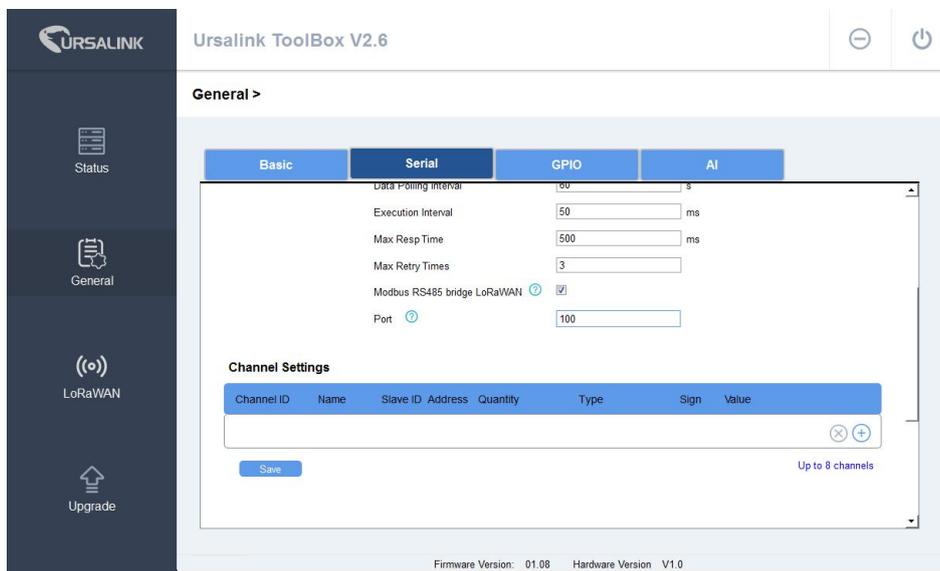
- Enable:
- Interface Type: RS485 (Modbus Master)
- Interface 1 (Pin1) 5/9/12V Output:
- Baud Rate: 9600
- Data Bit: 8 bits
- Stop Bit: 1 bits
- Parity: None
- Data Polling Interval: 600 s
- Execution Interval: 50 ms
- Max Resp Time: 500 ms
- Max Retry Times: 3
- Modbus RS485 bridge LoRaWAN:

Channel Settings

Firmware Version: 01.29 Hardware Version: 1.1

RS485 Settings		
Item	Description	Default
Enable	Enable/Disable serial interface	Enable
Interface Type	Set the interface type. Select from RS485 (Modbus Master) and RS232.	RS485 (Modbus Master)
Interface 1 (Pin 1) 5/9/12V Output	Enable: UC11-N1 will provide power to the device connected to Interface 1 (Pin 1). Voltage is 5V, 9V or 12V.	Disabled
Power Output Time Before Collect	If the time is set 100ms, then before collecting data from end nodes, UC11-N1 will provide power for the end node for 100ms. Range: 1-5000 (ms). Note: With this feature being enabled, the power consumption will increase.	None
Baud Rate	Select from "1200", "2400", "4800", "9600", "57600" and "115200".	9600
Data Bits	Select from "5", "7", "8".	8
Stop Bits	Select from "1", "2".	1
Parity Bits	Select from "Even", "Odd", "None".	None
Data Polling Interval	Set the interval for reading remote channels. When the reading cycle ends, the new reading cycle begins until this interval over. If it is set to 0, the device will restart the new reading cycle after all channels have been read. Range: 0-86400 (s).	0
Execution Interval (ms)	The execution interval between each command. Range: 10-1000.	50
Max Resp Time (ms)	Set the maximum response time that the UC11-N1 waits for the response to the command. If the device does not get a response after the maximum response time, it is determined that the command has timed out. Range: 10-1000.	500
Max Retry Times	Set the maximum retry times after it	3

	fails to read, range: 0-5.	
Modbus RS485 bridge LoRaWAN	Enable this mode to collect data from slave devices and then send them to Network Server via LoRaWAN. This mode also has the capability to change the behaviour of the ModBus device by writing into its registers.	Disable
Port	Enter the LoRaWAN frame port for transparent transmission between UC11-N1 and Network Server. Range: 2-84, 86-223.	Null



Channel Settings		
Item	Description	Default
Channel ID	Assign the channel for the slave device, 8 channels selectable.	Null
Name	Set the name to identify the remote channel. It cannot be blank.	Null
Slave ID	Set Modbus slave ID.	Null
Address	The starting address for reading.	Null
Quantity	Set read how many digits from starting address.	Null
Type	Read command, options are "Coil", "Discrete", "Holding Register (INT16)", "Input Register (INT16)", "Holding Register (INT32)" and "Holding Register (Float)".	Holding Register (INT16)

Sign	Identify whether this channel is signed. Default: Unsigned.	Null
Value	Show the data which read from this slave device.	Null
Fetch	Click to read the data from this slave device.	Null

You could click  to add a channel or click  to delete a channel.

3.3.3 Serial-RS232

The screenshot shows the 'ToolBox V5.19' interface with a sidebar on the left containing icons for Status, General, LoRaWAN, and Upgrade. The main area is titled 'General >' and has four tabs: Basic, Serial, GPIO, and AI. The 'Serial' tab is active, displaying the following settings:

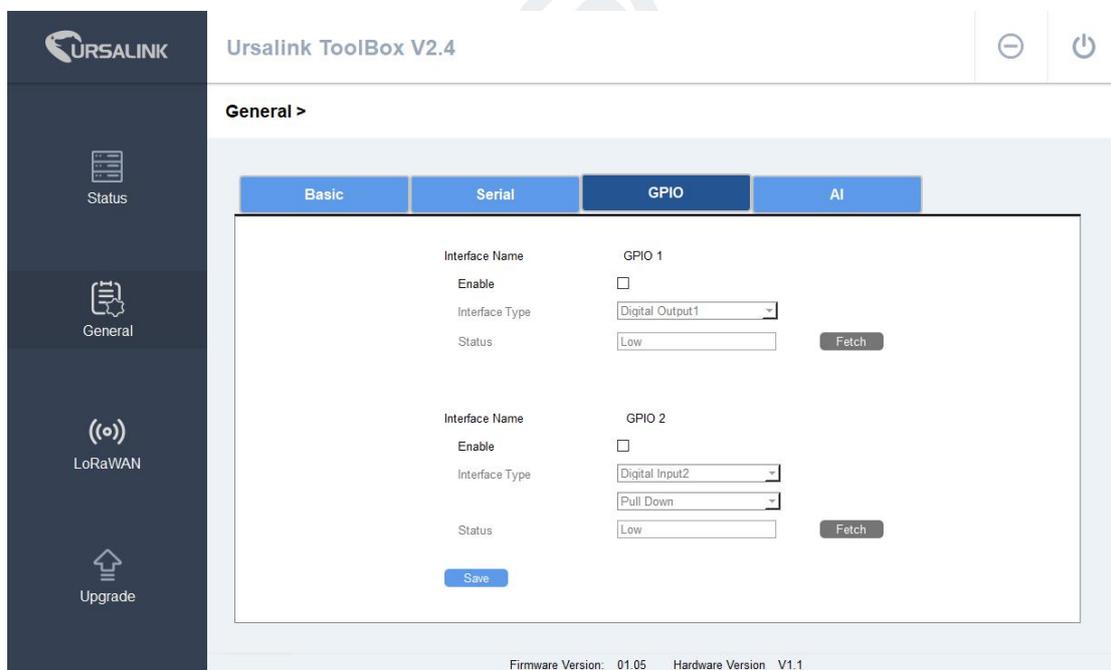
- Enable:
- Interface Type: RS232
- Baud Rate: 9600
- Data Bit: 8 bits
- Stop Bit: 1 bits
- Parity: None

A 'Save' button is located below the settings. At the bottom of the interface, it shows 'Firmware Version: 01.29' and 'Hardware Version 1.1'.

RS232 Settings		
Item	Description	Default
Enable	Enable/Disable serial interface	Enable
Interface Type	Set the interface type. Select from RS485 (Modbus Master) and RS232.	RS485 (Modbus Master)
Interface 1 (Pin 1) 5v/9v/12v Output	Enable: UC11-N1 will provide power to the device that connected to Interface	Disabled

	1 (Pin 1). Voltage is 5V, 9V or 12V. Note: Power supply function only available on DC powered version.	
Power Output Time Before Collect	If the time is set 100ms, then before collecting data from end nodes, UC11-N1 will provide power for end nodes for 100ms. Range: 1-5000 (ms). Note: With this feature being enabled, the power consumption will increase.	None
Baud Rate	Select from "1200", "2400", "4800", "9600", "57600", "115200".	9600
Data Bits	Select from "5", "7", "8".	8
Stop Bits	Select from "1", "2".	1
Parity Bits	Select from "Even", "Odd", "None".	None

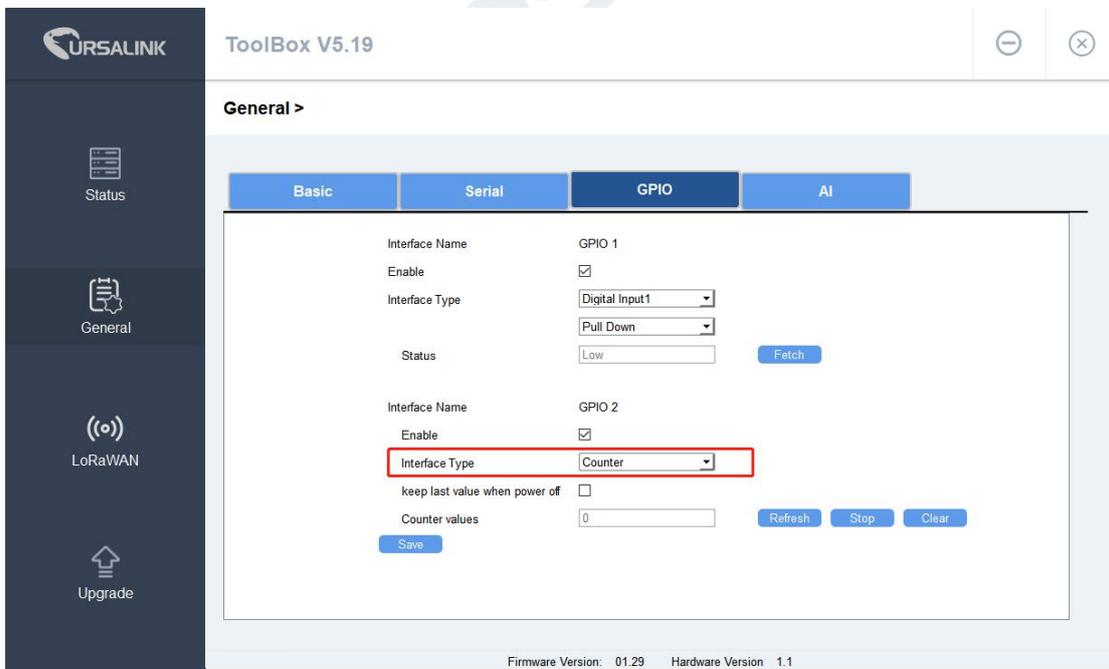
3.3.4 GPIO



The screenshot displays the URSALINK Toolbox V2.4 interface for configuring GPIO settings. The main menu on the left includes Status, General, LoRaWAN, and Upgrade. The 'General' section is expanded, showing tabs for Basic, Serial, GPIO, and AI. The GPIO configuration area contains two sections for GPIO 1 and GPIO 2. Each section includes an 'Interface Name' field, an 'Enable' checkbox, an 'Interface Type' dropdown menu, and a 'Status' dropdown menu. A 'Fetch' button is located next to the status dropdown for each interface. A 'Save' button is positioned at the bottom of the configuration area. The bottom status bar indicates 'Firmware Version: 01.05' and 'Hardware Version: V1.1'.

GPIO Settings		
Item	Description	Default
Interface Name	Show the name of this interface.	Null
Enable	Click to enable this interface.	Disable
Interface Type	<p>Choose from: Digital Input, Digital Output</p> <p>Digital Input: This GPIO will be used as Digital Input. Then you will need to select the initial state of this digital input from "Pull Up" (High), "Pull Down" (Low).</p> <p>Digital Output: This GPIO will be used as Digital Output.</p>	Digital Input
Status	Show the current status of this interface. Click "Fetch" to fetch the latest status.	Null

3.3.5 Pulse Counter



The screenshot displays the 'GPIO' settings page in the URSALINK Toolbox V5.19. The 'General' tab is selected, and the 'GPIO' sub-tab is active. Two GPIO configurations are shown:

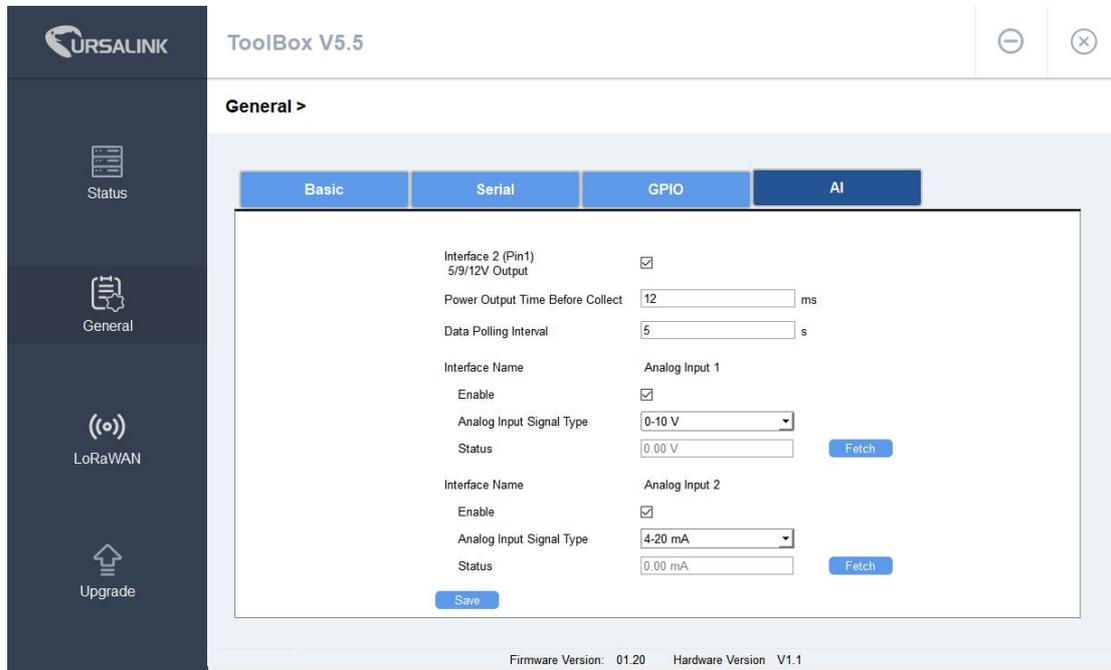
- GPIO 1:** Interface Name: GPIO 1, Enable: , Interface Type: Digital Input1, Status: Pull Down, Status value: Low, Fetch button.
- GPIO 2:** Interface Name: GPIO 2, Enable: , Interface Type: Counter (highlighted with a red box), Keep last value when power off: , Counter values: 0, Refresh, Stop, Clear buttons, Save button.

Firmware Version: 01.29 Hardware Version: 1.1

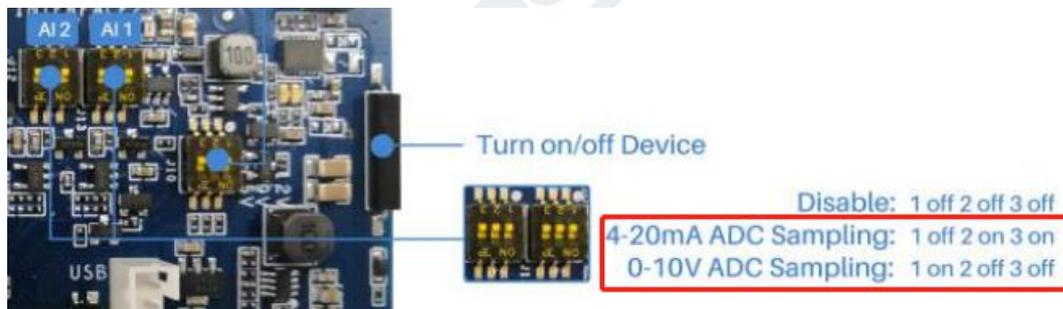
Note: The Pulse Counter feature is only available on GPIO 2 of UC11-N1 DC powered version.

GPIO 2 Settings		
Item	Description	Default
Interface Name	Show the name of this interface.	Null
Enable	Click to enable this interface.	Disable
Interface Type	<p>Choose from: Digital Input,Digital Output</p> <p>Digital Input: This GPIO will be used as Digital Input. Then you will need to select the initial state of this digital input form "Pull Up"(High), "Pull Down"(Low).</p> <p>Digital Output: This GPIO will be used as Digital Output.</p> <p>Counter: This GPIO will be used as the pulse counter.</p>	Digital Input2
Keep Last Value when Power Off	Enable: The device will store the last counter value in the register when the module is powered off.	Disable
Counter Value	It will continuously show the present counter value unless it stops.	Null
Refresh	Click to refresh the counter value.	Null
Stop/Start	Click the Star/Stop button to start or stop the counter.	Null
Reset	Click the Clear button to reset the counter value.	Null

3.3.6 AI



Note: Please adjust the ADC sampling DIP switch on PCB to the corresponding mode before changing the type of analog input signal.

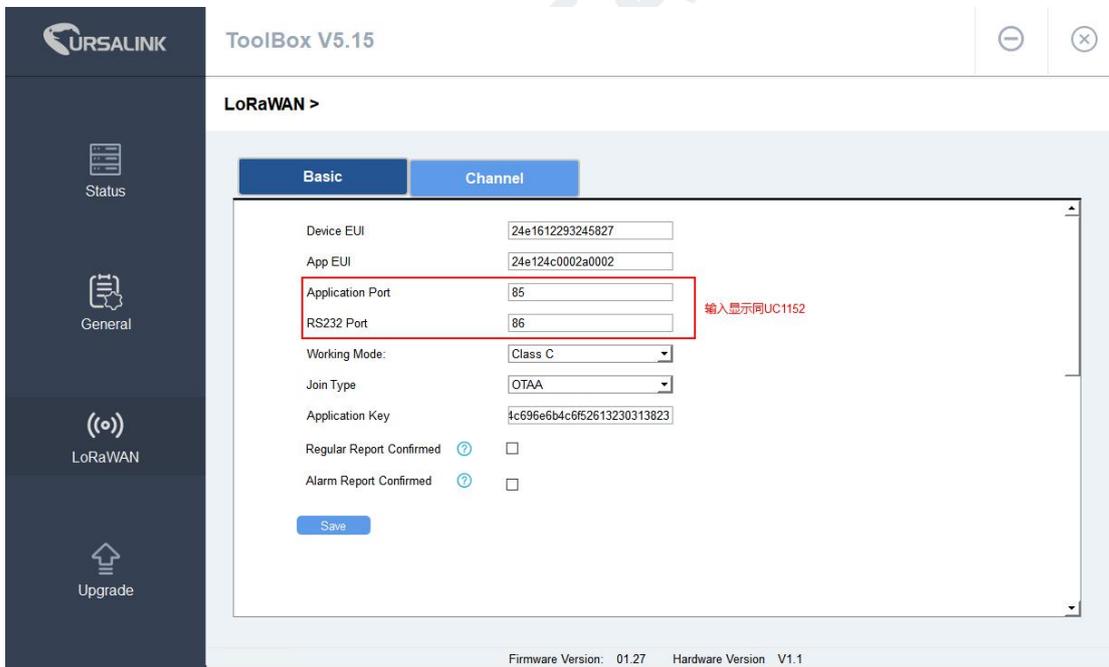


AI Settings		
Item	Description	Default
Interface 2 (Pin 1) 5/9/12V Output	Enable: UC11-N1 will provide power to device connected to Interface 1 (pin1). Voltage is 5V, 9V or 12V.	Disabled
Power Output Time Before Collect	If the time is set to 100ms, then before collecting data from end nodes, UC11-N1 will provider power for end nodes for 100ms. Range: 1-5000 (ms).	1-5000

	Note: With this feature being enabled, the power consumption will increase.	
Data Polling Interval	Set the interval for reading analog input. Range: 5-3600 (s).	5
Interface Name	Show the name of this interface.	Null
Enable	Click to enable this interface.	Disable
Analog Input Signal Type	Select from: "4-20 mA", "0-10 V".	4-20 mA
Status	Show the current value of this interface. Click "Fetch" to fetch the latest value of this analog input.	Null

3.4 LoRaWAN

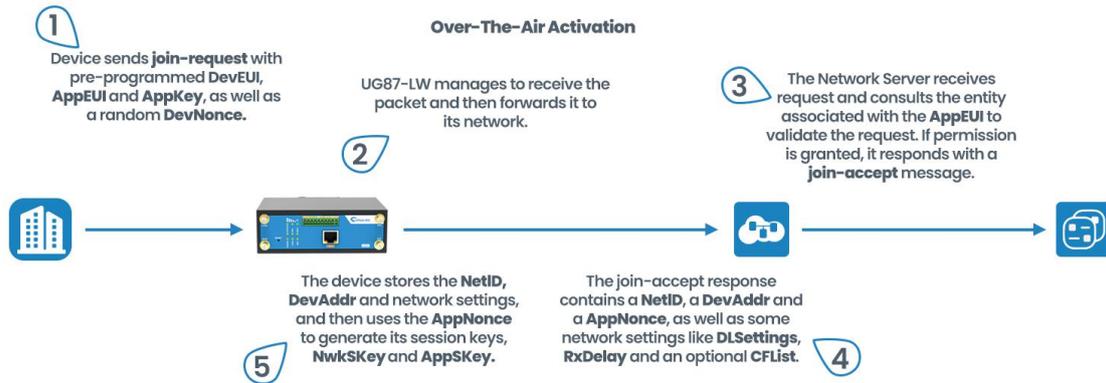
3.4.1 Basic-OTAA



The screenshot shows the 'LoRaWAN >' configuration page in the URSALINK Toolbox V5.15. The 'Basic' tab is active, displaying the following configuration details:

- Device EUI: 24e1612293245827
- App EUI: 24e124c0002a0002
- Application Port: 85
- RS232 Port: 86
- Working Mode: Class C
- Join Type: OTAA
- Application Key: 4c696e6b4c6f52613230313823
- Regular Report Confirmed:
- Alarm Report Confirmed:

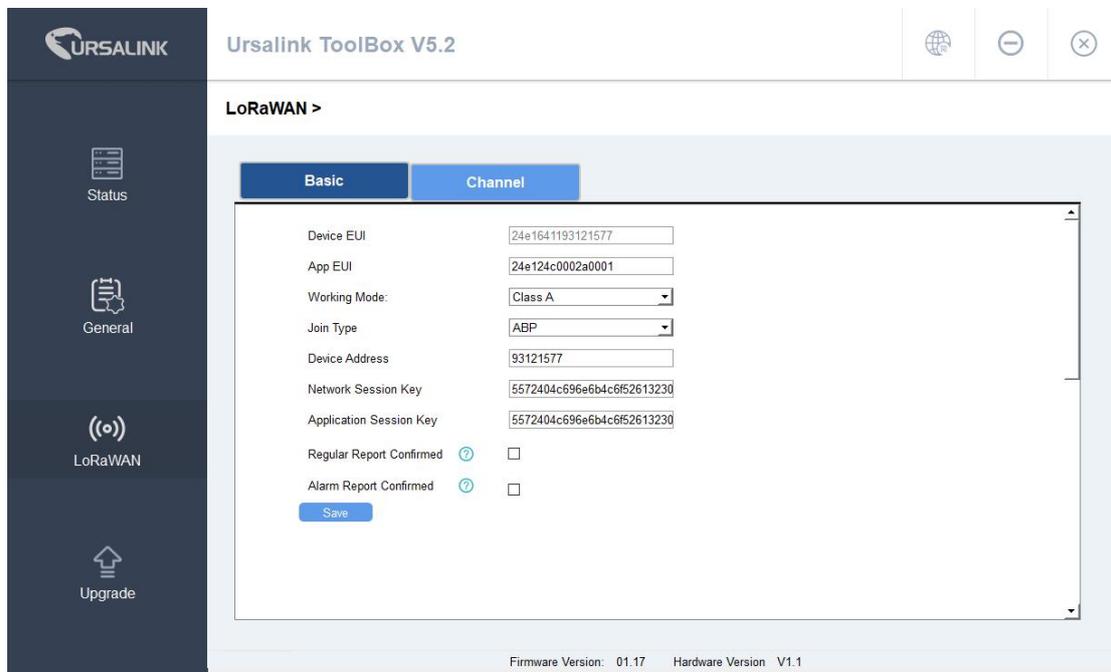
A red box highlights the 'Application Port' and 'RS232 Port' fields, with a red note '输入显示同UC1152' (Input display same as UC1152) next to it. A 'Save' button is located at the bottom of the configuration area. The footer of the interface indicates 'Firmware Version: 01.27' and 'Hardware Version: V1.1'.



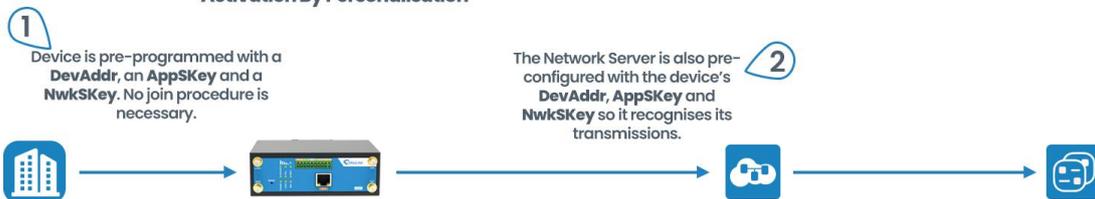
Basic Settings-OTAA		
Item	Description	Default
Device EUI	Show the identifier of this device.	the identifier of this device.
App EUI	Enter the application EUI.The Network Server receives request and consults the entity associated with the APP EUI to validate the request.If permission is granted, it responds with a join-accept message.	24E124C00 02A0001
Application Port	The port used by the device to send and receive LoRaWAN data.	85
RS232 Port	The port used by the device to send and receive RS232 data.	86
Working Mode	Show the working mode of the device. UC11-N1: Null. UC11-N1-DC: "Class A" , "Class C". Class A :Class A operation is the lowest power end-device system. Class C: Class C end-device will use more power to operate than Class A but they offer the lowest latency for server to end-device communication.	Class A
Join Type	Select from: "OTAA" and "ABP". OTAA:Over-the-Air Activation. For over-the-air activation, end-devices must follow a join procedure prior to participating in data exchanges with the network server. An end-device has to go through a new join procedure every time it has lost the session context information.	OTAA

	<p>ABP: Activation by Personalization.</p> <p>Under certain circumstances, end-devices can be activated by personalization. Activation by personalization directly ties an end-device to a specific network by-passing the join request - join accept procedure.</p>	
Application Key	Enter the application key. Whenever an end-device joins a network via over-the-air activation, the application key is used to derive the Application Session key.	5572404c6 96e6b4c6f 526132303 13823
Regular Report Confirmed	<p>After sending the regular report packet to the network server, if the device does not receive ACK bit from the network server, then the device will resend the packet.</p> <p>Note: If the device doesn't receive ACK for a long time, the device will resend regular report confirmed packets 3 times at most.</p>	Disabled
Alarm Report Confirmed	<p>After sending the attribute package or alarm packet or battery packet to the network server, if the device does not receive ACK bit from the Network Server, then the device will resend the packet.</p> <p>Note: If you doesn't receive ACK for a long time, the device will resend alarm report packets or battery packets 3 times at most. However, the device will resend attribute package all the time.</p>	Disabled

3.4.2 Basic-ABP



Activation By Personalisation



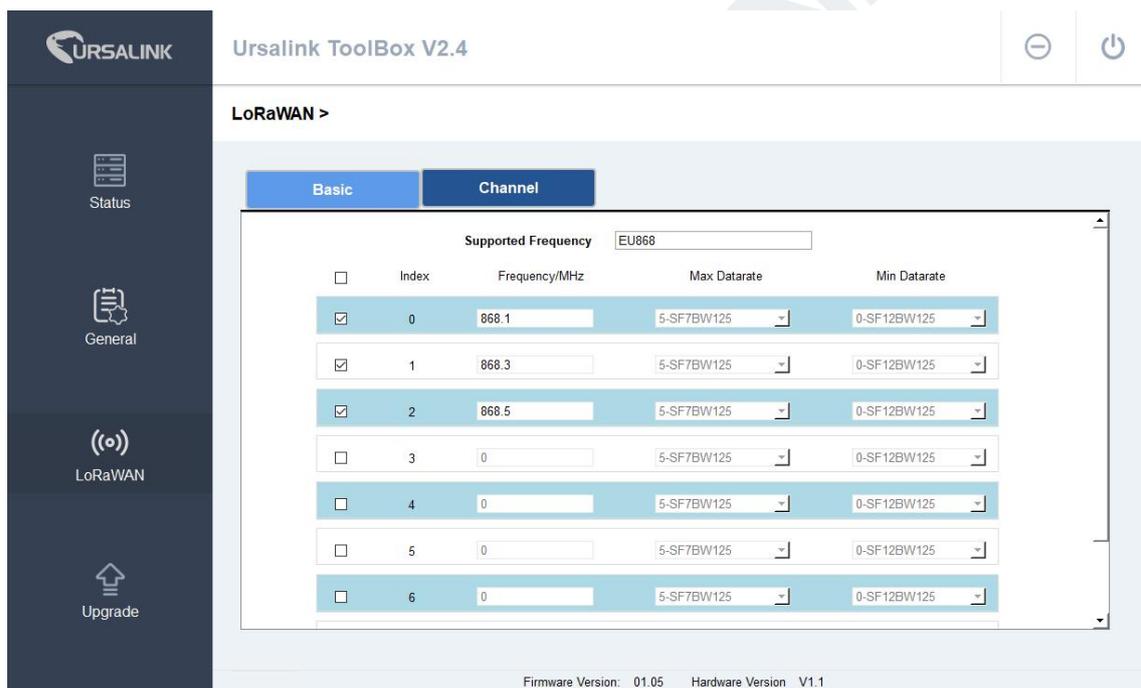
Basic Settings-ABP		
Item	Description	Default
Device EUI	Show the identifier of this device.	the identifier of this device.
App EUI	Enter the application EUI.The Network Server receives request and consults the entity associated with the APPEUI to validate the request.If permission is granted, it responds with a join-accept message.	24E124C00 02A0001
Application Port	The port used by the device to send and receive LoRaWAN data.	85
RS232 Port	The port used by the device to send and receive RS232 data.	86
Working Mode	Show the working mode of the device.	Class A

	<p>UC11-N1: Null. UC11-N1-DC: Select from: "Class A" , "Class C".</p> <p>Class A :Class A operation is the lowest power end-device system. Class C: Class C end-device will use more power to operate than Class A but they offer the lowest latency for server to end-device communication.</p>	
Join Type	<p>Select from: "OTAA" and "ABP". OTAA:Over-the-Air Activation. For over-the-air activation, end-devices must follow a join procedure prior to participating in data exchanges with the network server. An end-device has to go through a new join procedure every time it has lost the session context information.</p> <p>ABP: Activation by Personalization. Under certain circumstances, end-devices can be activated by personalization. Activation by personalization directly ties an end-device to a specific network by-passing the join request - join accept procedure.</p>	OTAA
Device Address	Enter the device address. The device address identifies the end-device within the current network.	The last 8 digits number of SN
Network Session Key	Enter the network session key of the device. The network session key specific for the end-device. It is used by the end-device to calculate the MIC or part of the MIC (message integrity code) of all uplink data messages to ensure data integrity.	5572404c6 96e6b4c6f 526132303 13823
Application Session Key	Enter the application session key of the device. The AppKey is an application session key specific for the end-device. It is used by both the application server and the end-device to encrypt and decrypt the payload field of application-specific data messages.	5572404c6 96e6b4c6f 526132303 13823
Regular Report Confirmed	<p>After sending the regular report packet to the network server, if the device does not receive ACK bit from the network server, then the device will resend the packet. Note: If the device doesn't receive ACK for a long time, the device will resend regular report confirmed packets</p>	Disabled

	3 times at most.	
Alarm Report Confirmed	<p>After sending the attribute package or alarm packet or battery packet to the network server, if the device does not receive ACK bit from the Network Server, then the device will resend the packet.</p> <p>Note: If you doesn't receive ACK for a long time, the device will resend alarm report packets or battery packets 3 times at most. However, the device will resend attribute package all the time.</p>	Disabled

3.4.3 Channel

On this page, you can view all of the supported LoRa frequencies and setup the channel frequency used for receiving and sending data.



URSALINK Uralink ToolBox V2.4

LoRaWAN >

Basic Channel

Supported Frequency: EU868

<input type="checkbox"/>	Index	Frequency/MHz	Max Datarate	Min Datarate
<input checked="" type="checkbox"/>	0	868.1	5-SF7BW125	0-SF12BW125
<input checked="" type="checkbox"/>	1	868.3	5-SF7BW125	0-SF12BW125
<input checked="" type="checkbox"/>	2	868.5	5-SF7BW125	0-SF12BW125
<input type="checkbox"/>	3	0	5-SF7BW125	0-SF12BW125
<input type="checkbox"/>	4	0	5-SF7BW125	0-SF12BW125
<input type="checkbox"/>	5	0	5-SF7BW125	0-SF12BW125
<input type="checkbox"/>	6	0	5-SF7BW125	0-SF12BW125

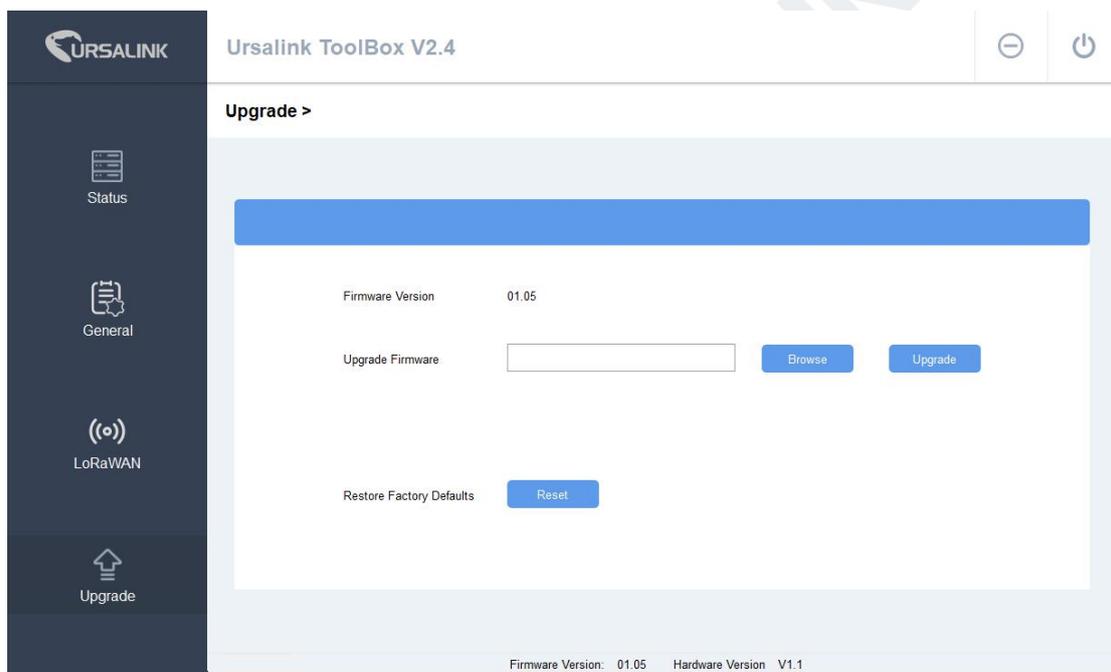
Firmware Version: 01.05 Hardware Version V1.1

Note: Make sure that you have configured the corresponding channel on the gateway. E.g. If you have configured a 923.2 MHz channel on UC11-N1, then you have to configure a 923.2 MHz channel on gateway as well.

Multi Channels Setting

Enable	Index	Radio	Frequency/MHz
<input checked="" type="checkbox"/>	0	Radio 0	923.2
<input checked="" type="checkbox"/>	1	Radio 0	923.4
<input checked="" type="checkbox"/>	2	Radio 0	923.6
<input checked="" type="checkbox"/>	3	Radio 1	922.2
<input checked="" type="checkbox"/>	4	Radio 1	922.4
<input checked="" type="checkbox"/>	5	Radio 1	922.6
<input checked="" type="checkbox"/>	6	Radio 1	922.8
<input checked="" type="checkbox"/>	7	Radio 1	923.0

3.5 Upgrade



Step 1: Connect UC11-N1 to PC via the USB port.

Step 2: Run the Urialink ToolBox and go to "Upgrade".

Step 3: Click "Browse" and select the correct firmware file from the PC.

Step 4: Click "Upgrade" and the device will check if the firmware file is correct. If it's correct, the firmware will be imported to the device, and the device will reboot after upgrading is completed.

Note: Any operation on Urialink ToolBox is not allowed during upgrading, otherwise the upgrading will be interrupted, or even the device will break down.

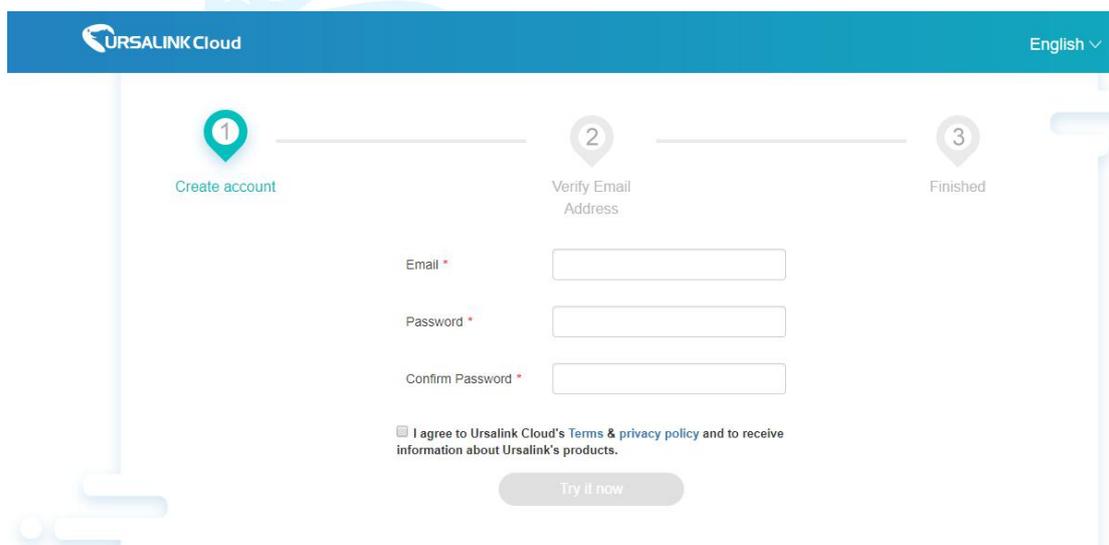
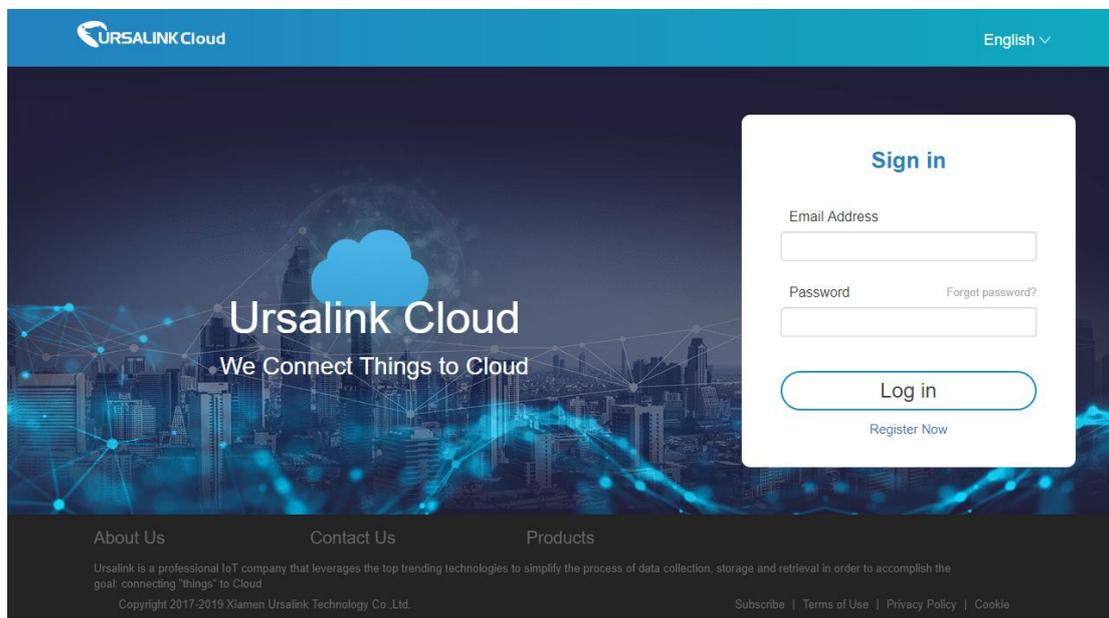
4.Configuration via Ursalink Cloud

4.1 Account Setup

To set up an account with Ursalink Cloud, follow these steps:

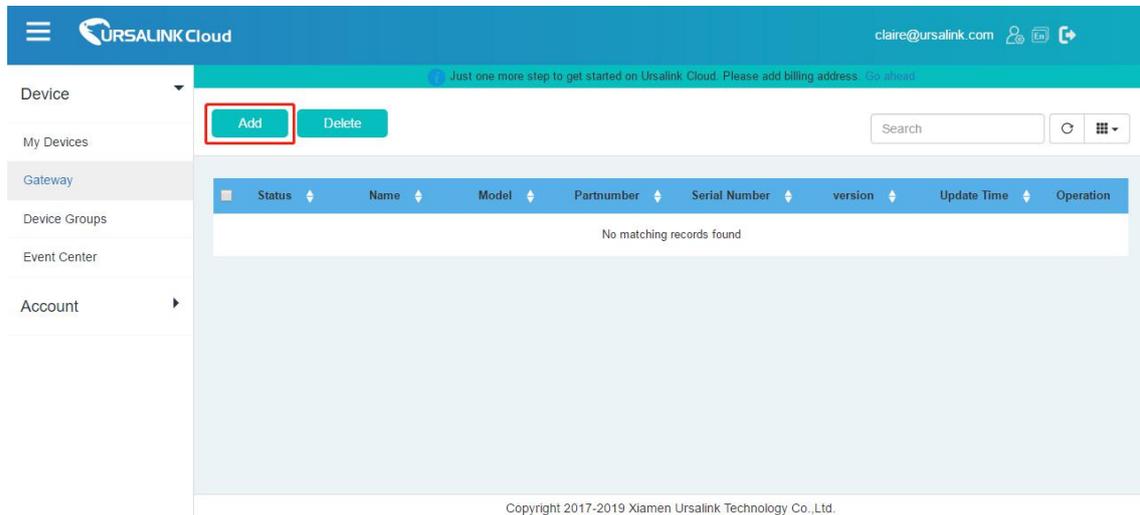
1. Go to <https://cloud.ursalink.com/login.html> to register an Ursalink Cloud account .
2. Log in to Ursalink Cloud after the email has been verified.

Note: It is important that you have access to the verified email address before proceeding.



4.2 Add a Ursalink LoRaWAN Gateway

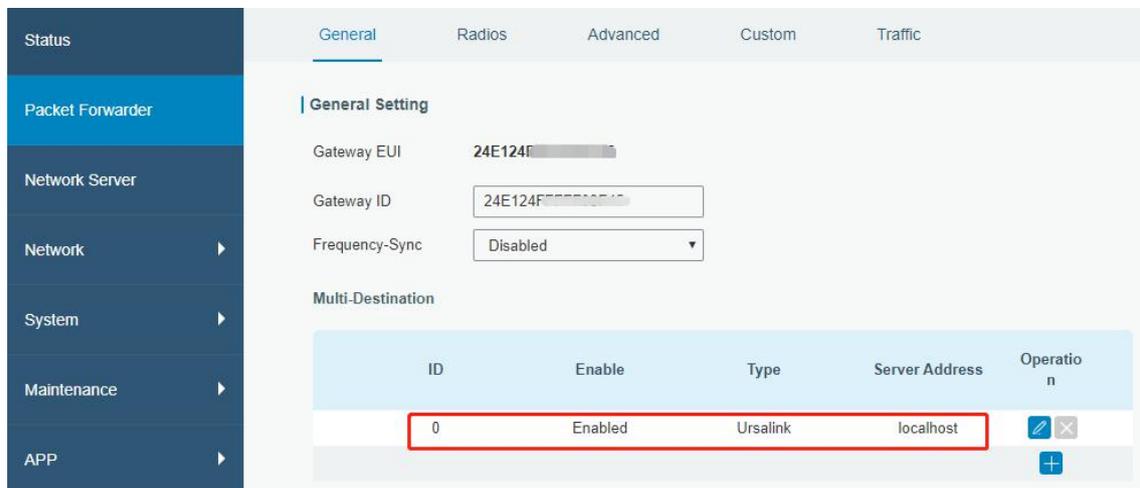
Go to “Device”-> “Gateway” and click “Add” to add a LoRaWAN gateway.

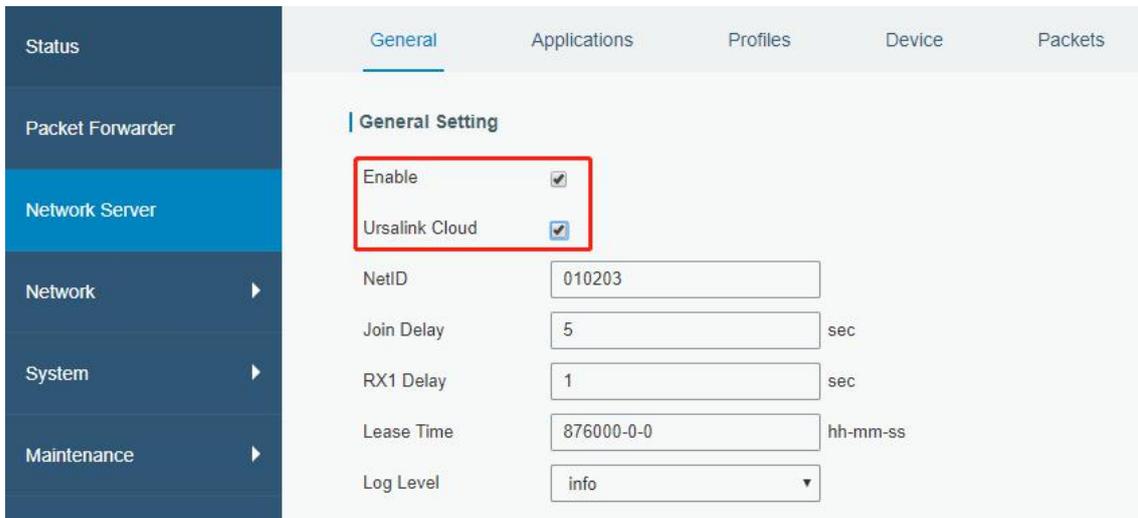


Enter the correct SN of the gateway and click “Add”. Gateway SN can be found either on the label on the bottom of the device or on the web GUI of gateway.



Note: Gateway mode should be selected as Ursalink Cloud.





General Applications Profiles Device Packets

General Setting

Enable

Ursalink Cloud

NetID

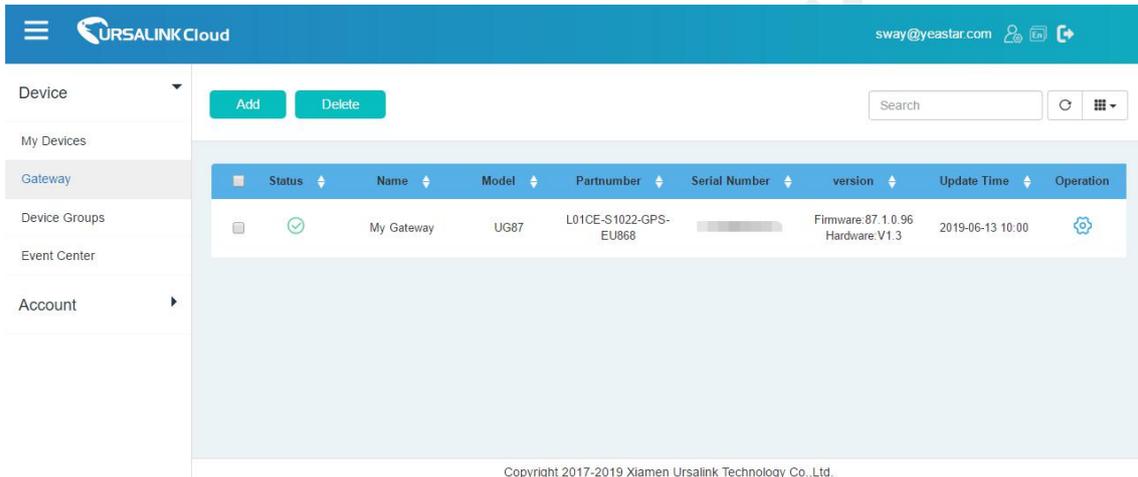
Join Delay sec

RX1 Delay sec

Lease Time hh-mm-ss

Log Level

Once the device has been added successfully, You will see the device in the list.



URSALINK Cloud sway@yeastar.com

Device Add Delete Search

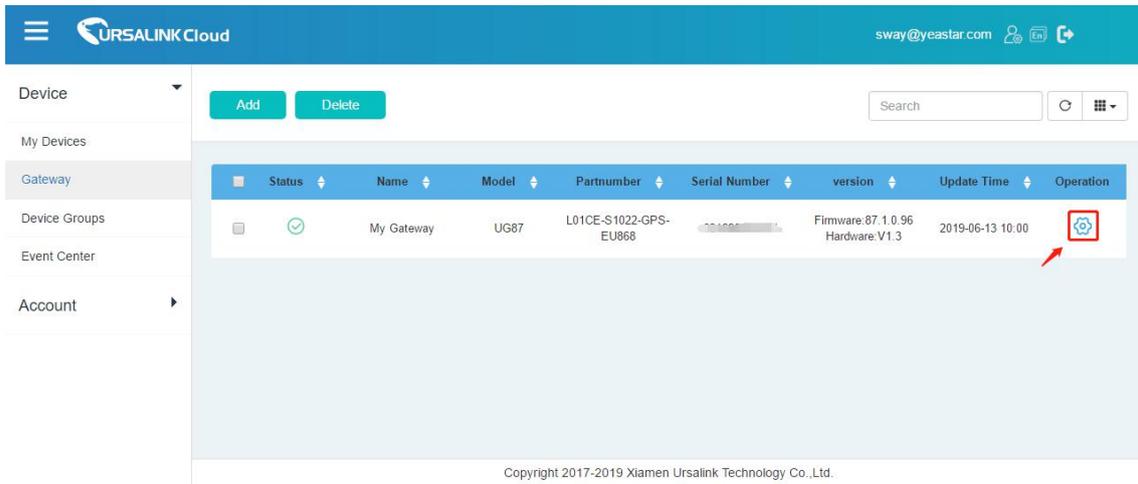
Status	Name	Model	Partnumber	Serial Number	version	Update Time	Operation
	My Gateway	UG87	L01CE-S1022-GPS-EU868		Firmware: 87.1.0.96 Hardware: V1.3	2019-06-13 10:00	

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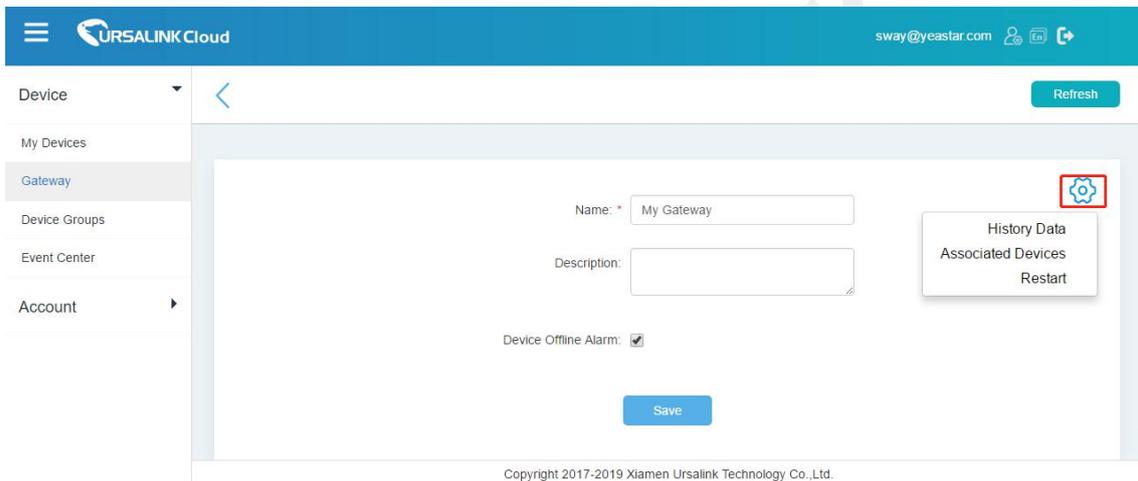
4.3 Add Devices to Ursalink Cloud

To add a UC11-N1 to Ursalink Cloud, please follow these steps:

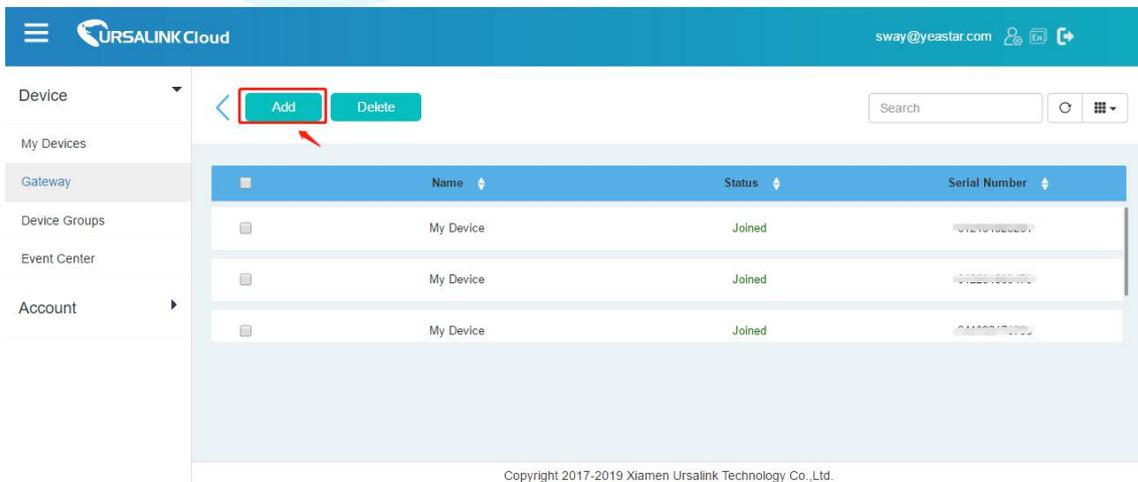
1. Click  to go to the configuration page of this gateway.



2. Click  and then click "Associated Devices".

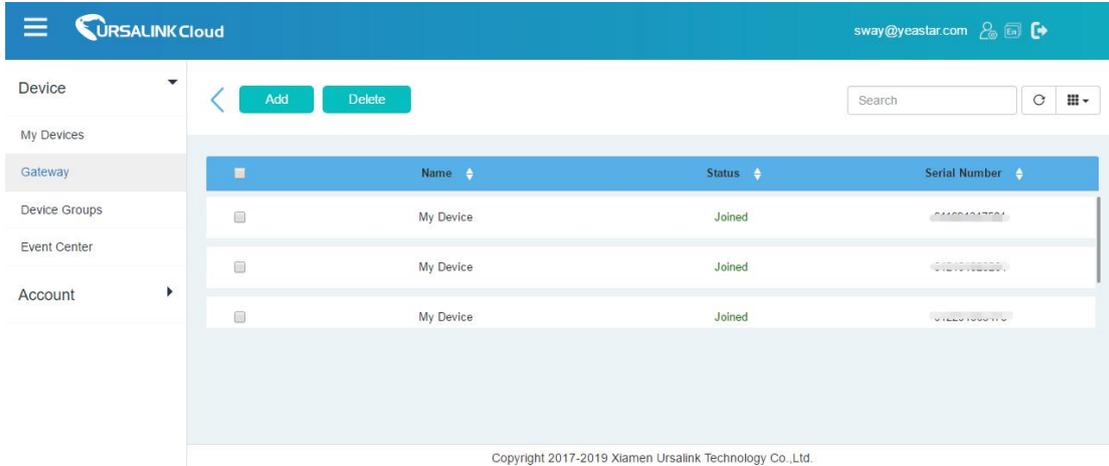


3. Click "Add" to add a UC11-N1 to this gateway.



4. Enter the correct SN of the UC11-N1, and then click "Add". The device SN can be found on the bottom of the device.

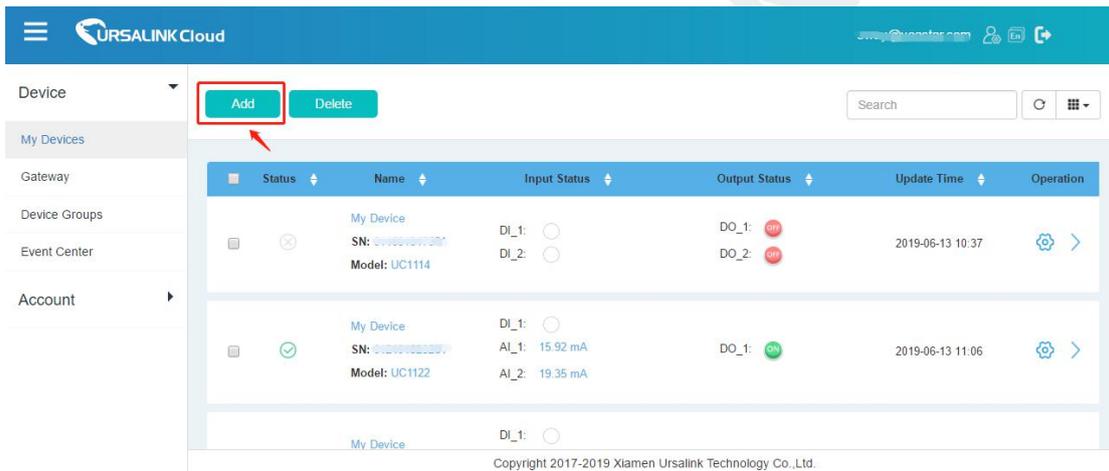
5. Once the device has been added successfully, You will see the device in the list.



The screenshot shows the URSALINK Cloud interface. The top navigation bar includes the URSALINK logo, the user email 'sway@yeastar.com', and icons for user profile, notifications, and help. A sidebar on the left contains navigation options: Device, My Devices, Gateway, Device Groups, Event Center, and Account. The main content area features a table with columns for Name, Status, and Serial Number. Three devices are listed, all with a 'Joined' status. A red box highlights the 'Add' button in the top left corner of the main content area.

You can also add UC11-N1 directly to the main page, please follow these steps:

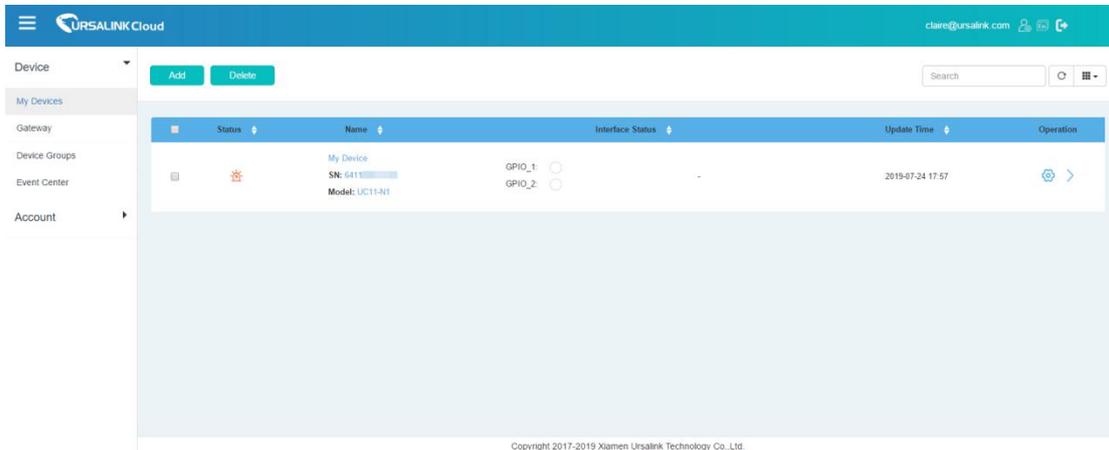
1. Click “Add” on the upper left corner.



The screenshot shows the URSALINK Cloud interface. The top navigation bar includes the URSALINK logo, the user email 'sway@yeastar.com', and icons for user profile, notifications, and help. A sidebar on the left contains navigation options: Device, My Devices, Gateway, Device Groups, Event Center, and Account. The main content area features a table with columns for Status, Name, Input Status, Output Status, Update Time, and Operation. Two devices are listed. The first device has a status of 'Failed' (red X) and the second has a status of 'Success' (green checkmark). A red box highlights the 'Add' button in the top left corner of the main content area, with a red arrow pointing to it.

2. Enter the correct SN of UC11-N1 and select the correct gateway to which this UC11-N1 will be added. Then click “Add”.

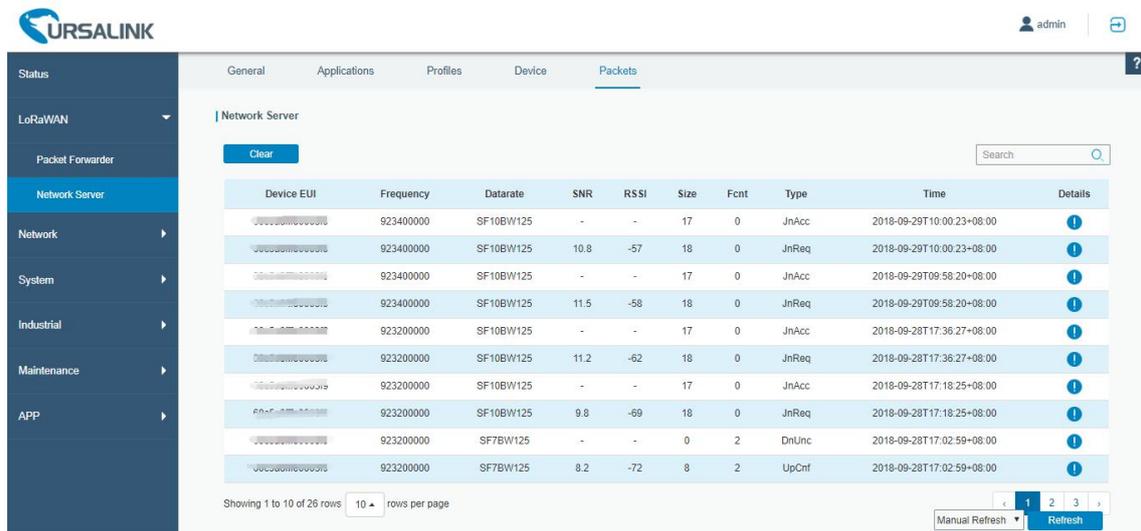
3. Once the device has been added successfully, You will see the device in the list.



The screenshot shows the URSALINK Cloud interface. The top navigation bar includes the URSALINK logo, the user email 'claire@ursalink.com', and icons for user profile, notifications, and help. A sidebar on the left contains navigation options: Device, My Devices, Gateway, Device Groups, Event Center, and Account. The main content area features a table with columns for Status, Name, Interface Status, Update Time, and Operation. One device is listed with a status of 'Success' (green checkmark). A red box highlights the 'Add' button in the top left corner of the main content area.

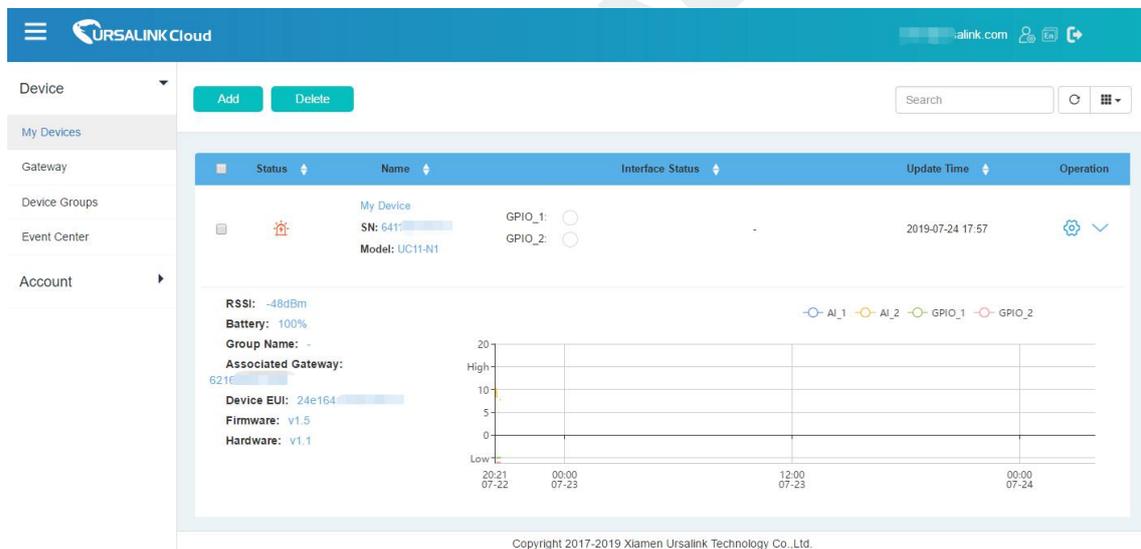
4.4 Check the Data of UC11-N1

Click “LoRaWAN”->”Network Server”->”Packets” to view the data transmission.



Device EUI	Frequency	Datarate	SNR	RSSI	Size	Fcnt	Type	Time	Details
923400000	923400000	SF10BW125	-	-	17	0	JnAcc	2018-09-29T10:00:23+08:00	1
923400000	923400000	SF10BW125	10.8	-57	18	0	JnReq	2018-09-29T10:00:23+08:00	1
923400000	923400000	SF10BW125	-	-	17	0	JnAcc	2018-09-29T09:58:20+08:00	1
923400000	923400000	SF10BW125	11.5	-58	18	0	JnReq	2018-09-29T09:58:20+08:00	1
923200000	923200000	SF10BW125	-	-	17	0	JnAcc	2018-09-28T17:36:27+08:00	1
923200000	923200000	SF10BW125	11.2	-62	18	0	JnReq	2018-09-28T17:36:27+08:00	1
923200000	923200000	SF10BW125	-	-	17	0	JnAcc	2018-09-28T17:18:25+08:00	1
923200000	923200000	SF10BW125	9.8	-69	18	0	JnReq	2018-09-28T17:18:25+08:00	1
923200000	923200000	SF7BW125	-	-	0	2	DnUnc	2018-09-28T17:02:59+08:00	1
923200000	923200000	SF7BW125	8.2	-72	8	2	UpCnf	2018-09-28T17:02:59+08:00	1

You can see the basic status of the UC11-N1 on the Ursalink Cloud main page.



Device: My Devices

My Device

SN: 641...
Model: UC11-N1

GPIO_1:
GPIO_2:

Update Time: 2019-07-24 17:57

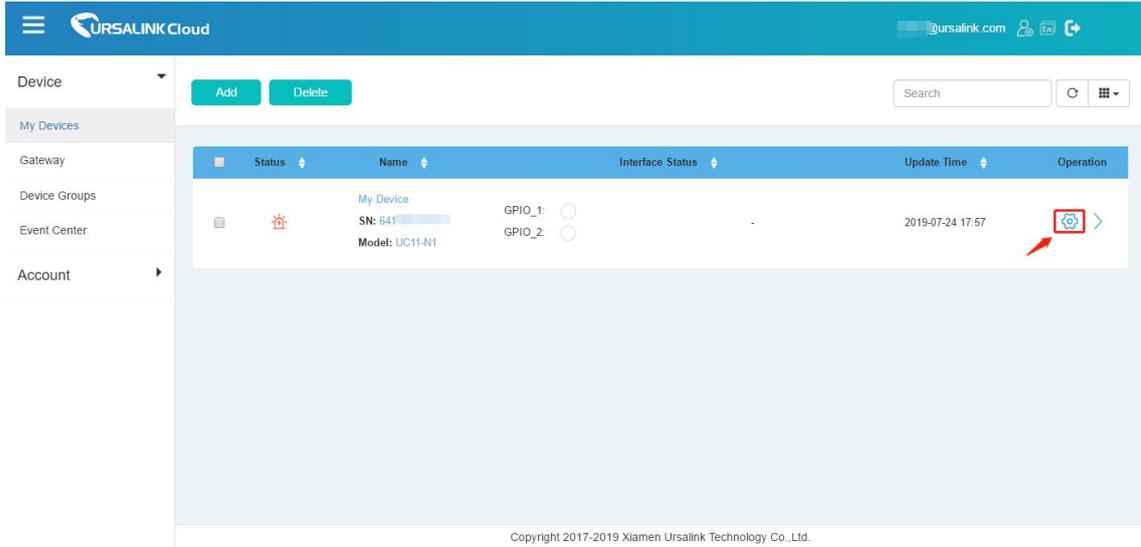
RSSI: -48dBm
Battery: 100%
Group Name: -
Associated Gateway: 621c...
Device EUI: 24e164...
Firmware: v1.5
Hardware: v1.1

Legend: AI_1, AI_2, GPIO_1, GPIO_2

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4.5 Configure UC11-N1 via Ursalink Cloud

Click  to go to the configuration page of UC11-N1. You can edit the basic information of the device on this page.



The screenshot shows the URSALINK Cloud dashboard. On the left is a navigation menu with options: Device, My Devices, Gateway, Device Groups, Event Center, and Account. The main area displays a table of devices. The table has columns for Status, Name, Interface Status, Update Time, and Operation. One device is listed with the name 'My Device', SN: 641, and Model: UC11-N1. In the Operation column, there is a gear icon highlighted with a red arrow, indicating the configuration page for that device.

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4.5.1 Basic Settings

General Settings		
Item	Description	Default
Device Name	Enter the custom name of this device.	My device
Application Key	Enter the application key. Whenever an end-device joins a network via over-the-air activation, the application key is used for derive the Application Session key.	5572404c6 96e6b4c6f 526132303 13823
Description	The description of the device.	--
Reporting Interval	The interval of sending data to Ursalink Cloud.	20min
Device Offline Alarm	The device will send an alert if disconnected.	Enabled
Low Battery Alarm	The device will send an alert if battery is less than 20%.	Enabled

4.5.2 Interface Settings

Name	Custom Name	Value	Visualization
GPIO 1(Digital Input)	<input type="text" value="GPIO_1"/>	Low	<input checked="" type="checkbox"/>
GPIO 2(Digital Input)	<input type="text" value="GPIO_2"/>	Low	<input checked="" type="checkbox"/>

Note:

Before checking GPIO data on Ursalink Cloud, you need to configure UC11-N1 via ToolBox and enable correspondent GPIO, and set port type for GPIO as digital input or digital output.

GPIO Settings		
Item	Description	Default
Name	Show the name and the type of this interface.	GPIO x (Digital Input x)
Custom Name	Enter the custom name of this interface.	GPIO 1
Value	Show the latest value of this interface.	Null
Visualization	Enable: The interface's name and value will be shown on the home page. Disable: The interface's name and value will not be shown on the home page.	Disable

Name	Custom Name	Osh	Osl	Unit	Value	Visualization
AI 1:	<input type="text" value="AI_1"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Max: 0.00 mA Min: 0.00 mA Avg: 0.00 mA	<input type="checkbox"/>
AI 2:	<input type="text" value="AI_2"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Max: 0.00 mA Min: 0.00 mA Avg: 0.00 mA	<input type="checkbox"/>

Note:

Before checking AI data on Ursalink Cloud, you need to configure UC11-N1 via ToolBox and enable correspondent AI.

AI Settings		
Item	Description	Default
Name	Show the name and the type of this interface.	AI 1
Custom Name	Enter the custom name of this interface.	AI_1
Osh	High limit of the scale for the scaled output value.	Null
Osl	Low limit of the scale for the scaled output value.	Null
Unit	Enter the unit for the scaled output value.	Null
Value	Show the latest value of this interface.	Null
Visualization	<p>Enable: The interface's name and value will be shown on the home page.</p> <p>Disable: The interface's name and value will not be shown on the home page.</p>	Disable

The following variables are pertinent to the scaling formula:

Ov = scaled output value

Iv = analog input value

Osh = high limit of the scale for the scaled output value

Osl = low limit of the scale for the scaled output value

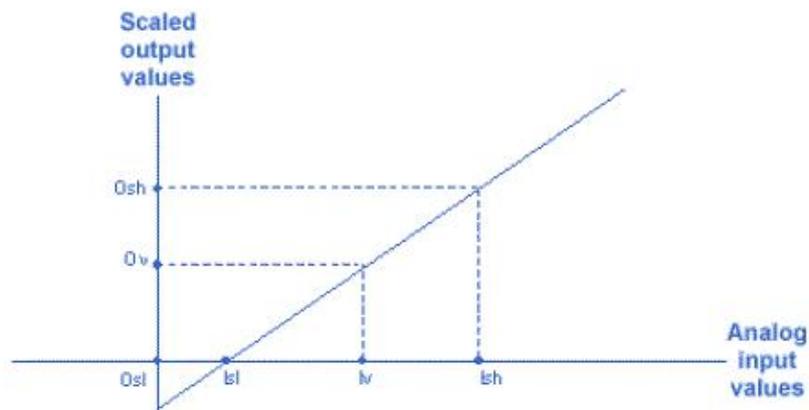
Ish = high limit of the scale for the analog input value

Isl = low limit of the scale for the analog input value

The scaling scheme can be diagrammed as follows:

The following formula for calculating the scaled value can be derived from the diagram:

$$Ov = [(Osh - Osl) * (Iv - Isl) / (Ish - Isl)] + Osl$$



Channel ID	Channel Name	Type	Sign	Decimal Place	Raw Data	Value	Unit	Operation
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>				

Note:

Before checking channel data on Ursalink Cloud, you need to configure UC11-N1 in Toolbox and create channel on Ursalink Cloud. The channel ID of channels on Toolbox and Ursalink Cloud should be correspondent.

Channel Settings		
Item	Description	Default
Channel ID	Assign the channel for the slave device. 8 channels selectable.	Null
Channel Name	Set the name to identify the remote channel. It cannot be blank.	Null
Type	Read command, options are "Coil", "Discrete", "Holding Register (INT16)", "Input Register (INT16)", "Holding Register (INT32)" and "Holding Register (Float)".	Holding Register (INT16)
Sign	To identify whether this channel is signed. Default: Unsigned.	Null
Decimal Place	To indicate a dot in the read into the position of the channel. For example: if the channel raw data is 204d, and a Decimal Place is equal to 2, then the actual value is 12.34.	Null
Raw Data	Show the raw data of this channel (Hex).	Null
Value	Show the conversion results (Dec).	Null
Unit	Enter the unit for the channel's value.	Null

5. Configuration via TTN

5.1 Add UC11-N1 to The Things Network

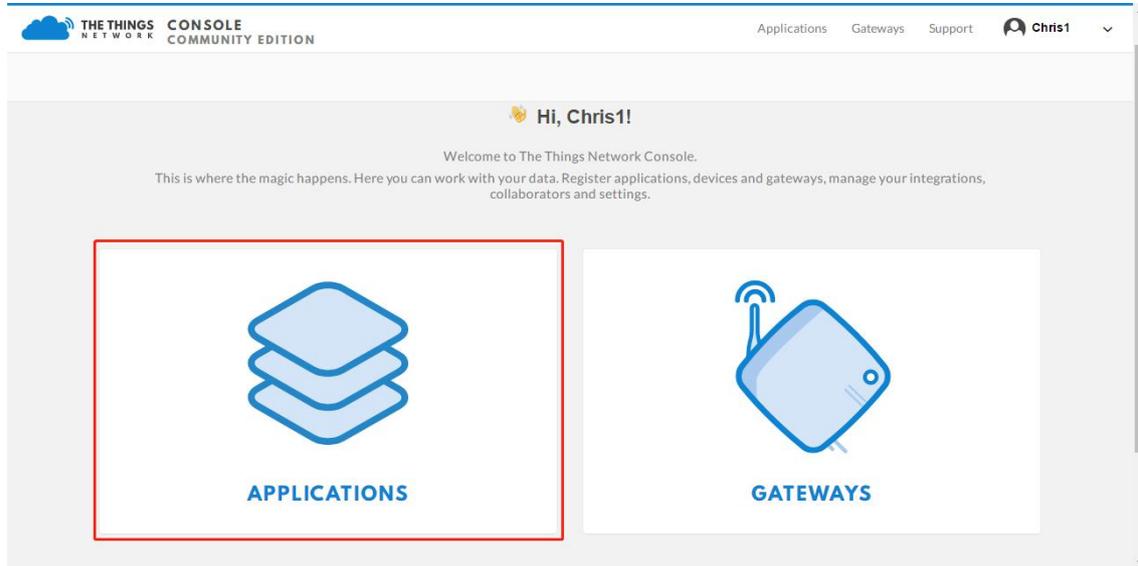
5.1.1 Create an Application in The Things Network

TTN server uses Applications to create groups of devices.

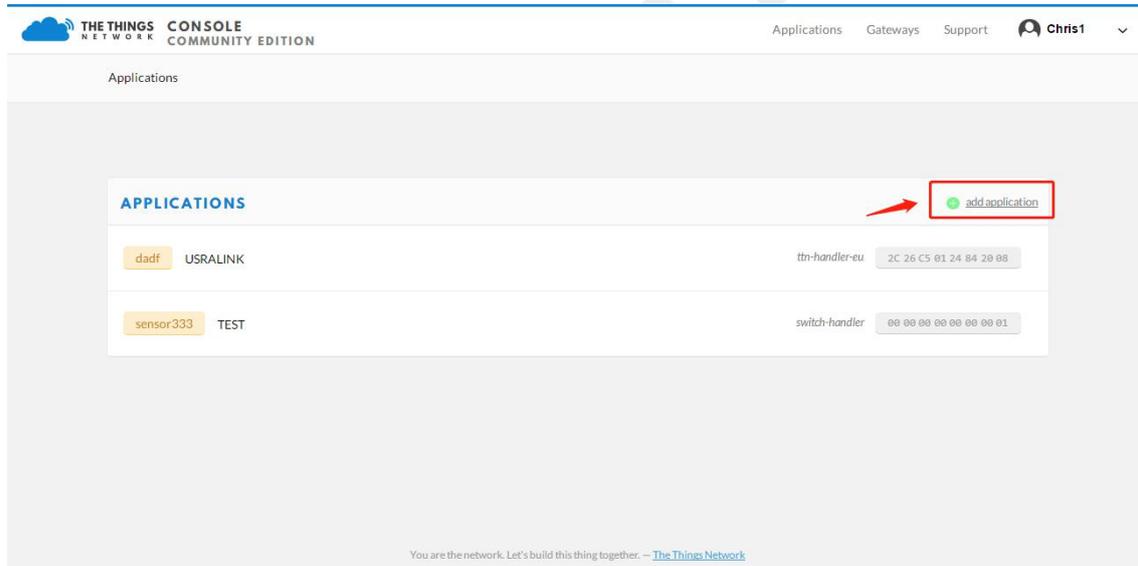
Gateways are associated with user account but not Applications. All gateways connected to TTN servers forward all LoRaWAN data traffic to the TTN message router. The TTN network server filters LoRa traffic by Application ID so that the data is routed to the correct user/application and users are only able to access data from devices registered to their account.

To add an application, follow these steps:

1. Click “APPLICATIONS” located on the Console page.



2. Click “add application” .



3. Fill in the information of Application. Handler Registration is the same as previous in Gateway registration.

ADD APPLICATION

Application ID
The unique identifier of your application on the network

Description
A human readable description of your new app

Application EUI
An application EUI will be issued for The Things Network block for convenience, you can add your own in the application settings page.

Handler registration
Select the handler you want to register this application to

Cancel

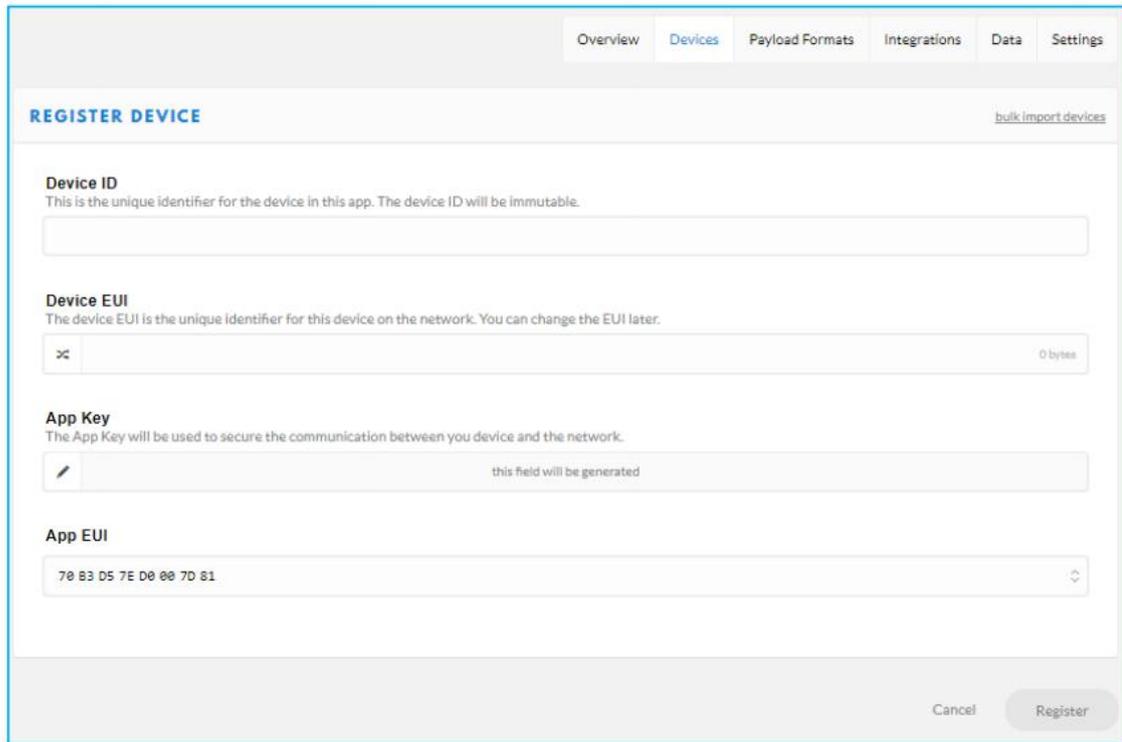
5.1.2 Add Devices to the Application

To add a UC11-N1 to the Application ID recently established, follow these steps:

1. Click "Register Device" under Devices in the application overview page.
2. Enter the Device ID. This ID must be unique on the user's account.

We recommend using the convention dev (for device), followed by the device Dev EUI. For instance, if the device has a Dev EUI of 0025ca000000000f then the Device ID is dev-0025ca000000000f.

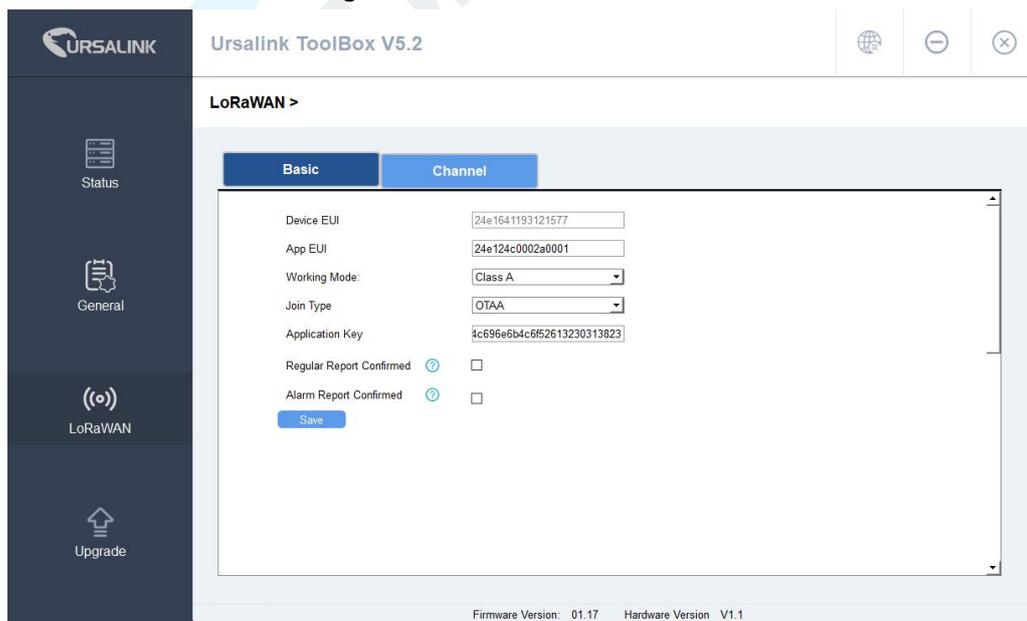
3. Enter the Device EUI, App EUI and App Key of UC11-N1.



4. Click “Register” to complete registration.

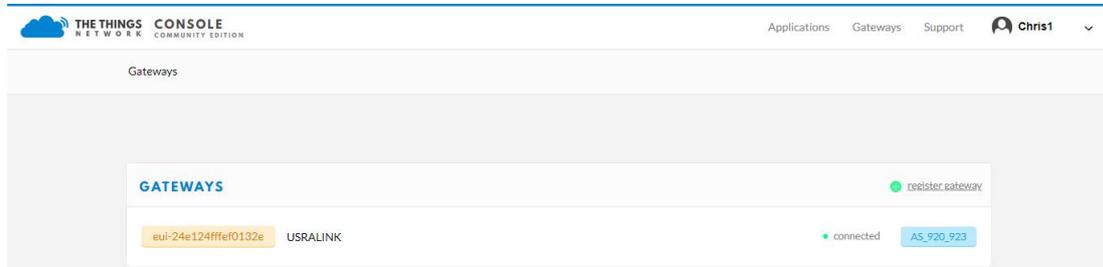
5.1.3 Configure UC11-N1

Connect UC11-N1 to PC and configure it via Toolbox.

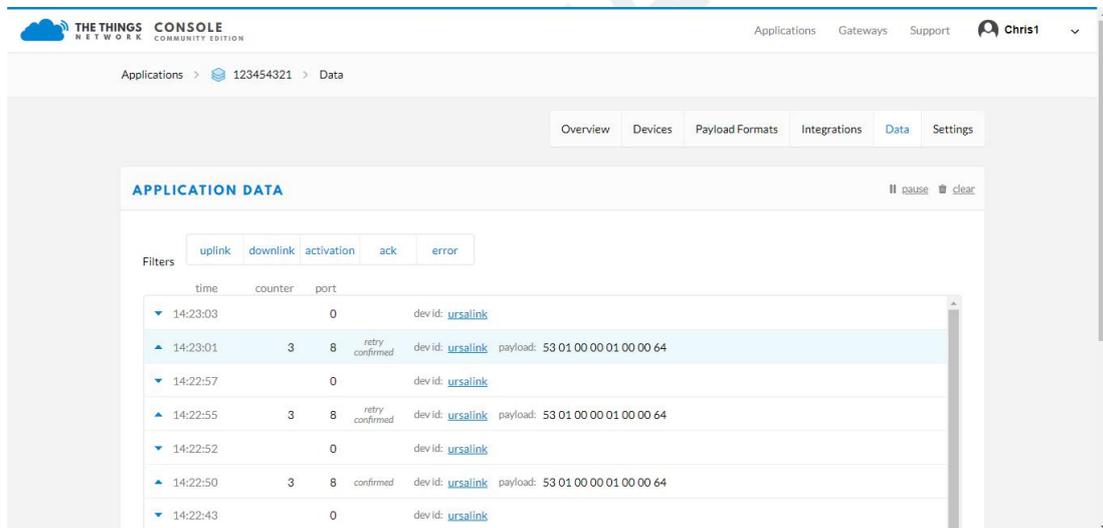


5.2 Check Data Transmission on The Things Network

1. Click “Gateways” to check the Gateways status.



2. Click “Applications” and select the Applications, then go to “Data”, you can find the data from UC11-N1.



-End-