WWW.INFOPULSAS.LT / info@infopulsas.lt



LoRaWAN Sensor Node

Multi-interface Platform for Connecting Sensors

UC11-N1 V1.2





UC11-N1 Tel: 86-592-5023060 Web: www.ursalink.com Email: support@ursalink.com

Platform for Connecting Sensor



www.ursalink.com



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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 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

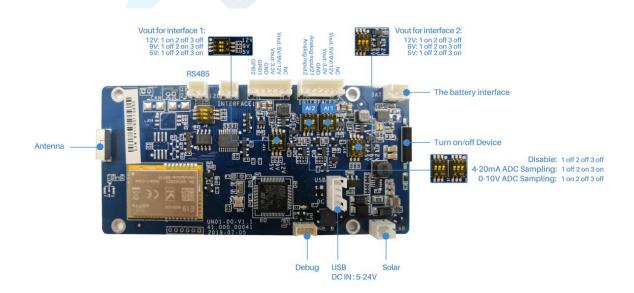
- Add or change a device probe in seconds
- Multiple interfaces including serial and I/O
- Multiple power supply option: battery, DC or solar
- Battery life: 5 years life under LoRaWAN Class A mode
- Support Frequency: CN470/EU868/US915/EU433/AU915/AS923/KR920/IN865/RU864
- Robust waterproof IP67 enclosure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



2.2 Parameters

Parameter Item	Reference Scope				
	2 x GPIO: Digital Input (0-3.3v)				
	or Digital Output (0-3.3v)				
Interface 1	1 x RS485				
	1 x 3.3 V output				
	1 x 5/9/12 V output switchable				
	2 x Analog input (4-20mA or 0-10v)				
Interface 2	1 x 3.3 V output				
	1 x 5/9/12 V output switchable				
Fraguancy Band	EU 433, CN 470-510, EU 863-870, US 902-928,				
Frequency Band	AU 915-928, KR 920-923				
Operating	-40°C to +70°C (-40°F to +158°F)				
Temperature					
	1.19000mhA replaceable Li-SOCL2 battery				
Power Supply	2.5-24 VDC with 5000mhA battery backup				
	3.Solar powered with 5000mhA battery				
Dimensions	120.1 x 120.1 x 55.4 mm				
Ingress Protection	IP67				

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. Configuration via PC

3.1 Configuration 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.

Ursalink ToolBox V2.4	Θ	
Serial information >		
Serial Port Settings		
Serial port: COM5 - Login password - Baud rate 115200 - Data bits 8 - Parity bits None - Stop bits 1 - Stop bits 1 - Stop Cancel		
Firmware Version: Hardware Version		



Serial Port Settin	ngs	
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:

Status Model: UC11N1 Status Serial Number: 641192416310 Partnumber: EU688-0000 Partnumber: EU688-0000 Firmware Version: 0.10 Hardware Version: V1.1 RSSI/SNR: -50/30		Ursalink ToolBox V	2.4	Θ	
Status Serial Number: 641192416310 Partnumber: EU868-0080 Firmware Version: 01.05 Hardware Version: V1.1 RSSI/SNR: -59/39		Status >			
Firmware Version: 01.05 Hardware Version: V1.1 RSSI/SNR: -59/39					
LoRaWAN		Firmware Version: Hardware Version:	01.05 V1.1		
ਊ Upgrade					
Firmware Version: 01.05 Hardware Version V1.1	ہ Upgrade		Firmware Version: 01.05 Hardware Version V1.1		



3.3 General

3.3.1 Basic

	Ursalink ToolBox	V2.4			⊝ ଓ
	General >				
Status	Basic	Serial	GPI0	AI	
General		Device ID Description Reporting Interval	6411 This is a devic for 1200	s	
((0)) LoRaWAN		Interface 1 (Pin2) 3V3 Output Interface 2 (Pin2) 3V3 Output Change Password Save			
습 Upgrade					
		Firmware Vers	ion: 01.05 Hardware Versio	n 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

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

	Ursalink ToolBox V2	2.4			Θ	Ċ
	General >					
Status	Basic	Serial	GPIO	AI		-
		Enable Interface Type Interface 1 (Pin1)	☑ RS485 (Modbus M	taster)		
General		5/9/12V Output Power Output Time Before Collect Baud Rate	0 9600	ms •		
((0)) LoRaWAN		Data Bit Stop Bit Parity	8 bits 1 bits None	• •		
Ŷ		Data Polling Interval Execution Interval	10 50	s		
≕ Upgrade		Max Resp Time Max Retry Times	500 3	ms		<u>_</u>
		Firmware Version: 01.0	5 Hardware Versi	on V1.1		

RS485 Settings		
Item	Description	Default
Enable	Enable/disable RS485.	Enable
X		RS485
Interface Type	Show the interface type.	(Modbus
		Master)
Interface 1(Pin 1)	Enable: UC11-N1 will provide power to	
5v/9v/12v Output	device connected to Interface 1(pin1).	Disabled
50/90/120 Output	Voltage is 5V, 9V or 12V.	
	If the time is set 100ms, then before	
	collecting data from end nodes,	
Power Output	UC11-N1 will provide power for end	
Time Before	nodes for 100ms.	None
Collect	Range:1-5000(ms).	Hone
Concer		
	Note: With this feature being enabled,	
	the power consumption will increase.	
Baud Rate	Select from "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
Data Polling Interval	Set the interval for reading remote channels. When the read cycle ends, the new read cycle begins until this interval over . If it is set to 0, the device will restart the new read 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's determined that the command has timed out. Range: 10-1000.	500
Max Retry Times	Set the maximum retry times after it fails to read, range: 0-5.	3
Modbus RS485 bridge LoRaWAN	Enable this mode to collect data from slave devices and then send it 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



	Ursalink ToolBo	ox V2.6			\ominus	
	General >					
Status	Basic	Serial	GPIO	AI		
		Data Poliing Interval	50	s ms		<u> </u>
General		Max Resp Time Max Retry Times Modbus RS485 bridge LoRaWAN ②	500 3 V	ms		
((0))	Channel Settings	Port 🕜	100			
LoRaWAN	Channel ID Na	ame Slave ID Address Quantity	Туре	Sign Value		
슬 Upgrade	Save				Up to 8 channels	-
		Firmware Version: 01.0	8 Hardware Versio	m V1.0		

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
Туре	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



3.3.3 GPIO

	Ursalink ToolBox V2.4	Θ	Ċ
	General >		
Status	Basic Serial GPIO AI		_
General	Interface Name GPI0 1 Enable		
((0)) LoRaWAN	Interface Name GPIO 2 Enable Interface Type Digital Input2 Pull Down		
습 Upgrade	Status Low Fetch		
	Firmware Version: 01.05 Hardware Version V1.1		

GPIO Settings	GPIO Settings				
Item	Description	Default			
Interface Name	Show the name of this interface.	Null			
Enable	Click to enable this interface.	Disable			
	Choose from:Digital Input,Digital Output Digital Input: This GPIO will be used as Digital Input. Then you will need to				
Interface Type	select the initial state of this digital input form "Pull Up" (High), "Pill Down" (Low). Digital Output: This GPIO will be used as Digital Output.	Digital Input1			
Status	Show the current status of this interface. Click "Fetch" to fetch the latest status.	Null			



3.3.4 AI

	ToolBox V5.5	Θ	\otimes
	General >		
Status	Basic Serial GPIO AI		_
General	Interface 2 (Pin1) 5/9/12V Output Power Output Time Before Collect Data Polling Interval 5 s		
((0)) LoRaWAN	Interface Name Analog Input 1 Enable ☑ Analog Input Signal Type 0-10 V ✓ Status 0.00 V Fetch		
습 Upgrade	Interface Name Analog Input 2 Enable Analog Input Signal Type 4-20 mA Status 0 000 mA Fetch		
	Firmware Version: 01.20 Hardware Version V1.1		

Note: Please adjust the ADC sampling DIP switch on PCB to the corresponding mode before

changing the type of analog input signal.



- Turn on/off Device



Al Settings			
Item	Description	Default	
Interface 2(Pin 1) 5v/9v/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	If the time is set to 100ms, then before collecting data from end nodes,	1-5000	



nodes for 100ms. Range:1-5000(ms).Note: With this feature being enabled, the power consumption will increase.Data Polling IntervalSet the interval for reading analog input. Range: 5-3600(s).Interface NameShow the name of this interface.Datalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".Show the current value of this interface.A-20 mAStatusClick "Fetch" to fetch the latest value of this analog input.		UC11-N1 will provider power for end	
Note: With this feature being enabled, the power consumption will increase.SetData Polling IntervalSet the interval for reading analog input. Range: 5-3600(s).5Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAStatusShow the current value of this interface.Null		nodes for 100ms.	
the power consumption will increase.Increase.Data Polling IntervalSet the interval for reading analog input. Range: 5-3600(s).5Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Show the current value of this interface.Null		Range:1-5000(ms).	
the power consumption will increase.Increase.Data Polling IntervalSet the interval for reading analog input. Range: 5-3600(s).5Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Show the current value of this interface.Null			
Data Polling IntervalSet the interval for reading analog input. Range: 5-3600(s).5Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Show the current value of this interface.Null		Note: With this feature being enabled,	
IntervalRange: 5-3600(s).5Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Show the current value of this interface.Null		the power consumption will increase.	
IntervalRange: 5-3600(s).Interface NameShow the name of this interface.NullEnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Show the current value of this interface.Null	Data Polling	Set the interval for reading analog input.	Ę
EnableClick to enable this interface.DisableAnalog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface. Click "Fetch" to fetch the latest value ofNull	Interval	Range: 5-3600(s).	5
Analog Input Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface. Click "Fetch" to fetch the latest value ofNull	Interface Name	Show the name of this interface.	Null
Signal TypeSelect from: "4-20 mA", "0-10 V".4-20 mAShow the current value of this interface.Click "Fetch" to fetch the latest value ofNull	Enable	Click to enable this interface.	Disable
Signal Type Show the current value of this interface. Status Click "Fetch" to fetch the latest value of Null	Analog Input	$f_{0} = f_{0} + f_{0$	1 20 m 1
Status Click "Fetch" to fetch the latest value of Null	Signal Type	Select from: 4-20 mA , 0-10 V".	4-20 MA
		Show the current value of this interface.	
this analog input.	Status	Click "Fetch" to fetch the latest value of	Null
		this analog input.	



3.4 LoRaWAN

3.4.1 Basic-OTAA

	Ursalink ToolBox V5.2	\ni \otimes
	LoRaWAN >	
Status	Basic Channel	4
General	Device EUI 24e1641193121577 App EUI 24e124c0002a0001 Working Mode: Class A Join Type OTAA Application Key 4c696e6b4c6f52613230313823 Regular Report Confirmed ⑦ □	_
((0)) LoRaWAN	Alarm Report Confirmed 🕜 🔲	
습 Upgrade	Firmware Version: 01.17 Hardware Version V1.1	×.
Device sends join-red	Over-The-Air Activation	
pre-programmed AppEUI and AppKey, a random DevNe	evEUI, s well as packet and then forwards it to Date and consults the entity	
		-
	The device stores the NetID, DevAddr and network settings, and then uses the AppNonce to generate its session keys, NwkSKey and AppSKey. The join-accept response contains a NetID, a DevAddr and a AppNonce, as well as some network settings like DLSettings, RxDelay and an optional CFList.	

Basic Settings-OTAA			
Item	Description	Default	
		the	
Device EUI	Show the identifier of this device.	identifier	
	show the identifier of this device.	of this	
		device.	
App EUI	Enter the application EUI. The Network Server receives	24E124C00	



	request and consults the entity associated with the APPEUI to validate the request.If permission is granted, it responds with a join-accept message.	02A0001
Working Mode	Show the working mode of the device. UC11-N1: Null. UC11-N1-DC: Select from: "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. 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. 	ΟΤΑΑ
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	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 3 times at most.	Disabled
Alarm Report Confirmed	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.	Disabled



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.	

3.4.2 Basic-ABP

App EUI

	Jrsalink ToolBox V5.2) O	\otimes
L	.oRaWAN >		
Status	Basic Channel		
General	Device EUI 24e1641193121577 App EUI 24e124c0002a0001 Working Mode: Class A Join Type ABP Device Address 93121577 Network Session Key 5572404c696e6b4c6952613230		
((0)) LoRaWAN	Application Session Key 5572404c696e6b4c6f52613230		
습 Upgrade	Alarm Report Confirmed 🕜 🔲 Since		-
	Firmware Version: 01.17 Hardware Version V1.1		
Ar Device is pre-programme DevAddr, an AppSKey NwkSKey. No join proce necessary.	and a configured with the device's	,	
Basic Settings-AB	D		
Item	Description	Defa	ult
Device EUI	Show the identifier of this device.	the ident of tl devi	ifier his

Enter the application EUI. The Network Server receives

request and consults the entity associated with the

24E124C00

02A0001



PEUI to validate the request. If permission is granted, it	
w the working mode of the device. L1-N1: Null. L1-N1-DC: Select from: "Class A", "Class C". as A :Class A operation is the lowest power l-device system. as C: Class C end-device will use more power to erate than Class A but they offer the lowest latency server to end-device communication.	Class A
ect from: "OTAA" and "ABP". AA:Over-the-Air Activation. over-the-air activation, end-devices must follow a procedure prior to participating in data exchanges in the network server. An end-device has to go bugh a new join procedure every time it has lost the sion context information. P: Activation by Personalization. der certain circumstances, end-devices can be vated by personalization. Activation by sonalization directly ties an end-device to a specific work by-passing the join request - join accept cedure.	ΟΤΑΑ
er the device address. The device address identifies end-device within the current network.	The last 8 digits number of SN
er the network session key of the device. The work session key specific for the end-device. It is used the end-device to calculate the MIC or part of the MIC essage integrity code) of all uplink data messages to ure data integrity.	5572404c6 96e6b4c6f 526132303 13823
er the application session key of the device. The oKey is an application session key specific for the -device. It is used by both the application server and end-device to encrypt and decrypt the payload field opplication-specific data messages.	5572404c6 96e6b4c6f 526132303 13823
er sending the regular report packet to the network	Disabled
	<pre>oonds with a join-accept message. w the working mode of the device. .1-N1: Null. .1-N1-DC: Select from: "Class A", "Class C". s A :Class A operation is the lowest power -device system. s C: Class C end-device will use more power to rate than Class A but they offer the lowest latency server to end-device communication. wt from: "OTAA" and "ABP". A:Over-the-Air Activation. over-the-air activation, end-devices must follow a procedure prior to participating in data exchanges in the network server. An end-device has to go pugh a new join procedure every time it has lost the ion context information. :: Activation by Personalization. ler certain circumstances, end-devices can be wated by personalization. Activation by sonalization directly ties an end-device to a specific work by-passing the join request - join accept cedure. er the device address. The device address identifies end-device within the current network. er the network session key of the device. The work session key specific for the end-device. It is used he end-device to calculate the MIC or part of the MIC ssage integrity. er the application session key of the device. The Key is an application session key specific for the -device. It is used by both the application server and end-device to encrypt and decrypt the payload field pplication-specific data messages.</pre>



	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 3 times at most.	
Alarm Report Confirmed	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. 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.	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	Ursal	ink Tool	Box V2	2.4			Θ
	LoRaW	AN >					
Status		Basic		Channel			
				Supported Frequency	EU868		2
			Index	Frequency/MHz	Max Datarate	Min Datarate	_
General			0	868.1	5-SF7BW125 -	0-SF12BW125 <u>*</u>	
General			1	868.3	5-SF7BW125 _*	0-SF12BW125 -	
			2	868.5	5-SF7BW125	0-SF12BW125 -	
((0)) LoRaWAN			3	0	5-SF7BW125 _*	0-SF12BW125 -	
			4	0	5-SF7BW125 _	0-SF12BW125 _	1
~			5	0	5-SF7BW125 *	0-SF12BW125 -] -
실 Upgrade			6	0	5-SF7BW125 _	0-SF12BW125	

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
	0	Radio 0 🔻	923.2
	1	Radio 0 🔻	923.4
	2	Radio 0 🔻	923.6
	3	Radio 1 🔹	922.2
2	4	Radio 1 🔹	922.4
9	5	Radio 1 🔹	922.6
	6	Radio 1 🔹	922.8
	7	Radio 1 v	923.0

3.5 Upgrade

	Ursalink ToolBox V2.4			⊖ ∪
	Upgrade >			
Status				
General	Firmware Version	01.05		
	Upgrade Firmware		Browse	Upgrade
((0)) LoRaWAN	Restore Factory Defaults	Reset		
습 Upgrade				
		Firmware Version: 01.05	Hardware Version V1.1	

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

Step 2: Run the Ursalink 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 Ursalink ToolBox is not allowed during upgrading, otherwise the upgrading will be interrupted, or even the device will break down.



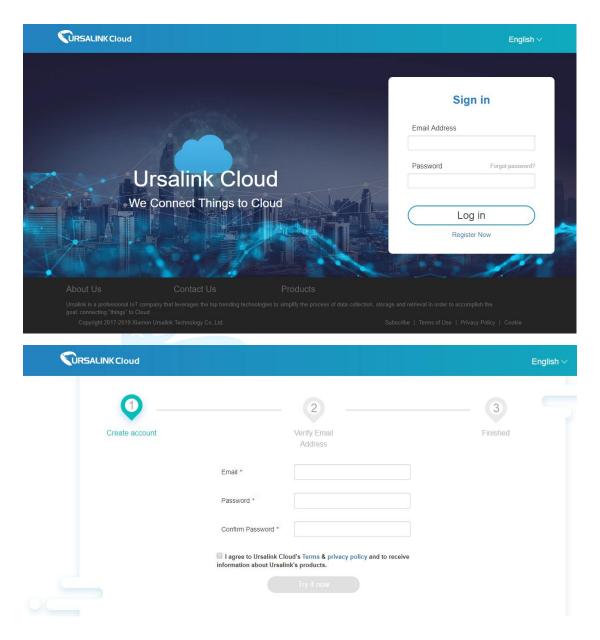
4.Configuration via Ursalink Cloud

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 a 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

To add your Ursalink gateway to the Ursalink Cloud, please follow these steps:

1. On the main page, click "Gateway".

	INK Cloud										claire@u	irsalink.com 2	<u>}</u> 6	C+
Device	-			👔 Just one m	ore step t	to get started o	ı Ursalin	k Cloud. Please ac	dd billing	address. G	o ahead			
My Devices	_	Add	Delete								Search			0 ₩•
Gateway		Status) Name 🔶	Mode	I \$	Partnumbe	r 👙	Serial Number	¢	version	\$	Update Time	\$	Operation
Device Groups						No ma	tching re	ecords found						
Event Center														
Account	+													
				(Copyrigh	it 2017-2019 >	iamen	Ursalink Technolo	ogy Co.,L					

2. On the gateway page, click "Add" to add a gateway.

	LINKC	loud								claire@u	irsalink.com {	2 6	6	
	•			Just one more	step to get starte	d on Ursali	nk Cloud. Please ad	dd billing a	address. G					
Device														
My Devices		Add Del	ete							Search			0	₩.
Gateway														
Device Groups		🔟 Status 🔶	Name 🔶	Model	Partnur	nber 🔶	Serial Number	•	version	(Update Time	÷	Opera	ition
					No	matching	records found							
Event Center														
Account	٠													
				Cop	yright 2017-201	9 Xiamen	Ursalink Technolo	ogy Co.,L	_td.					

Enter the correct SN of the gateway and click "Add". You can find your gateway SN either on the label on the bottom of the device or on the web GUI.



	Add Device	×
SN		
(j) Please	enable Ursalink Cloud mode on gateway first.	
	Add Cancel	

Note: Please make sure the working mode is Ursalink Cloud.

				For your device	security, please <mark>chang</mark>	e the default password
Status		General	Applications	Profiles	Device	Packets
LoRaWAN	•	General Setting	3			
Packet Forwarder		Enable	Ø			
Network Server		Mode	Ursalink Cloud	۲		
Network Server		NetID	010203]	
Network	•	Join Delay	5		sec	
		RX1 Delay	1		sec	
System		Lease Time	744-0-0		hh-mm-ss	
Maintenance	Þ	Log Level	info	۲]	

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

	SALINK CI	oud						sway(@yeastar.com 🔏 🖥	0 C+	
Device	•	Ad	d Dele	te				Searc	ch	o	
My Devices											
Gateway			Status 🔶	Name 🔶	Model 🔶	Partnumber 🔶	Serial Number 🔶	version 🔶	Update Time 🔶	Oper	ratior
Device Groups			\odot	My Gateway	UG87	L01CE-S1022-GPS- EU868		Firmware: 87.1.0.96 Hardware: V1.3	2019-06-13 10:00	{	2
Event Center						20000		That Girls of The			
Account	•										
					Copyrig	nt 2017-2019 Xiamen l	Jrsalink Technology C	o.,Ltd.			



4.3 Add Devices to Ursalink Cloud

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

Add Delete Search C III Status Name Model Partnumber Serial Number version Update Time Operation Image: Status My Gateway UG87 L01CE-\$1022-GPS- EU868 Firmware:87.10.96 Hardware:V1.3 2019-06-13 10:00 Image: Status	My Devices Gateway Status & Name & Model & Partnumber & Serial Number & version & Update Time & Operation Device Groups My Getenery LIG87 L01CE-\$1022-GPS- Firmware.87.10.96 2019.06.13.10.00	y Devices	y Devices	Add Delete C III			bu						sway@	@yeastar.com 🔏 🖻	• •
Mu Gateway UC87 L01CE-S1022-GPS	Saleway Status & Name & Model & Partnumber & Serial Number & version & Update Time & Operation Device Groups My Gateway UIG87 L01CE-S1022-GPS- Serial Number & Firmware.87.10.96 2019.06.13.10.00			Devices	Device	•	Add	Dele	te				Searc	h	0 🖩
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			Aunoy Name Model Partitiumber Senai Number Version Update Time Operation	teway 🔲 Status 🔶 Name 🔶 Model 🔶 Partnumber 🔶 Serial Number 🔶 version 🍦 Update Time 🔶 Operation	ateway	1		Status 🔶	Name 🔶	Model 🔶	Partnumber 🔶	Serial Number 🔶	version 🔶	Update Time	Operation
					Device Groups			\odot	My Gateway	UG87				2019-06-13 10:00	@
	ivent Center		Wy Gateway 0007 FU868 Hardware V1 3 2013-06-13 10.00		event Center						20000		1000000		/
		vent Center	EU666 Hardware.V1.3	My Gateway UG87 EU868 Hardware.V1.3 2019-06-13 10:00	ccount	•									
Copyright 2017-2019 Xiamen Ursalink Technology Co.,Ltd.	Copyright 2017-2019 Xiamen Ursalink Technology Co.,Ltd.	Copyright 2017-2019 Xiamen Ursalink Technology Co.,Ltd.	vent Center scount Copyright 2017-2019 Xiamen Ursalink Technology CoLtd.	ent Center count Copyright 2017-2019 Xiamen Ursalink Technology Co.,Ltd.	Click 꽥	the 🕻	n cli	ck "Ass	ociated D	evices" .					
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Mr. Gataway UG87 L01CE-S1022-GPS- Firmware:87.10.96 2019.06.43.10.00	vice Groups	teway Etway Name 🔶 Nodel 💠 Partnumber 🔶 Serial Number 🔶 version 🔶 Update Time 🔶 Operation	PW/AV		Devices		Add	Dele	:te				Searc	n	
Status + Name + Model + Partnumber + Serial Number + version + Update Time + Operation	v/ Devices ateway Status & Name & Model & Partnumber & Serial Number & version & Update Time & Operation evice Groups Wic Gateway UG87 L01CE-S1022-GPS- Trimware 87.10.96 2019-0.0.13.10.00	/ Devices	/ Devices		evice	•	Add	Dolo	to				Paara		
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3. Click "Add" to add a UC11-N1 to this gateway.



Device	< Add	Delete		Search C III-
My Devices	~			
Gateway		Name 🔶	Status 🔶	Serial Number 🔶
Device Groups		My Device	Joined	012101020201
Event Center		My Device	Joined	10102010001001
Account	•			
		My Device	Joined	011000172723

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.

Device	•	Add	Delete		Search C III-
My Devices					
Gateway			Name 🔶	Status 🖨	Serial Number 👙
Device Groups			My Device	Joined	011001017501
Event Center			My Device	Joined	-012101020201
Account	•		My Device	Joined	012201000110

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

- ≡ Device Search 0 ⊪• My Devices Gateway Input Status 🔶 Output Status 🧾 Status 🔶 Name 🔶 Update Time 🔶 Operation Device Groups My Device DI_1: () DI_2: () DO_1: 💿 SN: 2019-06-13 10:37 (2) Event Center DO_2: 💿 Model: UC1114 . Account My Device DI_1: () AI_1: 15.92 mA \odot DO_1: 🚳 2019-06-13 11:06 @ > SN: AI_2: 19.35 mA Model: UC1122 DI_1: () My Device Copyright 2017-2019 Xiamen Ursalink Technology Co.,Ltd.
- 1. Click "Add" on the upper left corner.



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.

	ALINK Cio	ud				claire@ursalink.c	om 🔏 🗊 🔂
Device	•	Add	Delete			Search	с ш.
ly Devices							
iateway			Status 🔶	Name 🕴	Interface Status	Update Time 🔶	Operation
vent Center		٠	查	My Device SN: 6411 Model: UC11-N1	GPIO_1: GPIO_2: ·	2019-07-24 17:57	
ccount	•						
					Copyright 2017-2019 Xlamen Ursalink Technology Co.,Ltd.		

4.4 Check the Data of UC11-N1

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

Status	General Applicat	ions Profile	s Device	P	ackets					
.oRaWAN 🔫	Network Server									
Packet Forwarder	Clear								Search	Q Q
Network Server	Device EUI	Frequency	Datarate	SNR	RSSI	Size	Fcnt	Туре	Time	Details
Vetwork 🕨	Constanteresta	923400000	SF10BW125			17	0	JnAcc	2018-09-29T10:00:23+08:00	0
Vetwork P	Coccadimetropoliti	923400000	SF10BW125	10.8	-57	18	0	JnReq	2018-09-29T10:00:23+08:00	0
System 🕨	Contraction	923400000	SF10BW125			17	0	JnAcc	2018-09-29T09:58:20+08:00	0
		923400000	SF10BW125	11.5	-58	18	0	JnReq	2018-09-29T09:58:20+08:00	0
ndustrial 🕨 🕨	10.0.000	923200000	SF10BW125	12	-	17	0	JnAcc	2018-09-28T17:36:27+08:00	0
Naintenance ►		923200000	SF10BW125	11.2	-62	18	0	JnReq	2018-09-28T17:36:27+08:00	0
	B	923200000	SF10BW125			17	0	JnAcc	2018-09-28T17:18:25+08:00	0
PP 🕨	60-F-000.000	923200000	SF10BW125	9.8	-69	18	0	JnReq	2018-09-28T17:18:25+08:00	0
	(decommenced)	923200000	SF7BW125	-		0	2	DnUnc	2018-09-28T17:02:59+08:00	0
	oucadometooaa	923200000	SF7BW125	8.2	-72	8	2	UpCnf	2018-09-28T17:02:59+08:00	0



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

Device	Add Delete				Search	с ш.
My Devices						
Gateway	Status 🔶	Name 🔶	Interface S	tatus 🔶	Update Time 🔶	Operation
Device Groups Event Center	□ <u></u> Ď	My Device SN: 6411 Model: UC11-N1	GPIO_1: GPIO_2:		2019-07-24 17:57	<u>ه</u> ~
Account	RSSI: -48dBm Battery: 100% Group Name: - Associated Gateway: 6210 Device EUI: 24e164 Firmware: v1.5 Hardware: v1.1	20 - High 10 - 5 - 0 - Low + 20: 07:		-O- Al_1	-O- AI_2 -O- GPIO_1 -O- GPIO_	
		07-	22 07-23 Copyright 2017-2019 Xiamen U		07-2	4

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.

	NK Cloud				Qursalink.com 🖉 🖬 🕞
evice	Add	d Delete			Search
ly Devices					
ateway	-	Status 🔶	Name 🔶	Interface Status 👙	Update Time 🝦 Operati
evice Groups			My Device	GPIO_1:	_
rent Center		迹	SN: 641 Model: UC11-N1	GPIO_2:	2019-07-24 17:57
count	•				



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)	GPIO_1	Low	۲
GPIO 2(Digital Input)	GPIO_2	Low	

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
Nama	Chaw the name and the type of this interface	GPIO x
Name	Show the name and the type of this interface.	(Digital



		Input x)
Custom Name	Enter the custom name of this interface.	GPIO_1
Value	Show the latest value of this interface.	Null
· · · ·	Enable: The interface's name and value will be shown on the home page.	<u>.</u>
Visualization	Disable: The interface's name and value will not be shown on the home page.	Disable

Name	Custom Name	Osh	Osl	Unit	1	/alue	Visualization
AI 1:	AI_1			[Max:	0.00 mA	
					Min:	0.00 mA	
					Avg:	0.00 mA	
AI 2:	AI_2	I			Max:	0.00 mA	
					Min:	0.00 mA	
					Avg:	0.00 mA	

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
	Enable: The interface's name and value will be shown on the home page.	
Visualization	Disable: The interface's name and value will not be shown on the home page.	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

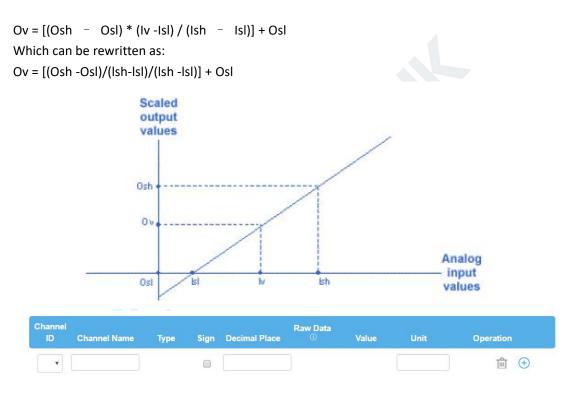
Osl = low limit of the scale for the scaled output value

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:



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		



	Read command, options are "Coil", "Discrete", "Holding	Holding
Туре	Register (INT16)", "Input Register (INT16)", "Holding Register	Register
	(INT32)" and "Holding Register (Float)".	(INT16)
Sign	To identify whether this channel is signed.	Null
Sign	Default: Unsigned.	INUII
	To indicate a dot in the read into the position of the channel.	
Decimal Place	For example: if the channel raw data is 204d, and a Decimal	Null
	Place is equal to 2, then the actual value is 12.34.	
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 a LoRaWAN Gateway to The Things Network

5.1.1 Register Your Gateway in The Things Network

To register your gateway with the The Things Network, please follow these steps: 1. Click "GATEWAYS" on the console screen.

THETHINGS CONSOLE NETWORK COMMUNITY EDITION	Applications Gateways Support 闪 Christ
😽 Hi, C	Chris1!
Welcome to The Thing	gs Network Console.
This is where the magic happens. Here you can work with your data. Re collaborators a	
APPLICATIONS	GATEWAYS

2. Click "register gateway".



THE THINGS CONSOLE COMMUNITY EDITION	Applicatio	ns Gateways	Support	Chris1	~
Gateways					
GATEWAYS			register	gateway	

3. Enter the gateway information.

GISTER GATEWAY	
Cateway EUI he EUI of the gateway as read from the LoRa module	
24 E1 24 FF FE F0 13 2E	🧔 8 bytes
I'm using the legacy packet forwarder Select this if you are using the legacy <u>Semtech packet forwarder</u> .	
Description human-readable description of the gateway	
requency Plan he <u>frequency plan</u> this gateway will use	
Asia 920-923MHz	ŝ
Router he router this gateway will connect to. To reduce latency, pick a router that is in a region which is close to the location of the gateway.	
switch-router	

5.1.2 Connect Ursalink Gateway to The Things Network

To connect your gateway to TTN , please follow these steps:

1. Log in gateway web GUI.



♥ URSALINK × +				-		×
\leftarrow \rightarrow D 192.168.1.1/login.html		□ ☆	₽	Ø	٩	
192.168.1.1		English				
	Username					
	Password					
	Login					

2. Click "LoRaWAN" \rightarrow "Packet Forwarder" \rightarrow "General" to configure the general setting.

Status	General	Radios	Advanced	Custom	Traffic
LoRaWAN	General Setting				
	Enable				
Packet Forwarder	Mode		Packet Forwa	arder	
Network Server	Gateway EUI		24E124FFFE	F0132D	
Network ►	Gateway ID		24E124FFFE	F0132E	
	Server Address		ttn.opennetw	orkinfrastructure.or	
System	Server Up Port		1700		
	Server Down Port		1700		
Industrial				,	

3. Click "Radios" to configure the center frequency and channels.



Status	General	Radios	Advanced	Custom	Traffic				
RaWAN	Radio Cha	nnel Setting							
	Supported F	requency			AS923	٣			
Packet Forwarder			Name				Center Freq	uency/MHz	
Network Server			Radio 0				923.6		
letwork			Radio 1				922.6		
ystem	Multi Chan	nels Setting							
		Enable	Index		Radio			Frequency/MHz	
ndustrial	•		0		Radio 0	۲	[923.2	
laintenance			1		Radio 0	٣	[923.4	
		2	2		Radio 0	٣		923.6	
PP	. K	2	3		Radio 1	٣	[922.2	
		2	4		Radio 1	٣	[922.4	
			5		Radio 1	٣	[922.6	
		2	6		Radio 1	¥		922.8	
			7		Radio 1	*	[923.0	

5.2 Add UC11-N1 to The Things Network

5.2.1 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.



THE N ET	THINGS CONSOLE			Applications	Gateways	Support	Chris1	~
	This is where the magic happens. H	Welcome to The Thir ere you can work with your data. R	Chris1! ngs Network Console. Register applications, devices an	d gateways, ma	anage your ir	itegrations,		
		collaborators	s and settings.		0			
	APPLICATI	ONS		GATEWA	YS			
	"add application" .			Applications		Connect	Chris1	•
	THINGS CONSOLE COMMUNITY EDITION			Applications	Gateways	Support		v
	APPLICATIONS				-	🕒 <u>add a</u>	oplication	
	dadf USRALINK			ttn-handl	er-eu 2C 26	C5 01 24 84 20	08	
	sensor333 TEST			switch-ha	ndler 🛛 00 00	00 00 00 00 00	01	
		You are the network. Let's build thi	is thing together. — <u>The Things Network</u>					

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



Application ID The unique identifier of your application on t	the network	
Description Numan readable description of your new a	pp	
Eg. My sensor network application		
	ngs Network block for convenience, you can add your own in the application settings page. EUI issued by The Things Network	
n application EUI will be issued for The Thi	EUI issued by The Things Network	
n application EUI will be issued for The Thin andler registration elect the handler you want to register this a	EUI issued by The Things Network	
Application EUI An application EUI will be issued for The Thin Handler registration Select the handler you want to register this a ttn-handler-eu	EUI issued by The Things Network	

5.2.2 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 0025ca00000000f then the Device ID is dev-0025ca000000000f.

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



		Overview	Devices	Payload Formats	Integrations	Data	Setti
EGISTER DEVICE						<u>bulk im</u>	port dev
Device ID This is the unique identifier for the	device in this app. The device ID	will be immutable.					
Device EUI The device EUI is the unique identif	fier for this device on the networl	k. You can change the EUI late	n				
							and the second
×							0 bytes
App Key The App Key will be used to secure	the communication between you						O bytes
Арр Кеу	the communication between you	I device and the network. this field will be generated					O bytes
App Key The App Key will be used to secure	the communication between you						O bytes
App Key The App Key will be used to secure	the communication between you						O bytes
App Key The App Key will be used to secure App EUI	the communication between you						
App Key The App Key will be used to secure App EUI	the communication between you						

4. Click "Register" to complete registration.

5.2.3 Configure UC11-N1

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

	Ursalink ToolBox V5.2	Θ	\otimes
Status	LoRaWAN > Basic Channel Device EUI 24e1641193121577 App EUI 24e124c0002a0001		-
General	Working Mode: Class A Join Type OTAA Application Key \$c696e6b4c6f52613230313823 Regular Report Confirmed ?		
((•)) LoRaWAN	Alarm Report Confirmed 🕜 🕞		
슱 Upgrade	Firmware Version: 01.17 Hardware Version V1.1		_



5.3 Check Data Transmission on The Things Network

1. Click "Gateways" to check the Gateways status.

GS CONSOLE R K COMMUNITY IDITION	Applications Gateways Support 闪 Christ 🗸
Gateways	
GATEWAYS	register gateway
eui-24e124fffef0132e USRALINK	connected A5_920_923

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

	NSOLE	N							Ap	plications	Gateways	Support	Chris1	~
Applicati	ions													
APP	LICATION	15									c	add applicati	<u>on</u>	
123	3454321	JSRALINK							switc	h-handler	70 B3 D5 7E D	0 00 7A C2		
								VA						
THE THINGS CO	NSOLE	c.							Applic	ations (Gateways	Support	Chris1	~
Application	ns > 🤘 1:	23454321	> Data											
							Overview	Devices	Payload Formats	Integrat	ions Data	Settings		
							Overview	Devices	rayidad Formats	integrat	ions Data	Jettings		- 1
APPL		DATA									II p	ause 🗃 <u>clear</u>		- 1
														- 1
Filters	uplink	downlink	activation	ack	error									- 1
	time 14:23:03	counter	port 0		devid: <u>ursalink</u>							A.		- 1
	14:23:03	3		retry onfirmed		navload	53 01 00 00 01 0	0 00 64				-		. 1
	14:22:57	0	0	onfirmed	devid: <u>ursalink</u>	poyrood	50 01 00 00 01 0							
	14:22:55	3		retry onfirmed		payload:	53 01 00 00 01 0	0 00 64				-		
	14:22:52		0	unjamieŭ	devid: <u>ursalink</u>							- 1		
	14:22:50	3	8 0	onfirmed	devid: <u>ursalink</u>	payload:	53 01 00 00 01 0	00 00 6 <mark>4</mark>				-1		
•	14:22:43		0		devid: <u>ursalink</u>									÷