How to use RAK cloud ChirpStack for testing

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39 PAGES



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1. What's the RAK cloud ChirpStack?

Sometimes, some customers will meet some problems about how to setup a ChirpStack or how to use a ChirpStack for testing.

RAK have supply some solutions for it, for example, every RAK LoRa gateway has a built-in ChirpStack. But we think it is not enough for our customer, especially when they want to use a ChirpStack directly without setting up a new one.

That's why we supply another way for customers to use ChirpStack.

Actually, RAK has deployed 3 ChirpStack on cloud server to support our customers to test their RAK LoRa gateway or RAK LoRa node.

We always believe that our excellent service will help our customers, and we will do our best!

2. Where are them?

We have deployed ChirpStack on 3 cloud servers, and each of them can support only one frequency:

Frequency	IP Address
CN470	106.15.233.112
EU868	209.250.251.9
US915	106.15.239.64

You can choose one of them for testing.

3. How can i use them?

You can use one of them through its web page. All of them have the same web page port: 8080.

For example, if you want to use EU868 frequency ChirpStack, you can open the following link: http://209.250.251.9:8080

If you want to use US915 frequency ChirpStack, you can open the following link:

http://106.15.239.64:8080

Similarly, if you want to use CN470 frequency ChirpStack, you can open the following link: <u>http://106.15.233.112:8080</u>

Then you can see the web page of ChirpStack as follow:



Login	
Username *	
Password *	
	LOGIN

Note: You can go to RAK forum <u>https://forum.rakwireless.com/t/rak-free-cloud-ChirpStack-for-testing/344</u> to post an application in that topic, then RAK will send you an username and password of ChirpStack you want to use.

After login, you can see the following page:

	ChirpStack						?	θ	test001
test	test001 Applications							+	CREATE
<u>+</u>	Org. users	Applications							
≟ ≡	Service-profiles	iD	Name	Service-profile		Descriptio	n		
TT	Device-profiles	3	app-001	service-profile-001		app-001			
\bigcirc	Gateways					10	10100	32	
	Applications				Hows per page:	10.	1-1 of 1	<	,
2	Multicast-groups								

Now, you can register your LoRa gateway or LoRa node to this ChirpStack freely.

4. How to register my LoRa gateway?

Please have a look at the section 8 of the following document: <u>http://docs.rakwireless.com/en/LoRa/RAK2245-Pi-HAT/Application-Notes/Get_Start_with</u> <u>RAK2245&RAK831 RPi LoRa Gateway.pdf</u>

5. How to register my LoRa node?

Open the web page of the ChirpStack which you want to use.

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€	ChirpStack			Q Search organization	on, application, gateway or device	0	e admin
COMM COMM	Network-servers	Ameliantiana				-	L ODEATE
R	Gateway-profiles	Applications					- CREATE
H	Organizations	D	Name	Service-profile	Description		
÷	All users	1	AppModel	ServiceProfileModel	AppModel		
loras	server 👻				Rows per page: 10 - 1-1 c	1	< >
۵	Org. settings						
•	Org. users						
±≣	Service-profiles						
	Device-profiles						
R	Gateways						
	Applications						
2	Multicast-groups						

By default, there is already one or more items in this page, you can use it or create a new item. Now, let's create a new item by click the "CREATE" button, and fill in them.

€	ChirpStack	Q. Search organization, application, gateway or device	? \varTheta admin
	Network-servers Gateway-profiles	Applications / Create	
Ŧ	Organizations		
*	All users	Application name * The name may not contain words numbers and disches	
loras	server +		
ッ III ③ III III	Org. settings Org. users Service-profiles Device-profiles Gateways Applications Multicast-groups	Application description * service-profile The service-profile to which this application will be attached. Note that you can't change this value after the application has been created. Payload code: None By defining a payload coder; Lofta App Briver can encode and decode the binary device payload for you.	CREATE APPLICATION
€		Caserb presidation empleation asterior or device	
			? 🔒 admin
R	Network-servers Gateway-profiles	Applications / Create	? admin
R	Network-servers Gateway-profiles Organizations	Applications / Create	🕜 🖰 admin
® #	Network-servers Gateway-profiles Organizations All users	Application serve + RAK7200_test	
©	Network-servers Gateway-profiles Organizations All users	Application same * Application work and determined to control to c	e admin
	Network servers Gateway profiles Organizations All users server • Org. settings Org. users Service-profiles	Application swee* Application swee* RA(7200_test The same may only contain words, numbers and dashee. Application is used to test RAK7200 This application is us	
	Network servers Gateway profiles Organizations All users server • Org. settings Org. users Service-profiles Device-profiles	Application sware * Application sware * AApplication works, numbers and dashes, Application is used to test RAK7200 This application is used to test RAK7200 Thi	• • • • • •
◎ ■ • lora: ora: ora: ora: 中国 中国	Network servers Gateway profiles Organizations All users server • Org. settings Org. users Service-profiles Device-profiles Gateways	Applications / Create Application serve * AAX7200_test This application is used to test RAK7200 Enrice profile * Service	• • • • • •
◎ ■ · · · · · · · · · · · · · · · · · ·	Network-servers Gateway-profiles Organizations All users server - Org. settings Org. users Service-profiles Device-profiles Gateways Applications	Applications / Create Application save* AK7200_test AK7200_test This application is used to test RAK7200 This applicati	CREATE APPLICATION

"CREATE APPLICATION".



€	ChirpStack					Q. Search organization, application, gateway or device		9 E	admin
	Network-servers Gateway-profiles	A	pplications					+	CREATE
	Organizations		ID	Name	Service-profile	Description			
•	All users		1	AppModel	ServiceProfileModel	AppModel			
loras	server +		2	RAK7200_test	ServiceProfileModel	This application is used to test RAK7200			
\$	Org. settings					Rows per page: 10 *	1-2 of 2	<	>
•	Org, users								
å≡	Service-profiles								
	Device-profiles								
R	Gateways								
	Applications								
2	Multicast-groups								

Click the new item name "RAK7200_test":

€	ChirpStack				Q Search organization, application, gateway	r device	0	Θ	admin
	Network-servers Gateway-profiles	Applications / R	AK7200_test					i Di	ELETE
	Organizations	DEVICES	APPLICATION CONFIGURATION INTEGRATI	ONS					
•	All users							+ cr	REATE
loras	erver 👻								
ф	Org. settings	Last seen	Device name	Device EUI	Link margin		Battery		
•	Org. users				Rows per p	ige: 10 🕶	0 to 0 0	<	>
±=	Service-profiles								
	Device-profiles								
R	Gateways								
ш	Applications								
2	Multicast-groups								

Add a LoRa node device into ChirpStack by clicking the "CREATE" button:

€	ChirpStack				Q Search	organization, application	i, gateway or de	vide	0	e adm	n
III @	Network-servers Gateway-profiles Organizations	Applications / I	RAK7200_test	INTEGRATIONS						DELETE	
<u>+</u>	All users									+ CREATE	
loras	erver 👻										
¢	Org. settings	Last seen	Device name	Device 8	Л	Link margin			Battery		
<u>.</u>	Org. users						Rows per page:	10-	0-0 of 0	< >	
±≡	Service-profiles										_
귶는	Device-profiles										
R	Gateways										
ш	Applications										
2	Multicast-groups										



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echi	nolo	gy	C	0.,	Ltd.	

€	ChirpStack	Q. Search organization, application, gateway or device	0	\rm edmin	
	Network-servers Gateway-profiles	Applications / RAK7200_test / Devices / Create			
•	All users	Device name * The name may only contain words, numbers and dashes:			
loras	erver 👻	Device description *			
¢ •	Org. settings Org. users	Device EUI *	MSB	C	
<u>⊥</u> ≡	Service-profiles	Device-profile * Device-profile		•	
∰ ®	Gateways	Disable frame-counter validation			
<i>ت</i> ا ا	Applications Multicast-groups	Note that disabling the frame counter validation will compromise security as it enables people to perform replay attacks.	CREATI	DEVICE	

Fill in them. You can generate a Device EUI automatically by click the following icon, or you can write a correct Device EUI in the edit box.

	ChirpStack	Q Search organization, application, gateway or device O	θ	test001
test0	01			
•	Org. users	Applications / app-001 / Devices / Create		
±≡	Service-profiles	Device name *		
발	Device-profiles	RAK7200 test The name may only contain words, numbers and dashes.		
\bigcirc	Gateways	Device description *		
ш	Applications	the first KAK/200 to test		_
2	Multicast-groups	Beside EUI* 85 ad da b5 11 19 d9 cb Ms	SB	C
		Device-profile * Device-profile		
		DeviceProfile_ABP		
		DeviceProfile_OTAA		
		CREA	TE DE	VICE

Note: If you want to join in OTAA mode, you should select "DeviceProfile_OTAA" in the "Device-profile" item. If you want to join in ABP mode and other frequencies except AS923 and CN470, you should select "DeviceProfile_ABP" in the "Device-profile" item. What about AS923 in ABP mode? Sorry! ChirpStack can not support it now.

5.1 Register a LoRa node in OTAA mode

If you select "DeviceProfile_OTAA", it means you want to join ChirpStack in OTAA mode.

Æ	ChirpStack		e e	edmin)
	Network-servers	Applications / RAK7200_test / Devices / Create		
R	Gateway-profiles			
	Organizations	Device name *		
<u>+</u>	All users	RAK7200_test1 The name may only constain works morehan and rischase		
loras	erver 👻	The function of any solution in the second sec		
\$	Org. settings	DeceRP		
<u>+</u>	Org. users	74 4d 44 52 dd 39 03 7c	MSB	C
≟ ≡	Service-profiles	Device profile - Device Profile_OTAA		
	Device-profiles			
R	Gateways	Disable frame-counter validation		
ш	Applications	Note that disabling the trame-counter validation will compromise security as it enables people to perform replay-attacks.		
2	Multicast-groups		CREATE	DEVICE

"CREATE DEVICE". Then generate the application key in this page. You can write it by



yourself or generate it automatically by clicking the following icon:

€	ChirpStack	Q. Search organization, application, gateway or device	? \varTheta admin
■	Network-servers Gateway-profiles Organizations	Applications / RAK7200_test / Devices / RAK7200_test1 configuration Live device data Live Lorawan Frames	DELETE
*	All users		
loras	erver 👻	Application key (LoRaWAN 1.0) *	MSB C 🗞
\$	Org. settings	For LoRaWAN 1.0 devices, this is the only key you need to set. In case your device supports LoRaWAN 1.1, update the device-profile first.	
•	Org. users		SET DEVICE-KEYS
≞ ≡	Service-profiles		
- 	Device-profiles		
R	Gateways		
	Applications		
2	Multicast-groups		
10000	~		
€	ChirpStack	Q Search organization, application, gateway or device	? 😆 admin
	Network-servers		-
R	Gateway-profiles	Applications 7 RAK/200_test 7 Devices 7 RAK/200_test 1	DELETE
	Organizations	CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES	
•	All users		
loras	server	Application key (LoRuHAN 1.0) * bo To 45 75 65 65 67 00 00 10 41 10 00 42	
\$	Org. settings	US 7 4 4 3 3 6 1 00 et 3 5 0 0 2 2 0 0 3 6 4 1 C 94 4 2 For LoBWAN 1 0 devices, this is the only key you need to act in case your device supports LoBWAN 1 1, update the device-profile first.	MSB C Q
*	Org. users		SET DEVICE-KEYS
.≜≡	Service-profiles		
	Device-profiles		
R	Gateways		
	Applications		
2	Multicast-groups		

"SET DEVICE-KEYS". That's OK! You've complete the configuration on ChirpStack. As you see, the Device EUI which will be set into your LoRa node as "dev_eui" is this one:

€	ChirpStack				Q Search organization, application, gateway or d	evice.	?	e admin
	Network-servers	Applications / P	AK7200 test				-	DELETE
R	Gateway-profiles	Applications / P	AR/200_lest				-	DELETE
	Organizations	DEVICES	APPLICATION CONFIGURATION	INTEGRATIONS				
<u>.</u>	All users						+	CREATE
loras	server 👻							
4	Org. settings	Last seen	Device name	Device EUI	Link margin	Batt	ery	
÷	Org. users	n/a	RAK7200_test1	744d4452dd39037c	n/a	n/a		
≞ ≡	Service-profiles				Rows per page:	10• 1-1 of 1	<	>
	Device-profiles							
R	Gateways							
ш	Applications							
2	Multicast-groups							

The Application Key which will be set into your LoRa node as "app_key" is this one:



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MANWII CIC33	
Technology Co., Ltd.	

€	ChirpStack	Q. Search organization, application, gateway or device	?	(admi 🤇	in
	Network-servers	Applications / RAK7200 test / Devices / RAK7200 test1			DELETE	
\bigcirc	Gateway-profiles					
	Organizations	CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES				
•	All users					
loras	server -	b3 7a 45 35 8f 6d ed 58 6c 22 06 38 4f 1c 9a 42	MSB	G	8	
\$	Org. settings	For LORAWAN 1.0 devices, this is the only key you need to set, in case your device supports LORAWAN 1.1, update the device-profile first.				
<u>+</u>	Org. users		SET	EVIC	E-KEYS	
ä≡	Service-profiles					
븄	Device-profiles					
R	Gateways					
	Applications					
2	Multicast-groups					

The Application EUI which will be set into your LoRa node as "app_eui" is useless for ChirpStack, and you can set it to any value with a correct format, for example: 7083D57ED001C1CF.

5.2 Register a LoRa node in ABP mode

If you select "DeviceProfile_ABP" or "DeviceProfile_ABP_CN470", it means you want to join ChirpStack in OTAA mode.

€	ChirpStack	Q Search organization, application, gateway or device	e admin
III ©	Network-servers Gateway-profiles	Applications / RAK7200_test / Devices / RAK7200_test1	DELETE
	Organizations	CONFIGURATION KEYS (0TAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES	
<u>.</u>	All users		
lora	server 👻	Device name * RAK7200_test1	
4	Org. settings	The name may only contain words, numbers and dashes. Device description *	
*	Org. users	the first RAK7200 to test	
≟ ≣	Service-profiles	DeviceProfile_ABP	
규는 슈토	Device-profiles		
R	Gateways	Disable frame-counter validation	
ш	Applications	Note that disabling the frame-counter validation will compromise security as it enables people to perform replay-attacks.	
2	Multicast-groups		UPDATE DEVICE

Then you can see that there are some parameters for ABP in the "ACTIVATION" item:

€	ChirpStack	Q. Search organization, application, gateway or device	? Ə admin
	Network-servers Gateway-profiles Organizations All users	Applications / RAK7200_test / Devices / RAK7200_test1 CONFIGURATION KEYS (07AA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES	Telete
loras	erver 👻	Dexte addess * 01 9c 82 0a	MSB C
\$	Org. settings	Network session key (LufistMAI 1.0) *	o
1= 1	Org. users Service-profiles	Application session by (C_UINTRN 1.0) *	٥
큪	Device-profiles	Uplink frame-counter *	
R	Gateways	26	
ш	Applications	Downlick frame counter (network) * 1	
ÿ	Multicast-groups		(RE)ACTIVATE DEVICE

Next, let's use these parameters to set your LoRa node by using AT command.

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6. Revision History

Revision	Description	Date
1.0	Initial version	2019-06-12

7. Document Summary

Prepared by	Checked by	Approved by
Fomi	Penn&Fomi	



About RAKwireless:

RAKwireless is the pioneer in providing innovative and diverse cellular and LoRa connectivity solutions for IoT edge devices. It's easy and modular design can be used in different IoT applications and accelerate time-to-market.

For more information, please visit RAKwireless website at www.rakwireless.com.