

RAK7243 Environment Test Report

(Raspberry Pi 3B+ LoRa Gateway)

Version V1.0 | November 2019

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1. Production Information

Sample Name	Model	Quantity
LoRa Gateway	RAK7243(Raspberry Pi3B+LTE+RAK2245 EU868)	1

2. Test Project

No.	Test Item	Temperature Conditions
1	Low temperature storage test	-40 °C
2	Low temperature work test	-40 °C
3	High temperature storage test	85 °C
4	High temperature work test	85 °C

3. Test Equipment

Test Equipment	Model	Quantity
Multi channel temperature tester	WD-08A	1
environmental test chamber	Mini BTC 03	1
Equipment under test	RAK7243(Raspberry Pi3B+LTE+RAK2245 EU868)	1
LoRa Nodes	RAK5205	7

4. Pictures of test equipments



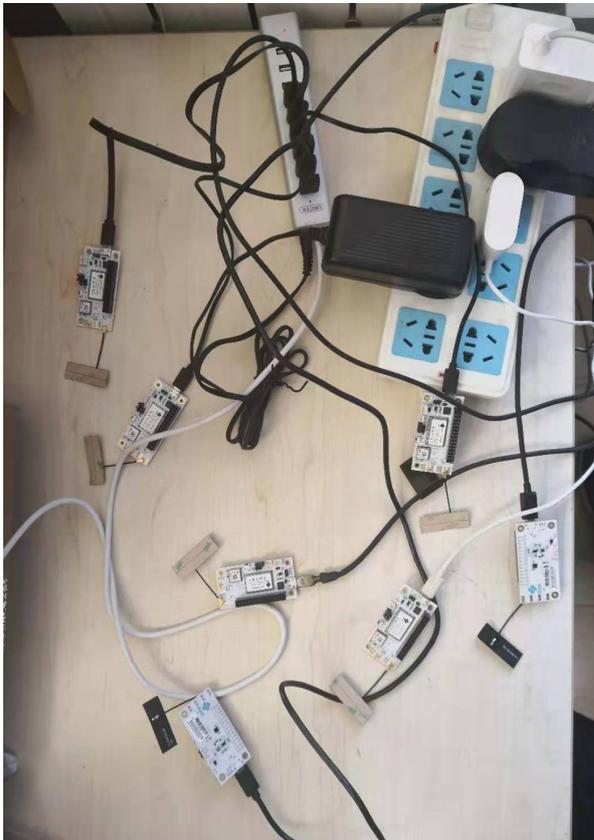
Multi channel temprature tester



Equipment under test(RAK7243)



environmental test chamber



LoRa Nodes

5. Test requirements

Low temperature storage test

Place the DUT in the temperature chamber and set the low temperature to -40°C , The DUT can power up and login via SSH when all temperature monitoring points reach to -40°C .

Low temperature work test

When all test points reach to -40°C , The DUT can power up and login via SSH.

It can connect to the cloud server to send and receive Lora packets.

The LAN port and WIFI can work well.

High temperature storage test

Place the DUT in the temperature chamber and set the high temperature to 85°C , The DUT can power up and login via SSH when all temperature monitoring points reach to 85°C .

High temperature work test

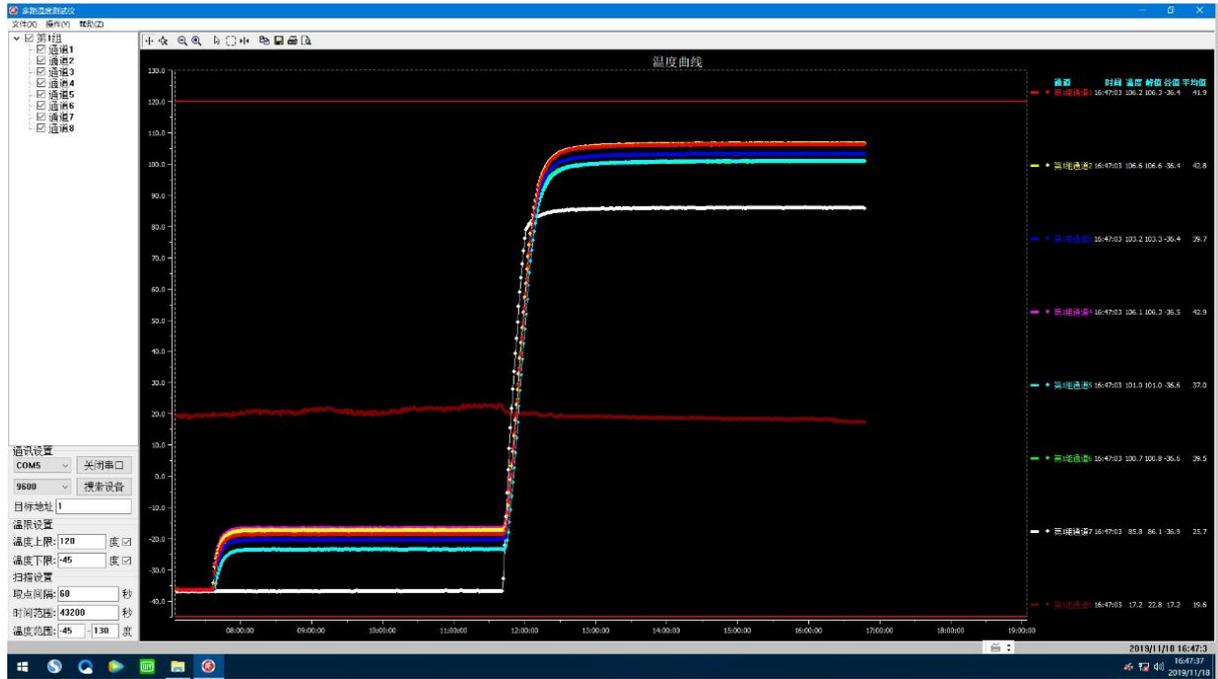
a. When all test points reach to 85°C , The DUT can power up and login via SSH.

b. It can connect to the cloud server to send and receive Lora packets.

c. The LAN port and WIFI can work well.

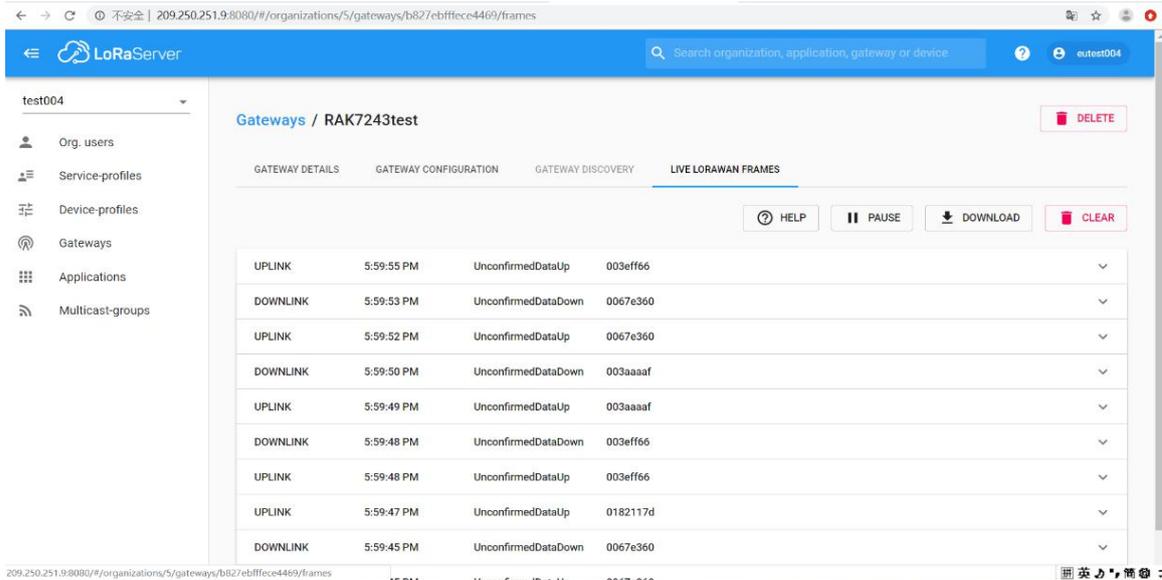
Temperature monitoring points of RAK7243

chains	monitoring point	Color	Max temperature
ch1	Raspberry pi3 B+'CPU	RED	106.7°C
ch2	Raspberry pi3 B+' power chip	YELLOW	107°C
ch3	Raspberry pi3 B+' wifi module	BLUE	104.1°C
ch4	Raspberry pi3 B+' PHY chip	PURPLE	106.5°C
ch5	RAK2013 LTE module	CYAN	101°C
ch6	Heat dissipation aluminum of RAK2245	GREEN	100.9°C
ch7	Internal temperature of environmental test chamber	WHITE	85.6°C



6. Test Result

Test Project	Test Result	Conclusion
Low temperature storage	The DUT can power up and login via SSH	PASS
Low temperature work	Can send and receive lora packages normally and the wifi work well also.	PASS
High temperature storage	The DUT can power up and login via SSH	PASS
High temperature work	Can send and receive lora packages normally and the wifi work well also.	PASS



test004

Org. users
Service-profiles
Device-profiles
Gateways
Applications
Multicast-groups

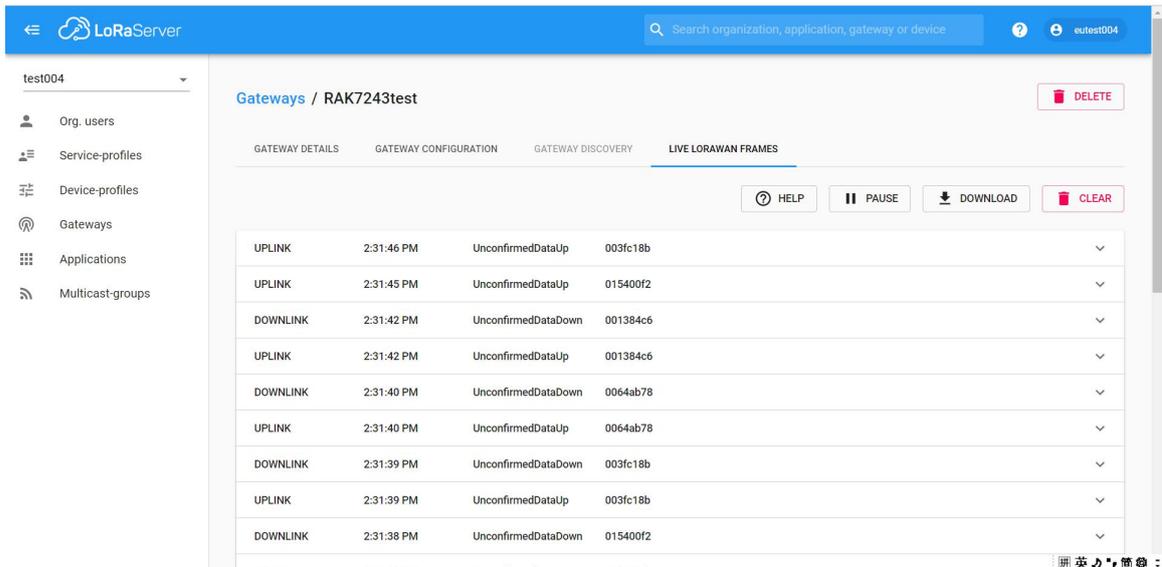
Gateways / RAK7243test

GATEWAY DETAILS GATEWAY CONFIGURATION GATEWAY DISCOVERY LIVE LORAWAN FRAMES

HELP PAUSE DOWNLOAD CLEAR

UPLINK	5:59:55 PM	UnconfirmedDataUp	003eff66	
DOWNLINK	5:59:53 PM	UnconfirmedDataDown	0067e360	
UPLINK	5:59:52 PM	UnconfirmedDataUp	0067e360	
DOWNLINK	5:59:50 PM	UnconfirmedDataDown	003aaaaf	
UPLINK	5:59:49 PM	UnconfirmedDataUp	003aaaaf	
DOWNLINK	5:59:48 PM	UnconfirmedDataDown	003eff66	
UPLINK	5:59:48 PM	UnconfirmedDataUp	003eff66	
UPLINK	5:59:47 PM	UnconfirmedDataUp	0182117d	
DOWNLINK	5:59:45 PM	UnconfirmedDataDown	0067e360	

Send and receive lora packages at -40C°



test004

Org. users
Service-profiles
Device-profiles
Gateways
Applications
Multicast-groups

Gateways / RAK7243test

GATEWAY DETAILS GATEWAY CONFIGURATION GATEWAY DISCOVERY LIVE LORAWAN FRAMES

HELP PAUSE DOWNLOAD CLEAR

UPLINK	2:31:46 PM	UnconfirmedDataUp	003fc18b	
UPLINK	2:31:45 PM	UnconfirmedDataUp	015400f2	
DOWNLINK	2:31:42 PM	UnconfirmedDataDown	001384c6	
UPLINK	2:31:42 PM	UnconfirmedDataUp	001384c6	
DOWNLINK	2:31:40 PM	UnconfirmedDataDown	0064ab78	
UPLINK	2:31:40 PM	UnconfirmedDataUp	0064ab78	
DOWNLINK	2:31:39 PM	UnconfirmedDataDown	003fc18b	
UPLINK	2:31:39 PM	UnconfirmedDataUp	003fc18b	
DOWNLINK	2:31:38 PM	UnconfirmedDataDown	015400f2	

Send and receive lora packages at 85 °C

```
pi@rak-gateway: ~  
Linux rak-gateway 4.19.57-v7l+ #1244 SMP Thu Jul 4 18:48:07 BST 2019 armv7l  
=====
```



```
=====
```

Last login: Tue Nov 19 05:47:37 2019 from 10.0.7.38

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

```
pi@rak-gateway:~ $  
pi@rak-gateway:~ $  
pi@rak-gateway:~ $ ping 10.0.7.38  
PING 10.0.7.38 (10.0.7.38) 56(84) bytes of data.  
64 bytes from 10.0.7.38: icmp_seq=1 ttl=128 time=6.63 ms  
64 bytes from 10.0.7.38: icmp_seq=2 ttl=128 time=2.99 ms  
64 bytes from 10.0.7.38: icmp_seq=3 ttl=128 time=6.80 ms  
64 bytes from 10.0.7.38: icmp_seq=4 ttl=128 time=2.38 ms  
64 bytes from 10.0.7.38: icmp_seq=5 ttl=128 time=2.74 ms  
64 bytes from 10.0.7.38: icmp_seq=6 ttl=128 time=7.93 ms  
64 bytes from 10.0.7.38: icmp_seq=7 ttl=128 time=2.51 ms  
64 bytes from 10.0.7.38: icmp_seq=8 ttl=128 time=2.81 ms  
64 bytes from 10.0.7.38: icmp_seq=9 ttl=128 time=3.44 ms  
64 bytes from 10.0.7.38: icmp_seq=10 ttl=128 time=3.78 ms  
64 bytes from 10.0.7.38: icmp_seq=11 ttl=128 time=4.48 ms  
64 bytes from 10.0.7.38: icmp_seq=12 ttl=128 time=5.10 ms  
64 bytes from 10.0.7.38: icmp_seq=13 ttl=128 time=4.55 ms  
64 bytes from 10.0.7.38: icmp_seq=14 ttl=128 time=2.47 ms  
64 bytes from 10.0.7.38: icmp_seq=15 ttl=128 time=3.61 ms  
64 bytes from 10.0.7.38: icmp_seq=16 ttl=128 time=2.83 ms  
64 bytes from 10.0.7.38: icmp_seq=17 ttl=128 time=3.15 ms  
64 bytes from 10.0.7.38: icmp_seq=18 ttl=128 time=2.60 ms  
64 bytes from 10.0.7.38: icmp_seq=19 ttl=128 time=10.5 ms  
|
```

WiFi can work well at -40°C

```

pi@rak-gateway: ~
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@rak-gateway:~ $
pi@rak-gateway:~ $
pi@rak-gateway:~ $ ping 10.0.7.38
PING 10.0.7.38 (10.0.7.38) 56(84) bytes of data.
64 bytes from 10.0.7.38: icmp_seq=1 ttl=128 time=5.27 ms
64 bytes from 10.0.7.38: icmp_seq=2 ttl=128 time=3.25 ms
64 bytes from 10.0.7.38: icmp_seq=3 ttl=128 time=3.27 ms
64 bytes from 10.0.7.38: icmp_seq=4 ttl=128 time=2.90 ms
64 bytes from 10.0.7.38: icmp_seq=5 ttl=128 time=3.64 ms
64 bytes from 10.0.7.38: icmp_seq=6 ttl=128 time=10.0 ms
64 bytes from 10.0.7.38: icmp_seq=7 ttl=128 time=3.65 ms
64 bytes from 10.0.7.38: icmp_seq=8 ttl=128 time=2.83 ms
64 bytes from 10.0.7.38: icmp_seq=9 ttl=128 time=4.39 ms
64 bytes from 10.0.7.38: icmp_seq=10 ttl=128 time=4.67 ms
64 bytes from 10.0.7.38: icmp_seq=11 ttl=128 time=3.38 ms
64 bytes from 10.0.7.38: icmp_seq=12 ttl=128 time=4.46 ms
64 bytes from 10.0.7.38: icmp_seq=13 ttl=128 time=3.48 ms
64 bytes from 10.0.7.38: icmp_seq=14 ttl=128 time=2.36 ms
64 bytes from 10.0.7.38: icmp_seq=15 ttl=128 time=6.21 ms
64 bytes from 10.0.7.38: icmp_seq=16 ttl=128 time=2.69 ms
  
```

WIFI can work well at 85°C

7. Test date and Operator

test date:	Nov.18 /2019
operator:	Hairui Tao
test location:	Room 307, building 3, guofeng meitang building, huilongguan town, Beijing

8. Revision History

Revision	Description	Date
1.0	Initial version	2019-11-21

9. Document Summary

Prepared by	Checked by	Approved by
Hairui	Penn	



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.