

RF Exposure Evaluation Declaration

Product Name : 915MHz LoRa Module

Model No. : LSD4RF-2F917N10

FCC ID : N8NLSD4RF2F917N10

Applicant : Lierda Science & Technology Group Co., Ltd.

Address : Building 1#, Lierda IOT park, No.1326 Wenyi Xi Rd,
Hangzhou, China

Date of Receipt : Nov. 29, 2016

Test Date : Nov. 29, 2016~ Dec. 23, 2016

Issued Date : Dec. 26, 2016

Report No. : 16B2198R-RF-US-P20V01

Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by CNAS, TAF or any agency of the government.

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Test Report Certification

Issued Date : Dec. 26, 2016
Report No. : 16B2198R-RF-US-P20V01



Product Name : 915MHz LoRa Module
Applicant : Lierda Science & Technology Group Co., Ltd.
Address : Building 1#, Lierda IOT park, No.1326 Wenyi Xi Rd, Hangzhou, China
Manufacturer : Zhejiang Xianxin Science & Technology Co., Ltd
Address : ZHEN ZHU BAN DAO, QIANDAOHU TOWN, CHUN'AN COUNTY, ZHEJIANG, CHINA
Model No. : LSD4RF-2F917N10
FCC ID : N8NLSD4RF2F917N10
EUT Voltage : DC 2.4~3.6V
Brand Name : Lierda
Applicable Standard : KDB 447498D01V06
FCC Part1.1310(b)
Test Result : Complied
Performed Location : Quietek Corporation - Suzhou EMC Laboratory
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098
FCC Registration Number: 800392
Documented By : 
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Reviewed By : 
(Engineering Supervisor: Frank He)
Approved By : 
(Engineering Manager: Harry Zhao)

Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	:	BSMI, NCC, TAF
USA	:	FCC
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <http://www.quietek.com/english/about/certificates.aspx?bval=5>
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site :
http://www.quietek.com/index_en.aspx

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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LinKou Testing Laboratory :

No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

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TEL : +86-512-6251-5088 / FAX : 86-512-6251-5098 E-Mail : service@quietek.com

1. RF Exposure Evaluation

1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 0.603mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	915MHz LoRa Module
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

● Antenna Information

Model No.	N/A					
Antenna manufacturer	N/A					
Antenna Delivery	<input checked="" type="checkbox"/>	1*TX+1*RX	<input type="checkbox"/>	2*TX+2*RX	<input type="checkbox"/>	3*TX+3*RX
Antenna technology	<input checked="" type="checkbox"/>	SISO				
	<input type="checkbox"/>	MIMO	<input type="checkbox"/>	Basic		
	<input type="checkbox"/>		<input type="checkbox"/>	CDD		
	<input type="checkbox"/>		<input type="checkbox"/>	Sectorized		
	<input type="checkbox"/>		<input type="checkbox"/>	Beam-forming		
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/>	Dipole		
	<input type="checkbox"/>		<input type="checkbox"/>	Sectorized		
	<input checked="" type="checkbox"/>	Internal	<input type="checkbox"/>	PIFA		
	<input checked="" type="checkbox"/>		<input type="checkbox"/>	PCB		
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	helical antenna		
	<input checked="" type="checkbox"/>		<input type="checkbox"/>	Ceramic Chip Antenna		
	<input checked="" type="checkbox"/>		<input type="checkbox"/>	Metal plate type F antenna		
Antenna Technology	Ant Gain (dBi)			Directional Gain (dBi)		
				For Power	For PSD	
<input checked="" type="checkbox"/> SISO	2			2	2	

- Output Power into Antenna & RF Exposure Evaluation Distance:

Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Directional Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit of Power Density S(mW/cm ²)
904~925MHz	14.82	2	0.0096	0.603

Note: The power density is 0.0096mW/cm² for 915MHz LoRa Module without any other radio equipment.

————— The End —————