

RF Exposure

Applicant: Dragino Technology Co., Limited

Address of Applicant: Room 1101, City Invest Commercial Center, No.546
QingLinRoad, LongCheng Street, LongGang District, Shenzhen
518116, China

Manufacturer/ Factory: Dragino Technology Co., Limited

**Address of
Manufacturer/ Factory:** Room 1101, City Invest Commercial Center, No.546
QingLinRoad, LongCheng Street, LongGang District, Shenzhen
518116, China

Equipment Under Test (EUT)

Product Name: LoRa IoT Gateway

Model No.: LG01, LG01-P, LG01-S, MS14N-P, MS14N-S

Applicable standards: EN 62311:2008

Date of sample receipt: June 15, 2017

Date of Test: June 15-20, 2017

Date of report issue: June 20, 2017

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.



Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	June 20, 2017	Original

Prepared By:

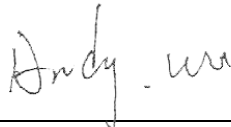


Date:

June 20, 2017

Project Engineer

Check By:



Date:

June 20, 2017

Reviewer

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4 General Information

4.1 General Description of EUT

Product Name:	LoRa IoT Gateway
Model No.:	LG01, LG01-P, LG01-S, MS14N-P, MS14N-S
Test Model No.:	LG01
<p><i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and LG01 include LG01-P and LG01-S. LG01-S with terminal and 868 module LG01-P without terminal and 868 module MS14N-P with termina MS14N-S without terminal</i></p>	
WiFi	
Operation Frequency:	2412MHz~2472MHz(802.11b/802.11g/802.11n(H20)) 2422MHz~2462MHz(802.11n(H40))
Channel Numbers:	13 for 802.11b/802.11g/802.11n(HT20) 9 for 802.11n(HT40)
Channel Separation:	5MHz
Modulation Type: (IEEE 802.11b)	Direct Sequence Spread Spectrum(DSSS)
Modulation Type: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	Integrated antenna
Antenna Gain:	3.3dBi (Declared by manufacturer)
868.1MHz	
Operation Frequency:	868.1MHz(Declared by manufacturer)
Occupied bandwidth	200kHz(Declared by manufacturer)
Antenna type:	Integrated antenna
Antenna Gain:	2.5dBi (Declared by manufacturer)
Modulation type:	FSK(Declared by manufacturer)
Power supply:	Adapter Input: AC100-240V 50-60Hz 0.5A Output: DC12V 0.1-1.3A

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

• **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

4.3 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.

5 Technical Requirements Specification in EN 62311

Test Requirement:	EN 62311																																																												
Test Method:	EN 62311																																																												
General Description of Applied Standards	EN 62311 Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.																																																												
Limit:	<p>According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.</p> <p style="text-align: center;">Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Frequency range</th> <th style="text-align: center;">E-field strength (V/m)</th> <th style="text-align: center;">H-field strength (A/m)</th> <th style="text-align: center;">B-field (μT)</th> <th style="text-align: center;">Equivalent plane wave power density S_{eq} (W/m²)</th> </tr> </thead> <tbody> <tr> <td>0-1 Hz</td> <td style="text-align: center;">—</td> <td style="text-align: center;">$3,2 \times 10^4$</td> <td style="text-align: center;">4×10^4</td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-8 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;">$3,2 \times 10^4 f^2$</td> <td style="text-align: center;">$4 \times 10^4 f^2$</td> <td style="text-align: center;">—</td> </tr> <tr> <td>8-25 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;">$4 000/f$</td> <td style="text-align: center;">$5 000/f$</td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,025-0,8 kHz</td> <td style="text-align: center;">$250/f$</td> <td style="text-align: center;">$4/f$</td> <td style="text-align: center;">$5/f$</td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,8-3 kHz</td> <td style="text-align: center;">$250/f$</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>3-150 kHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,15-1 MHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;">$0,73/f$</td> <td style="text-align: center;">$0,92/f$</td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-10 MHz</td> <td style="text-align: center;">$87 f^{1/2}$</td> <td style="text-align: center;">$0,73/f$</td> <td style="text-align: center;">$0,92/f$</td> <td style="text-align: center;">—</td> </tr> <tr> <td>10-400 MHz</td> <td style="text-align: center;">28</td> <td style="text-align: center;">0,073</td> <td style="text-align: center;">0,092</td> <td style="text-align: center;">2</td> </tr> <tr> <td>400-2 000 MHz</td> <td style="text-align: center;">$1,375 f^{1/2}$</td> <td style="text-align: center;">$0,0037 f^{1/2}$</td> <td style="text-align: center;">$0,0046 f^{1/2}$</td> <td style="text-align: center;">$f/200$</td> </tr> <tr> <td>2-300 GHz</td> <td style="text-align: center;">61</td> <td style="text-align: center;">0,16</td> <td style="text-align: center;">0,20</td> <td style="text-align: center;">10</td> </tr> </tbody> </table> <p>Notes:</p> <p>1. f as indicated in the frequency range column.</p>	Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)	0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—	1-8 Hz	10 000	$3,2 \times 10^4 f^2$	$4 \times 10^4 f^2$	—	8-25 Hz	10 000	$4 000/f$	$5 000/f$	—	0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—	0,8-3 kHz	$250/f$	5	6,25	—	3-150 kHz	87	5	6,25	—	0,15-1 MHz	87	$0,73/f$	$0,92/f$	—	1-10 MHz	$87 f^{1/2}$	$0,73/f$	$0,92/f$	—	10-400 MHz	28	0,073	0,092	2	400-2 000 MHz	$1,375 f^{1/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	$f/200$	2-300 GHz	61	0,16	0,20	10
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Test method:	<p>According to the Far field calculation formula:</p> <p style="text-align: center;">Far Field Calculation Formula</p> $E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$ <p>G = antenna gain relative to an isotropic antenna θ, ϕ = elevation and azimuth angles to point of investigation r = distance from observation point to the antenna</p> <p>The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement of the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.</p>																																																												
Result:	Pass																																																												

Measurement Data:

802.11b mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412	17.40	54.95	9.39	61.00	Pass
2442	17.65	58.21	9.66		
2472	18.20	66.07	10.29		
868.1MHz					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
868.1	11.82	15.21	4.50	61.00	Pass

-----End-----