

RF Exposure Report

Applicant: Dragino Technology Co., Limited

Address of Applicant: Room 202, Block B, BCT Incubation Bases (BaoChengTai),
No.8 CaiYunRoadLongCheng Street, LongGang District ;
Shenzhen 518116,China

Manufacturer/Factory: Dragino Technology Co., Limited

Address of Manufacturer/Factory: Room 202, Block B, BCT Incubation Bases (BaoChengTai),
No.8 CaiYunRoadLongCheng Street, LongGang District ;
Shenzhen 518116,China

Equipment Under Test (EUT)

Product Name: LoRaWAN Gateway
Model No.: LPS8
Trade Mark: Dragino

Applicable standards: EN 62311: 2008

Date of sample receipt: Nov. 29, 2019

Date of Test: Dec. 02- Dec. 09, 2019

Date of report issue: Dec. 11, 2019

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.

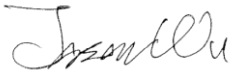

Edward Ding
Laboratory Manager



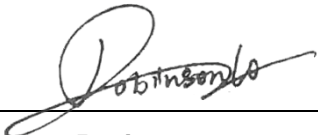
This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver

2 Version

Version No.	Date	Description
00	Dec. 11, 2019	Original

Prepared By:  **Date:** Dec. 11, 2019

Project Engineer

Check By:  **Date:** Dec. 11, 2019

Reviewer

3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL INFORMATION	4
4.1 GENERAL DESCRIPTION OF EUT	4
4.2 TEST FACILITY	5
4.3 TEST LOCATION	5
4.4 DESCRIPTION OF SUPPORT UNITS	5
4.5 DEVIATION FROM STANDARDS.....	5
4.6 ABNORMALITIES FROM STANDARD CONDITIONS.....	5
4.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	5
5 TECHNICAL REQUIREMENTS SPECIFICATION IN EN 62311	6

4 General Information

4.1 General Description of EUT

Product Name:	LoRaWAN Gateway
Model No.:	LPS8
Power Supply:	DC 5.0V From Adapter
Lora	
Operation Frequency:	863MHz-870MHz
Channel Numbers:	35
Channel Separation:	200KHz
Modulation Type:	FSK
Antenna Type:	External antenna
Antenna Gain:	2.69dBi
WIFI	
Operation Frequency:	2412MHz~2472MHz 802.11b/802.11g/802.11n(HT20) 2422MHz~2462MHz 802.11n(H40)
Channel Separation:	5MHz
Modulation Technology:	802.11b: DSSS 802.11n(HT20)/802.11n(HT40)
Antenna Type:	Integral Antenna
Antenna gain:	3.30dBi

4.2 Test Facility

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

● **FCC —Registration No.: 381383**

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 381383.

● **IC —Registration No.: 9079A**

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

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

4.3 Test Location

Radiated spurious emissions tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123- 128, Tower A, 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>Frequency range</th> <th>E-field strength (V/m)</th> <th>H-field strength (A/m)</th> <th>B-field (μT)</th> <th>Equivalent plane wave power density S_{eq} (W/m²)</th> </tr> </thead> <tbody> <tr> <td>0-1 Hz</td> <td>—</td> <td>$3,2 \times 10^4$</td> <td>4×10^4</td> <td>—</td> </tr> <tr> <td>1-8 Hz</td> <td>10 000</td> <td>$3,2 \times 10^4/f^2$</td> <td>$4 \times 10^4/f^2$</td> <td>—</td> </tr> <tr> <td>8-25 Hz</td> <td>10 000</td> <td>$4\ 000/f$</td> <td>$5\ 000/f$</td> <td>—</td> </tr> <tr> <td>0,025-0,8 kHz</td> <td>$250/f$</td> <td>$4/f$</td> <td>$5/f$</td> <td>—</td> </tr> <tr> <td>0,8-3 kHz</td> <td>$250/f$</td> <td>5</td> <td>6,25</td> <td>—</td> </tr> <tr> <td>3-150 kHz</td> <td>87</td> <td>5</td> <td>6,25</td> <td>—</td> </tr> <tr> <td>0,15-1 MHz</td> <td>87</td> <td>$0,73/f$</td> <td>$0,92/f$</td> <td>—</td> </tr> <tr> <td>1-10 MHz</td> <td>$87/f^{1/2}$</td> <td>$0,73/f$</td> <td>$0,92/f$</td> <td>—</td> </tr> <tr> <td>10-400 MHz</td> <td>28</td> <td>0,073</td> <td>0,092</td> <td>2</td> </tr> <tr> <td>400-2 000 MHz</td> <td>$1,375 f^{1/2}$</td> <td>$0,0037 f^{1/2}$</td> <td>$0,0046 f^{1/2}$</td> <td>$f/200$</td> </tr> <tr> <td>2-300 GHz</td> <td>61</td> <td>0,16</td> <td>0,20</td> <td>10</td> </tr> </tbody> </table> <p>Notes: 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
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																																																									
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:

LoRa mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
863.1	11.95	15.668	0.00312	61.00	Pass
866.5	11.93	15.596	0.00310		
869.9	11.91	15.524	0.00309		
802.11b mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412.00	16.24	42.073	5.617	61.00	Pass
2442.00	16.23	41.976	5.611		
2472.00	16.26	42.267	5.630		
802.11g mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412.00	14.75	29.854	4.732	61.00	Pass
2442.00	14.57	28.642	4.635		
2472.00	14.66	29.242	4.683		
802.11n(HT20) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412.00	14.29	26.853	4.488	61.00	Pass
2442.00	14.07	25.527	4.376		
2472.00	14.41	27.606	4.550		
802.11n(HT40) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412.00	13.59	22.856	4.140	61.00	Pass
2442.00	13.56	22.699	4.126		
2472.00	13.58	22.803	4.136		

-----End-----