

RF Exposure

Applicant: Dragino Technology Co., Limited.

Address of Applicant: Room 202, BaoChengTai industrial park, No.8 CaiYun LongCheng Street, LongGang District, Shenzhen 518116, China

Manufacturer/Factory: Dragino Technology Co., Limited.

Address of Manufacturer/Factory: Room 202, BaoChengTai industrial park, No.8 CaiYun LongCheng Street, LongGang District, Shenzhen 518116, China

Equipment Under Test (EUT)

Product Name: Wireless IoT Module

Model No.: HE

Applicable standards: EN 62311:2008

Date of sample receipt: December 20, 2018

Date of Test: December 21, 2018-February 18, 2019

Date of report issue: February 18, 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.



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

Report No.	Version No.	Date	Description
GTSE15010000603	00	January 28, 2015	Original
GTS201812000169E03	01	February 18, 2019	Change antenna; Delete trade mark

Prepared By:

Bill. Yuan

Date:

February 18, 2019

Project Engineer

Check By:

Robinson

Date:

February 18, 2019

Reviewer

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4 General Information

4.1 General Description of EUT

Product Name:	Wireless IoT Module
Model No.:	HE
Hardware Version:	A2
Software Version:	v1.3.4
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 Technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum(DSSS)
Modulation Technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	External Antenna
Antenna Gain:	1.5dBi (declare by Applicant)
Power Supply:	DC 3.3V

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.

- **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.

- **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

- **CNAS (No. CNAS L5775)**

CNAS has accredited Global United Technology Services Co., Ltd., to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

4.3 Test Location

All 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

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
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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	14.50	28.184	4.598	61.00	Pass
2442	15.19	33.037	4.978		
2472	15.89	38.815	5.395		
802.11g mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412	10.93	12.388	3.048	61.00	Pass
2442	12.75	18.836	3.759		
2472	13.40	21.878	4.051		
802.11n(H20) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412	10.95	12.445	3.055	61.00	Pass
2442	12.77	18.923	3.767		
2472	13.42	21.979	4.060		
802.11n(H40) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2422	8.71	7.430	2.361	61.00	Pass
2442	11.35	13.646	3.199		
2462	11.83	15.241	3.381		

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