

## RF Exposure REPORT

**Applicant:** Dragino Technology Co., Limited  
**Address of Applicant:** Room 7009, Zi'An Commercial Building, Qian Jin 1 Road.  
Xin'An 6th District, Bao'an District ; Shenzhen 518101,China  
**Equipment Under Test (EUT)**

**Product Name:** Wireless IoT Module

**Model No.:** HE

**Trade Mark:**



**Applicable standards:** EN 62311:2008

**Date of sample receipt:** January 05, 2015

**Date of Test:** January 06~16, 2015

**Date of report issue:** January 28, 2015

**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 1999/5/EC are considered.



Robinson LO

### Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."



## 2 Version

Version No.	Date	Description
00	January 28, 2015	Original

Prepared By:

*Edward. Pan*

Date:

January 28, 2015

Project Engineer

Check By:

*Hank. Yan*

Date:

January 28, 2015

Reviewer

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## 4 General Information

### 4.1 Client Information

Applicant:	Dragino Technology Co., Limited
Address of Applicant:	Room 7009, Zi'An Commercial Building, Qian Jin 1 Road. Xin'An 6th District, Bao'an District ; Shenzhen 518101,China
Manufacturer/Factory:	Dragino Technology Co., Limited
Address of Manufacturer/ Factory:	Room 7009, Zi'An Commercial Building, Qian Jin 1 Road. Xin'An 6th District, Bao'an District ; Shenzhen 518101,China

### 4.2 General Description of EUT

Product Name:	Wireless IoT Module
Model No.:	HE
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:	Intergal Antenna
Antenna gain:	2.0dBi (declare by Applicant)
Power supply:	DC 3.3V

## 4.3 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 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.

- **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 28, 2013.

- **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, June 26, 2013.

## 4.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

## 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 <math>S_{eq}</math> (W/m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0-1 Hz</td> <td style="text-align: center;">—</td> <td style="text-align: center;"><math>3,2 \times 10^4</math></td> <td style="text-align: center;"><math>4 \times 10^4</math></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;"><math>3,2 \times 10^4/f^2</math></td> <td style="text-align: center;"><math>4 \times 10^4/f^2</math></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;"><math>4 000/f</math></td> <td style="text-align: center;"><math>5 000/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,025-0,8 kHz</td> <td style="text-align: center;"><math>250/f</math></td> <td style="text-align: center;"><math>4/f</math></td> <td style="text-align: center;"><math>5/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,8-3 kHz</td> <td style="text-align: center;"><math>250/f</math></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;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-10 MHz</td> <td style="text-align: center;"><math>87/f^{1/2}</math></td> <td style="text-align: center;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></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;"><math>1,375 f^{1/2}</math></td> <td style="text-align: center;"><math>0,0037 f^{1/2}</math></td> <td style="text-align: center;"><math>0,0046 f^{1/2}</math></td> <td style="text-align: center;"><math>f/200</math></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. <math>f</math> 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 <sup>2</sup> )	0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—	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 <sup>2</sup> )																																																									
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Test method:	<p>According to the Far field calculation formula:</p> <p style="text-align: center;"><b>Far Field Calculation Formula</b></p> $E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$ <p style="text-align: center;"><math>G</math> = antenna gain relative to an isotropic antenna  <math>\theta, \phi</math> = elevation and azimuth angles to point of investigation  <math>r</math> = 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	15.00	31.623	4.870	61.00	Pass
2442	15.69	37.068	5.273		
2472	16.39	43.551	5.715		
802.11g mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412	11.43	13.900	3.229	61.00	Pass
2442	13.25	21.135	3.981		
2472	13.90	24.547	4.291		
802.11n(H20) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2412	11.45	13.964	3.236	61.00	Pass
2442	13.27	21.232	3.991		
2472	13.92	24.660	4.301		
802.11n(H40) mode					
Frequency (MHz)	Output Power (dBm)	Output Power (mW)	E Field Strength (V/m)	Limit (V/m)	Result
2422	9.21	8.337	2.501	61.00	Pass
2442	11.85	15.311	3.389		
2462	12.33	17.100	3.581		

-----End-----