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Report No.: HKES150900166902  
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## RF Exposure Evaluation Report

**Application No.:** HKES1509001669IT  
**Applicant:** Pismo Labs Technology Limited  
**Product Name:** WLAN 802.11b/g/n Module  
**Item No.(EUT):** N21  
**FCC ID:** U8G-P1121  
**Standards:** 47 CFR Part 1.1307(2014)  
47 CFR Part 1.1310(2014)  
**Date of Receipt:** 2015-09-08  
**Date of Test:** 2015-09-08 to 2015-09-09  
**Date of Issue:** 2015-09-10

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC 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 SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS 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.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2015-09-10		Original

Authorized for issue by:			
Tested By		(Chris Zhong) /Project Engineer	2015-09-09
			Date
Prepared By		(Hedy Wen) /Clerk	2015-09-10
			Date
Checked By		(Jim Huang) /Reviewer	2015-09-10
			Date



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## 4 General Information

### 4.1 Client Information

Applicant:	Pismo Labs Technology Limited
Address of Applicant:	FLAT/RM A5, 5/F HK SPINNERS IND BLDG PHASE 6, 481 CASTLE PEAK ROAD, CHEUNG SHA WAN, HONG KONG

### 4.2 General Description of EUT

Product Name:	WLAN 802.11b/g/n Module
Item No.:	N21
Sample Type:	Fixed production
Power Supply:	MODEL: S040EM1200300 INPUT: AC100-240V 50/60Hz 1.2A OUTPUT: DC12V 3000mA
DC Output Line:	150cm (Unshielded with a ferrite core)
LTE module:	Model Number: MC7354
	FCC ID: N7NMC7355
WIFI module:	Model Number: N21
	FCC ID: U8G-P1121



### 4.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

### 4.4 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 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.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical 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 our files. Registration No.: 556682.

- **Industry Canada (IC)**

The 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2.



#### **4.5 Deviation from Standards**

None.

#### **4.6 Abnormalities from Standard Conditions**

None.

#### **4.7 Other Information Requested by the Customer**

None.



## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

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

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

#### 5.1.2 Test Procedure

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



### 5.1.3 EUT RF Exposure Evaluation

#### For 2.4GHz

Antenna Gain: 5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

#### Wi-Fi moduler:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 35 cm (mW/cm <sup>2</sup> )	Limit	Result
2412-2462	29.7	933.9	0.191	1.0	PASS

Note: Refer to MPE evaluation report of WIFI modular(FCC ID: U8G-P1121 & report No.: SA110411E05) and find Max Conducted Peak Output Power is 933.9 mW.

#### WWAN:

Channel	Frequency (MHz)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at R = 35 cm (mW/cm <sup>2</sup> )	Limit	Result
23755	704	33	1995.262	0.130	0.469	PASS

Note: Refer to MPE evaluation report of LTE modular(FCC ID: N7NMC7355) and find the maximum ratio of the measured power density with limit in channel 23755, so only choose the channel to do MPE evaluation.

#### Σ of ratios simultaneous transmitting= Wi-Fi 1 + Wi-Fi 2 + WWAN1+WWAN2

Ratio of Power Density of Wi-Fi 1 at R = 35 cm	Ratio of Power Density of Wi-Fi 2 at R = 35 cm	Ratio of Max. Power Density of WWAN 1 at R = 35 cm	Ratio of Max. Power Density of WWAN 2 at R = 35 cm	Total ratios simultaneous transmitting at R =35cm	Limit	Result
0.191*/1	0.191/1	0.130/0.469	0.130/0.469	0.936	1.0	PASS