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Report No.: HKES160500087703
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RF Exposure Evaluation Report

Application No.: HKES1605000877AV
Applicant: Pismo Labs Technology Limited
Product Name: Peplink / Pepwave / Pismo Labs wireless product
Model No.(EUT): MAX BR1 mini
Add Model No.: Pismo930 LITE, MAX BR1 M2M
FCC ID: U8G-P1930LITE
Standards: 47 CFR Part 1.1307(2014)
47 CFR Part 1.1310(2014)
Date of Receipt: 2016-05-12
Date of Test: 2016-05-13 to 2016-05-19
Date of Issue: 2016-05-30

Test Result :	PASS*
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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.

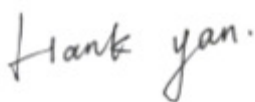


The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2016-05-30		Original

Authorized for issue by:			
Tested By		 <hr/> (Hank Yan) /Project Engineer	2016-05-19 <hr/> Date
Prepared By		 <hr/> (Iris Zhou) /Clerk	2016-05-30 <hr/> Date
Checked By		 <hr/> (Eric Fu) /Reviewer	2016-05-30 <hr/> 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:	Peplink / Pepwave / Pismo Labs wireless product
Item No.:	MAX BR1 mini
Sample Type:	Fixed Device
Antenna Type:	Dedicated Antenna Connector
Antenna Gain:	5dBi
Power Supply:	Model: MU24-Y120200-A1 Input: AC 100-240V, 50/60Hz, 0.7A Output: DC 12V, 2A Or DC 12V
DC Output Line:	150cm
LTE module:	Model Number: MC7354
	FCC ID: N7NMC7355
Alternative LTE module	Model Number: MC7455
	FCC ID: N7NMC7455

Remark:

Model No.: MAX BR1 mini, Pismo930 LITE, MAX BR1 M2M

Only the model MAX BR1 mini was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models, only different on model names for the marketing requirement.



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.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room 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)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



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 ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	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/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2412-2462	18.84	76.56	0.048	1.0	PASS

Note: Refer to report No. HKES160500087702 for EUT test Max Conducted Peak Output Power value.

LTE for MC7354

Antenna Gain: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.26 in linear scale.

Frequency (MHz)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
704	24	251.19	0.063	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 +WWAN

Ratio of Power Density of Wi-Fi at R = 20cm	Ratio of Max. Power Density of WWAN 1 at R = 20 cm	Total ratios simultaneous transmitting at R =20cm	Limit	Result
0.048/1	0.063/0.469	0.182	1.0	PASS



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Alternative LTE for MC7455

Antenna Gain: 1dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.26 in linear scale.

Frequency (MHz)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
699	24	251.19	0.063	0.466	PASS

Note: Refer to MPE evaluation report of LTE modular(FCC ID: N7NMC7455) and find the maximum ratio of the measured power density with limit in channel 23010, so only choose the channel to do MPE evaluation.

Σ of ratios simultaneous transmitting= Wi-Fi +WWAN

Ratio of Power Density of Wi-Fi at R = 20 cm	Ratio of Max. Power Density of WWAN 1 at R = 20 cm	Total ratios simultaneous transmitting at R =20cm	Limit	Result
0.048/1	0.063/0.466	0.183	1.0	PASS