RF Exposure Report

Report No.:	SA150825E05
FCC ID:	U8G-P1811
Test Model:	MAX 700
Series Model:	Pismo 811
Received Date:	Aug. 25, 2015
Test Date:	Sep. 14, 2015
Issued Date:	Sep. 25, 2015
Applicant:	Pismo Labs Technology Limited
Address:	FLAT/RM A5, 5/F, HK SPINNERS IND BLDG PHASE 6, 481 CASTLE PEAK ROAD, CHEUNG SHA WAN, HONG KONG.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (3):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA150825E05	Original release.	Sep. 25, 2015

1 Certificate of Conformity

Product:	Pepwave / Peplink / Pismo Wireless Product
Brand:	Pepwave / Peplink / Pismo
Test Model:	MAX 700
Series Model:	Pismo 811
Sample Status:	ENGINEERING SAMPLE
Applicant:	Pismo Labs Technology Limited
Test Date:	Sep. 14, 2015
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D03 IEEE C95.1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Phoenix Huang , **Date:** Sep. 25, 2015

Phoenix Huang / Specialist

Approved by : , **Date:** Sep. 25, 2015

May Chen / Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 22cm away from the body of the user. So, this device is classified as **Mobile Device**.

This product could be applied with four Cellular USB Dongle devices, and the safe distance is 70cm for collocated radio.

2.4 Antenna Gain

The antennas provided to the EUT, please refer to the following table:

For WIFI 1							
No.	Transmitter Circuit	Brand	Model	Ant. Gain (dBi) <Excluding cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connecter Type
1	Chain (0)	SmartAnt	SAA06-220690	3	2.4~2.4835	Dipole	RP-SMA
				4~5.5	5.15~5.25		
				5.5~6	5.725~5.85		
2	Chain (1)	SmartAnt	SAA06-220690	3	2.4~2.4835	Dipole	RP-SMA
				4~5.5	5.15~5.25		
				5.5~6	5.725~5.85		
For WIFI 2							
No.	Transmitter Circuit	Brand	Model	Ant. Gain (dBi) <Excluding cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connecter Type
3	Chain (0)	SmartAnt	SAA06-220690	3	2.4~2.4835	Dipole	RP-SMA
				4~5.5	5.15~5.25		
				5.5~6	5.725~5.85		
4	Chain (1)	SmartAnt	SAA06-220690	3	2.4~2.4835	Dipole	RP-SMA
				4~5.5	5.15~5.25		
				5.5~6	5.725~5.85		

3 Calculation Result of Maximum Conducted Power

For WLAN:

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	22	0.58345	1
5180-5240	235.977	8.51	22	0.27530	1
5745-5825	22.47	8.76	22	0.21829	1

NOTE:
1. 2.4GHz: Directional gain = 3dBi + 10log(2) = 9.97dBi
   5GHz (5150~5250MHz): Directional gain = 5.5dBi + 10log(2) = 8.51dBi
   5GHz (5725~5850MHz): Directional gain = 6dBi + 10log(2) = 8.76dBi

For WLAN + Cellular USB Dongle

Condition	Combination	Technology					
1	WLAN only	WLAN (2.4GHz)	WLAN (5GHz)	-	-	-	-
2	WLAN + one Cellular USB Dongle	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(2G/3G) or LTE(4G)	-	-	-
3	WLAN + two Cellular USB Dongles	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	-	-
4	WLAN + three Cellular USB Dongles	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	-
5	WLAN + four Cellular USB Dongles	WLAN (2.4GHz)	WLAN (5GHz)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)	WWAN(2G/3G) or LTE(4G)

Condition 1					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	22	0.58345	1
5180-5240	235.977	8.51	22	0.27530	1
Condition 2					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	40	0.17649	1
5180-5240	235.977	8.51	40	0.08328	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		40	0.34815	0.5495 (Note 1)

Condition 3					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	50	0.11296	1
5180-5240	235.977	8.51	50	0.05330	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		50	0.22282	0.5495 (Note 1)
824-849	7000		50	0.22282	0.5495 (Note 1)
Condition 4					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	60	0.07844	1
5180-5240	235.977	8.51	60	0.03701	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		60	0.15473	0.5495 (Note 1)
824-849	7000		60	0.15473	0.5495 (Note 1)
824-849	7000		60	0.15473	0.5495 (Note 1)
Condition 5					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	889.322	9.97	70	0.05763	1
5180-5240	235.977	8.51	70	0.02719	1
Frequency Band (MHz)	Max Power (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
824-849	7000		70	0.11368	0.5495 (Note 1)
824-849	7000		70	0.11368	0.5495 (Note 1)
824-849	7000		70	0.11368	0.5495 (Note 1)
824-849	7000		70	0.11368	0.5495 (Note 1)

NOTE:
1. Limit of Electric field=F/1500
2. This product can operate with plug-in Cellular USB Dongle device which has maximum of 7W output power.

Conclusion:

All of the WLAN and Cellular USB Dongles can transmit simultaneously, the formula of calculated the MPE is:

$CPD_1 / LPD_1 + CPD_2 / LPD_2$ + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Condition 1:

Therefore, the worst-case situation is 0.58345 / 1 + 0.27530 / 1 = 0.859, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 2:

Therefore, the worst-case situation is 0.17649 / 1 + 0.08328 / 1 + 0.34815 / 0.5495 = 0.893, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 3:

Therefore, the worst-case situation is 0.11296 / 1 + 0.05330 / 1 + 0.22282 / 0.5495 + 0.22282 / 0.5495 = 0.977, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 4:

Therefore, the worst-case situation is 0.07844 / 1 + 0.03701 / 1 + 0.15473 / 0.5495 + 0.15473 / 0.5495 + 0.15473 / 0.5495 = 0.960, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 5:

Therefore, the worst-case situation is 0.05763 / 1 + 0.02719 / 1 + 0.11368 / 0.5495 + 0.11368 / 0.5495 + 0.11368 / 0.5495 + 0.11368 / 0.5495 = 0.912, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

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