

# RF EXPOSURE REPORT

**REPORT NO.:** SA130927E06

AP One In-Wall, AP One InWall, Flex AP,

**MODEL NO.:** MAX, Surf Pro, AP One, AP Pro, Device  
Connector, Express, Balance, Pismo902

**FCC ID:** U8G-P1902

**RECEIVED:** Sep. 27, 2013

**TESTED:** Feb. 19, 2014

**ISSUED:** Feb. 27, 2014

**APPLICANT:** Pismo Labs Technology Limited

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**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd.,  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA130927E06	Original release	Feb. 27, 2014

## 1. CERTIFICATION

**PRODUCT:** Pepwave / Peplink / Pismo Wireless Product

**BRAND NAME:** Pepwave / Peplink / Pismo

**MODEL NO.:** AP One In-Wall, AP One InWall, Flex AP, MAX, Surf Pro, AP One, AP Pro, Device Connector, Express, Balance, Pismo902

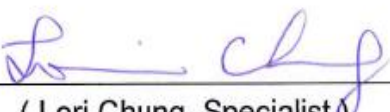
**TEST SAMPLE:** ENGINEERING SAMPLE

**APPLICANT:** Pismo Labs Technology Limited

**TESTED DATE:** Feb. 19, 2014

**STANDARDS:** FCC Part 2 (Section 2.1091)  
FCC OET Bulletin 65, Supplement C (01-01)  
IEEE C95.1

The above equipment (Model: AP One In-Wall) 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 :** , **DATE:** Feb. 27, 2014  
( Lori Chung, Specialist )

**APPROVED BY :** , **DATE:** Feb. 27, 2014  
( May Chen, Manager )

## 2. RF EXPOSURE LIMIT

### 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> )	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. MPE CALCULATION 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

### 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 5. ANTENNA GAIN

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

<b>For 2.4GHz</b>						
Transmitter Circuit	Brand	Model	Antenna Type	Gain (dBi) (Include cable loss)	Connector Type	Frequency range (MHz to MHz)
Chain (0)	Pulse	W3008C	Chip	2.2	NA	2400 ~ 2500
Chain (1)	Pulse	W3008C	Chip	2.2	NA	2400 ~ 2500
<b>For 5GHz</b>						
Transmitter Circuit	Brand	Model	Antenna Type	Gain (dBi) (Include cable loss)	Connector Type	Frequency range (MHz to MHz)
Chain (0) (Left)	SmartAnt	ADV05-2205 80	Embedded	2.64	IPEX	5150 ~ 5250
				4.27	IPEX	5725 ~ 5850
Chain (1) (Right)	SmartAnt	ADV05-2205 80	Embedded	3.27	IPEX	5150 ~ 5250
				1.87	IPEX	5725 ~ 5850

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

**For 15.247 (2.4GHz):**

**802.11b:**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	494.988	5.21	20	0.32683	1.00

**NOTE:** Directional gain = 2.2dBi + 10log(2) = 5.21dBi

**802.11g:**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	855.093	5.21	20	0.56460	1.00

**NOTE:** Directional gain = 2.2dBi + 10log(2) = 5.21dBi

**802.11n (HT20):**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	871.033	5.21	20	0.57513	1.00

**NOTE:** Directional gain = 2.2dBi + 10log(2) = 5.21dBi

**802.11n (HT40):**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422 - 2452	641.297	5.21	20	0.42344	1.00

**NOTE:** Directional gain = 2.2dBi + 10log(2) = 5.21dBi

**For 15.247 (5GHz):**

**802.11a:**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 - 5825	237.716	6.16	20	0.19534	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.16\text{dBi}$

**802.11n (HT20):**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 - 5825	237.716	6.16	20	0.19534	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.16\text{dBi}$

**802.11n (HT40):**

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5755 - 5795	234.980	6.16	20	0.19309	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.16\text{dBi}$



**For 15.407 (5GHz):**

**802.11a:**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 - 5240	33.911	5.97	20	0.02667	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.97\text{dBi}$

**802.11n (HT20):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 - 5240	34.679	5.97	20	0.02728	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.97\text{dBi}$

**802.11n (HT40):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5190 - 5230	47.170	5.97	20	0.03710	1.00

**NOTE:** Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.97\text{dBi}$

## CONCLUSION:

Both of the WLAN (2.4GHz & 5GHz) can transmit simultaneously, the formula of calculated the MPE is:

$$\text{CPD}_1 / \text{LPD}_1 + \text{CPD}_2 / \text{LPD}_2 + \dots \text{etc.} < 1$$

**CPD = Calculation power density**

**LPD = Limit of power density**

Therefore, the worst-case situation is  $0.57513 / 1 + 0.19534 / 1 = 0.770$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

**--- END ---**