

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

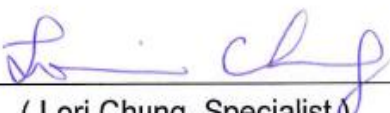
TEST SAMPLE: ENGINEERING SAMPLE

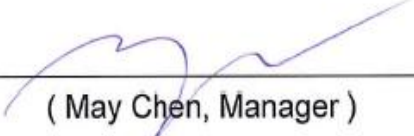
APPLICANT: Pismo Labs Technology Limited

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 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

3. MPE CALCULATION 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

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:

For 2.4GHz						
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
For 5GHz						
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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 ²)	LIMIT (mW/cm ²)
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:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

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.

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