

RF EXPOSURE REPORT

REPORT NO.: SA141024E06

MODEL NO.: AP One AC mini, Pismo AC0, Surf series, AP series,
Mesh Connector series, MAX series

FCC ID: U8G-P1AC0

RECEIVED: Oct. 24, 2014

TESTED: Dec. 03, 2014

ISSUED: Dec. 16, 2014

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA141024E06	Original release	Dec. 16, 2014

1. CERTIFICATION

PRODUCT: Pepwave / Peplink / Pismo Wireless Product

BRAND NAME: Pepwave / Peplink / Pismo

MODEL NO.: AP One AC mini, Pismo AC0, Surf series, AP series,
Mesh Connector series, MAX series

TEST SAMPLE: ENGINEER SAMPLE

APPLICANT: Pismo Labs Technology Limited

TESTED: Dec. 03, 2014

STANDARDS: FCC Part 2 (Section 2.1091)
KDB 447498 D03
IEEE C95.1

The above equipment (Model: AP One AC mini) 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:** Dec. 16, 2014
(Phoenix Huang, Specialist)

Approved by : May Chen , **Date:** Dec. 16, 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

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

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:

2.4GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
2	Chain (1)	Pulse	W3008C	2.2	Chip	NA	NA	2400~2483.5
5GHz								
Antenna No	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Antenna Type	Connector Type	Cable Length (cm)	Frequency range (MHz to MHz)
1	Chain (0)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	2.91	PCB	i-pex	7	5150~5250
				3.70				5725~5850
2	Chain (1)	PSA Walsin Technology Corporation	PEPWAVE (PCB)	3.06	PCB	i-pex	11	5150~5250
				3.20				5725~5850

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247:

802.11b:

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 ~ 2462	204.326	5.21	20	0.13491	1

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

802.11g:

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 ~ 2462	934.394	5.21	20	0.61696	1

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

802.11n (HT20):

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 ~ 2462	920.711	5.21	20	0.60793	1

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

802.11n (HT40):

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2422 ~ 2452	781.783	5.21	20	0.51620	1

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

For 15.407:

802.11a:

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5180 – 5240	149.994	6	20	0.11880	1
5745 - 5825	176.85	6.46	20	0.15572	1

For 5150-5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$

For 5725-5850MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.46\text{dBi}$

802.11ac (VHT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5180 – 5240	146.418	6	20	0.11596	1
5745 - 5825	185.651	6.46	20	0.16347	1

For 5150-5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$

For 5725-5850MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.46\text{dBi}$

802.11ac (VHT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5190 – 5230	163.903	6	20	0.12981	1
5755 - 5795	200.594	6.46	20	0.17662	1

For 5150-5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$

For 5725-5850MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.46\text{dBi}$

802.11ac (VHT80)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5210	37.077	6	20	0.02937	1
5775	34.746	6.46	20	0.03059	1

For 5150-5250MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6\text{dBi}$

For 5725-5850MHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.46\text{dBi}$

CONCLUSION:

Both of the 2.4GHz and 5GHz WLAN 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 $0.61696 / 1 + 0.17662 / 1 = 0.794$, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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