

RF EXPOSURE REPORT

REPORT NO.: SA140213C04

MODEL NO.: FORTIAP-221Cxxxxxx,
FAP-221Cxxxxxx (where "x" can be used
as "A-Z", or "0-9", or "-", or blank for software
changes or marketing purposes only)

FCC ID: TVE-121402

IC: 7280B-121402

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ISSUED: Feb. 25, 2014

APPLICANT: Fortinet Inc.

ADDRESS: 899 Kifer Road Sunnyvale, CA 94086, USA

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,
New Taipei City, Taiwan (R.O.C.)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|-------------|-------------------|---------------|
| SA140213C04 | Original release | Feb. 25, 2014 |

1. CERTIFICATION

PRODUCT: Security Wireless Access Point
FORTIAP-221Cxxxxxx, FAP-221Cxxxxxx (where "x" can
MODEL: be used as "A-Z", or "0-9", or "-", or blank for software changes or
marketing purposes only)
BRAND: Fortinet
APPLICANT: Fortinet Inc.
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 2 (Section 2.1091)**
FCC OET Bulletin 65, Supplement C (01-01)
IEEE C95.1
RSS-102 Issue 4 (2010-12)

The above equipment (Model: FORTIAP-221C) 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 : Celine Chou , **DATE** : Feb. 25, 2014
Celine Chou / Specialist

APPROVED BY : Ken Liu , **DATE** : Feb. 25, 2014
Ken Liu / Senior Manager

2. RF EXPOSURE

2.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

For FCC Part 2 (Section 2.1091)

| 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

For RSS-102 Issue 4 (2010-12)

| FREQUENCY RANGE (MHz) | ELECTRIC FIELD STRENGTH (V/m) | MAGNETIC FIELD STRENGTH (A/m) | POWER DENSITY (W/m ²) | AVERAGE TIME (minutes) |
|---|-------------------------------|-------------------------------|-----------------------------------|------------------------|
| LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE | | | | |
| 300-1500 | ... | ... | F/150 | 6 |
| 1500-100,000 | ... | ... | 10 | 6 |

F = Frequency in MHz

2.2 MPE CALCULATION FORMULA

For FCC Part 2 (Section 2.1091)

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

where

P_d = power density in mW/cm^2

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

For RSS-102 Issue 4 (2010-12)

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

where

P_d = power density in W/m^2

P_{out} = output power to antenna in W

G = gain of antenna in linear scale

π = 3.1416

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

2.3 CLASSIFICATION

For FCC Part 2 (Section 2.1091)

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**.

For RSS-102 Issue 4 (2010-12)

The antenna of this product, under normal use condition, is at least 0.22m away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For FCC Part 2 (Section 2.1091)

EUT

| FREQUENCY BAND (MHz) | MAX POWER (dBm) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/cm ²) | LIMIT (mW/cm ²) |
|----------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2412-2462 | 29.98 | 5.79 | 22 | 0.621 | 1 |
| 5180-5240 | 16.74 | 7.52 | 22 | 0.044 | 1 |
| 5745-5825 | 23.87 | 7.52 | 22 | 0.226 | 1 |

NOTE:

- 2.4GHz: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] = 5.79$
- 5GHz: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] = 7.52$

802.11 ac Module

| FREQUENCY BAND (MHz) | MAX POWER (dBm) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/cm ²) | LIMIT (mW/cm ²) |
|----------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 5180-5240 | 16.99 | 8.76 | 22 | 0.062 | 1 |
| 5745-5825 | 24.70 | 8.76 | 22 | 0.365 | 1 |

NOTE: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20})^2 / 2] = 8.76\text{dBi}$

CONCLUSION:

Both of the EUT & 802.11 ac Module can transmit simultaneously, the formula of calculated the MPE is:

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{EUT WLAN 2.4G} + \text{802.11 ac Module WLAN 5.0G} = 0.621 + 0.365 = 0.986$$

Therefore, the maximum calculation of this situation is 0.985, which is less than the "1" limit.

For RSS-102 Issue 4 (2010-12)

EUT

| FREQUENCY BAND (MHz) | MAX POWER (dBm) | ANTENNA GAIN (dBi) | DISTANCE (m) | POWER DENSITY (W/m ²) | LIMIT (W/m ²) |
|----------------------|-----------------|--------------------|--------------|-----------------------------------|---------------------------|
| 2412-2462 | 29.98 | 5.79 | 0.2 | 6.208 | 10 |
| 5180-5240 | 16.74 | 7.52 | 0.2 | 0.438 | 10 |
| 5745-5825 | 23.87 | 7.52 | 0.2 | 2.264 | 10 |

NOTE:

- 2.4GHz: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] = 5.79$
- 5GHz: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] = 7.52$

802.11 ac Module

| FREQUENCY BAND (MHz) | MAX POWER (dBm) | ANTENNA GAIN (dBi) | DISTANCE (m) | POWER DENSITY (W/m ²) | LIMIT (W/m ²) |
|----------------------|-----------------|--------------------|--------------|-----------------------------------|---------------------------|
| 5180-5240 | 16.99 | 8.76 | 0.2 | 0.618 | 10 |
| 5745-5825 | 24.70 | 8.76 | 0.2 | 3.647 | 10 |

NOTE: Directional gain = $10 \log[(10^{G_1/20} + 10^{G_2/20})^2 / 2] = 8.76\text{dBi}$

CONCLUSION:

Both of the EUT & 802.11 ac Module can transmit simultaneously, the formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 10$

CPD = Calculation power density

LPD = Limit of power density

EUT WLAN 2.4G + 802.11 ac Module WLAN 5.0G = $6.208 + 3.647 = 9.855$

Therefore, the maximum calculation of this situation is 0.985, which is less than the "10" limit.