

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:

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

CPD = Calculation power density

LPD = Limit of power density

EUT WLAN 2.4G + 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.