



RF EXPOSURE REPORT

REPORT NO.: SA140213C04C
MODEL NO.: FORTIAP-223Cxxxxxx, FAP-223Cxxxxxx
(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
RECEIVED: Feb. 13, 2014
TESTED: Feb. 18 ~ Feb. 25, 2014 (For 5GHz Band)
Sep. 03 ~ Sep. 20, 2014 (For 2.4GHz Band)
ISSUED: Oct. 06, 2014

APPLICANT: Fortinet Inc.

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

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TABLE OF CONTENTS

RELEASE CONTROL RECORD	3
1. CERTIFICATION	4
2. RF EXPOSURE.....	5
2.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	5
2.2 MPE CALCULATION FORMULA	6
2.3 CLASSIFICATION	6
2.4 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER.....	7



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140213C04C	Original release	Oct. 06, 2014

1. CERTIFICATION

PRODUCT: Secured Wireless Access Point
FORTIAP-223Cxxxxxx, FAP-223Cxxxxxx (where "x" can
MODEL: be used as "A-Z", or "0-9", or "-", or blank for software changes or
marketing purposes only)
BRAND: Fortinet Inc
APPLICANT: Fortinet Inc.
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: FCC Part 2 (Section 2.1091)
KDB 447498 D03
IEEE C95.1
RSS-102 Issue 4 (2010-12)

The above equipment (Model: FORTIAP-223C) 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** : Oct. 06, 2014
Celine Chou / Specialist

APPROVED BY : Ken Liu , **DATE** : Oct. 06, 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

$\pi = 3.1416$

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

$\pi = 3.1416$

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 20cm 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 0.20m 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	29.27	6.01	20	0.671	1
5180-5240	16.74	7.52	20	0.053	1
5745-5825	23.87	7.52	20	0.274	1

NOTE:

1. 2.4GHz: Directional gain = 3dBi + 10log(2) = 6.01dBi

2. 5GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.52\text{dBi}$

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	22.78	8.76	20	0.284	1
5745-5825	22.88	8.76	20	0.290	1

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 8.76\text{dBi}$

CONCLUSION:

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

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

CPD = Calculation power density

LPD = Limit of power density

EUT WLAN 2.4G + 802.11 ac Module WLAN 5.0G = 0.671 + 0.290 = 0.961

Therefore, the maximum calculation of this situation is 0.961, 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	29.27	6.01	0.2	6.710	10
5180-5240	16.74	7.52	0.2	0.531	10
5745-5825	23.87	7.52	0.2	2.740	10

NOTE:

1. 2.4GHz: Directional gain = 3dBi + 10log(2) = 6.01dBi

2. 5GHz: Directional gain = 10 log[(10^{G₁/20} + 10^{G₂/20} + ... + 10^{G_N/20})² / N_{ANT}] = 7.52dBi

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	22.78	8.76	0.2	2.836	10
5745-5825	22.88	8.76	0.2	2.902	10

NOTE: Directional gain = 10 log[(10^{G₁/20} + 10^{G₂/20})² / 2] = 8.76dBi

CONCLUSION:

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

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 10

CPD = Calculation power density

LPD = Limit of power density

EUT WLAN 2.4G + 802.11 ac Module WLAN 5.0G = 6.710 + 2.902 = 9.612

Therefore, the maximum calculation of this situation is 9.612, which is less than the "10" limit.