

# RF EXPOSURE REPORT

**REPORT NO.:** SA141024C24

FORTIAP-224Dxxxxxx, FortiAP-224Dxxxxxx,

**MODEL NO.:** FAP-224Dxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank)

**FCC ID:** TVE-24122013

**RECEIVED:** Oct. 24, 2014

**TESTED:** Nov. 25, 2014

**ISSUED:** Dec. 15, 2014

**APPLICANT:** Fortinet Inc.

**ADDRESS:** 899 Kifer Road Sunnyvale, CA 94086, USA

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

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Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung  
Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA141024C24	Original release	Dec. 15, 2014

## 1. CERTIFICATION

**PRODUCT:** Secured Wireless Access Point

**BRAND NAME:** Fortinet

**MODEL NO.:** FORTIAP-224Dxxxxxx, FortiAP-224Dxxxxxx,  
FAP-224Dxxxxxx (where "x" can be used as  
"A-Z" , or "0-9" , or "- " , or blank)

**TEST SAMPLE:** ENGINEERING SAMPLE

**APPLICANT:** Fortinet Inc.

**TESTED:** Nov. 25, 2014

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

The above equipment (Model: FAP-224D) 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:** Dec. 15, 2014  
( Lori Chung, Specialist )

**Approved By :**  , **Date:** Dec. 15, 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 <sup>2</sup> )	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/cm<sup>2</sup>

$P_{out}$  = 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

### 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 25cm 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 used						
Ant. No.	Transmitter Circuit	Model No.	Ant. Gain (dBi) Include cable loss	Frequency range (MHz to MHz)	Ant. Type	Connector Type
1	Chain (0)	98141MRSX003	5	2400~2483.5	Dipole	R-SMA
2	Chain (1)	98141MRSX003	5	2400~2483.5	Dipole	R-SMA
For 5GHz used						
Ant. No.	Transmitter Circuit	Model No.	Ant. Gain (dBi) Include cable loss	Frequency range (MHz to MHz)	Ant. Type	Connector Type
1	Chain (0)	98141URSX002	5	5150~5850	Dipole	R-SMA
2	Chain (1)	98141URSX002	5	5150~5850	Dipole	R-SMA

## 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 <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	59.78	8.01	25	0.04814	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

802.11g:

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	589.39	8.01	25	0.47458	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

802.11n (HT20):

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	651.287	8.01	25	0.52442	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

802.11n (HT40):

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422 ~ 2452	366.933	8.01	25	0.29546	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

For 15.407:

802.11a:

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 - 5825	103.561	8.01	25	0.08339	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

802.11n (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 - 5825	112.877	8.01	25	0.09089	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

802.11n (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5755 - 5795	76.775	8.01	25	0.06182	1

Directional gain = 5dBi + 10log(2) = 8.01dBi

## 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  $0.52442 / 1 + 0.09089 / 1 = 0.615$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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