

## RF Exposure Report

**Report No.:** SA160613C30A

**FCC ID:** TVE-281BB022

**Test Model:** FAP-U421EV, FAP-U423EV

**Series Model:** FortiAP U421EVxxxxxx, FAP-U421EVxxxxxx, FORTIAP-U421EVxxxxxx, FortiAP U423EVxxxxxx, FAP-U423EVxxxxxx, FORTIAP-U423EVxxxxxx (where "x" can be used as "A-Z" or "0-9" or "-" or blank for software changes or marketing purposes only)

**Received Date:** Jun. 13, 2016

**Test Date:** Jul. 07 ~ Jul. 21, 2016

**Issued Date:** Aug. 12, 2016

**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. 47-2, 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 Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)



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### Release Control Record

Issue No.	Description	Date Issued
SA160613C30A	Original release.	Aug. 12, 2016

## 1 Certificate of Conformity

**Product:** Secured Wireless Access Point

**Brand:** Fortinet Inc.

**Test Model:** FAP-U421EV, FAP-U423EV

**Series Model:** FortiAP U421EVxxxxxx, FAP-U421EVxxxxxx, FORTIAP-U421EVxxxxxx, FortiAP U423EVxxxxxx, FAP-U423EVxxxxxx, FORTIAP-U423EVxxxxxx (where "x" can be used as "A-Z" or "0-9" or "-" or blank for software changes or marketing purposes only)

**Sample Status:** Engineering sample

**Applicant:** Fortinet Inc.

**Test Date:** Jul. 07 ~ Jul. 21, 2016

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 (October 23, 2015)

IEEE C95.1

The above equipment 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 :** Suntee Liu, **Date:** Aug. 12, 2016

Suntee Liu / Specialist

**Approved by :** Ken Liu, **Date:** Aug. 12, 2016

Ken Liu / Senior Manager

## 2 RF Exposure

### 2.1 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

### 2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

Pout = 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

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 27cm away from the body of the user. So, this device is classified as **Mobile Device**.

### 3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN 2.4GHz (Internal antenna)					
WLAN 2412~2462 (CDD mode)	24.40	10.00	27	0.301	1
WLAN 2412~2462 (Beamforming mode)	23.50	10.00	27	0.244	1
WLAN 5GHz (Internal antenna)					
WLAN 5180~5240 (CDD mode)	23.47	11.86	27	0.372	1
WLAN 5745~5825 (CDD mode)	23.12	11.86	27	0.344	1
WLAN 5180~5240 (Beamforming mode)	21.24	11.86	27	0.223	1
WLAN 5745~5825 (Beamforming mode)	21.55	11.86	27	0.239	1
WLAN 2.4GHz (External antenna)					
WLAN 2412~2462 (CDD mode)	24.40	10.44	27	0.333	1
WLAN 2412~2462 (Beamforming mode)	23.50	10.44	27	0.270	1
WLAN 5GHz (External antenna)					
WLAN 5180~5240 (CDD mode)	23.47	9.20	27	0.202	1
WLAN 5745~5825 (CDD mode)	23.12	9.20	27	0.186	1
WLAN 5180~5240 (Beamforming mode)	21.24	9.20	27	0.121	1
WLAN 5745~5825 (Beamforming mode)	21.55	9.20	27	0.130	1
BT					
BT EDR 2402~2480	8.09	2.91	27	0.001	1
BT LE 2402~2480	6.20	2.91	27	0.001	1

Note:

Internal antenna 2412~2462MHz: Directional gain = 3.98dBi + 10log(4) = 10.00dBi

Internal antenna 5180~5825MHz: Directional gain = 5.84dBi + 10log(4) = 11.86dBi

External antenna 2412~2462MHz: Directional gain = 4.42dBi + 10log(4) = 10.44dBi

External antenna 5180~5825MHz: Directional gain = 3.18dBi + 10log(4) = 9.20dBi

Frequency Band	Max. Power (dBm)		Total Power (dBm)	Power Limit (dBm)
	WLAN 2.4GHz	BT EDR		
2.4GHz	24.40	8.09	24.55	30

Frequency Band	Max. Power (dBm)		Total Power (dBm)	Power Limit (dBm)
	WLAN 2.4GHz	BT LE		
2.4GHz	24.40	6.20	24.47	30

**Conclusion:**

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz (Internal antenna)} + \text{WLAN 5GHz (Internal antenna)} + \text{BT EDR} = 0.301 + 0.372 + 0.001 = 0.674 < 1$$

$$\text{WLAN 2.4GHz (Internal antenna)} + \text{WLAN 5GHz (Internal antenna)} + \text{BT LE} = 0.301 + 0.372 + 0.001 = 0.674 < 1$$

$$\text{WLAN 2.4GHz (External antenna)} + \text{WLAN 5GHz (External antenna)} + \text{BT EDR} = 0.333 + 0.202 + 0.001 = 0.536 < 1$$

$$\text{WLAN 2.4GHz (External antenna)} + \text{WLAN 5GHz (External antenna)} + \text{BT LE} = 0.333 + 0.202 + 0.001 = 0.536 < 1$$

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