RF Exposure Report

Report No.:	SA161026C20
FCC ID:	TVE-241BC041
Test Model:	FortiAP U221EV, FortiAP U223EV
Series Model:	FortiAP U221EVxxxxxx, FAP-U221EVxxxxxx, FORTIAP-U221EVxxxxxx, FortiAP U223EVxxxxxx, FAP-U223EVxxxxxx, FORTIAP-U223EVxxxxxx (where “x” can be used as “A-Z” or “0-9” or “-“ or blank for software changes or marketing purposes only)
Received Date:	Oct. 25, 2016
Test Date:	Oct. 26 ~ Dec. 28, 2016
Issued Date:	Dec. 28, 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
SA161026C20	Original release	Dec. 28, 2016

1 Certificate of Conformity

Product:	Secured Wireless Access Point
Brand:	Fortinet Inc.
Test Model:	FortiAP U221EV, FortiAP U223EV
Series Model:	FortiAP U221EVxxxxxx, FAP-U221EVxxxxxx, FORTIAP-U221EVxxxxxx, FortiAP U223EVxxxxxx, FAP-U223EVxxxxxx, FORTIAP-U223EVxxxxxx (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:	Oct. 26 ~ Dec. 28, 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 : _____ , **Date:** Dec. 28, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Dec. 28, 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^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

2.2 MPE Calculation Formula

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

where

Pd = power density in mW/cm^2

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 20cm 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^2)	Limit (mW/cm^2)
WLAN					
Internal antenna					
CDD mode					
2412-2462	22.49	7.96	20	0.221	1
5180-5240	21.71	8.84	20	0.226	1
5745-5825	21.64	8.84	20	0.222	1
Beamforming mode					
2412-2462	18.64	7.96	20	0.091	1
5180-5240	18.71	8.84	20	0.113	1
5745-5825	18.64	8.84	20	0.111	1
External antenna					
CDD mode					
2412-2462	22.49	7.59	20	0.203	1
5180-5240	21.71	8.36	20	0.202	1
5745-5825	21.64	8.36	20	0.199	1
Beamforming mode					
2412-2462	18.64	7.59	20	0.084	1
5180-5240	18.71	8.36	20	0.101	1
5745-5825	18.64	8.36	20	0.100	1
BT					
BT EDR	10.69	3.67	20	0.005	1
BT LE	6.58	3.67	20	0.002	1

Note:
Internal antenna 2412~2462MHz: Directional gain = 4.95dBi + 10log(2) = 7.96dBi
Internal antenna 5180~5825MHz: Directional gain = 5.83dBi + 10log(2) = 8.84dBi
External antenna 2412~2462MHz: Directional gain = 4.58dBi + 10log(2) = 7.59dBi
External antenna 5180~5825MHz: Directional gain = 5.35dBi + 10log(2) = 8.36dBi

Frequency Band	Max. Power (dBm)		Total Power (dBm)	Power Limit (dBm)
	WLAN 2.4GHz	BT EDR		
2.4GHz	22.49	10.69	22.77	30

Frequency Band	Max. Power (dBm)		Total Power (dBm)	Power Limit (dBm)
	WLAN 2.4GHz	BT LE		
2.4GHz	22.49	6.58	22.60	30

CONCULSION:

Both of the WLAN 2.4G & WLAN 5G & BT can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz (Internal antenna) + WLAN 5GHz (Internal antenna) + BT EDR = 0.221 +0.226 + 0.005 = 0.452 < 1
WLAN 2.4GHz (Internal antenna) + WLAN 5GHz (Internal antenna) + BT LE = 0.221 +0.226 + 0.002 = 0.449 < 1
WLAN 2.4GHz (External antenna) + WLAN 5GHz (External antenna) + BT EDR = 0.203 + 0.202 + 0.005 = 0.410 < 1
WLAN 2.4GHz (External antenna) + WLAN 5GHz (External antenna) + BT LE = 0.203 + 0.202 + 0.002 = 0.407 < 1

Therefore the maximum calculations of above situations are less than the “1” limit.

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