

## RF Exposure Report

**Report No.:** MFBERD-WTW-P22090179

**FCC ID:** TVE-391CBE0291

**Test Model:** FAP-U231G

**Series Model:** FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx  
(Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)

**Received Date:** 2022/9/6

**Issued Date:** 2023/3/21

**Applicant:** Fortinet, Inc.

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kewi Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

Issue No.	Description	Date Issued
MFBERD-WTW-P22090179	Original release	2023/3/21

## 1 Certificate of Conformity

**Product:** Secured Wireless Access Point

**Brand:** FORTINET

**Test Model:** FAP-U231G

**Series Model:** FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx (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.

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

**Standards:** KDB 447498 D01 General RF Exposure Guidance v06

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 RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen, **Date:** 2023/3/21  
Pettie Chen / Senior Specialist

**Approved by :** Jeremy Lin, **Date:** 2023/3/21  
Jeremy Lin / Project Engineer

## 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				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$Pd = (P_{out} * G) / (4 * \pi * r^2)$$

where

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

P<sub>out</sub> = 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 23cm 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 AV Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
Radio 1					
CDD Mode					
2412-2462	25.94	3.89	23	0.145	1
5745-5825	26.40	5.78	23	0.249	1
Beamforming Mode					
2412-2462	21.02	6.87	23	0.093	1
5745-5825	26.40	8.67	23	0.483	1
Radio 2					
CDD Mode					
5180-5240	25.53	5.19	23	0.178	1
5745-5825	24.61	5.59	23	0.158	1
Beamforming Mode					
5180-5240	25.53	7.94	23	0.334	1
5745-5825	24.51	8.43	23	0.296	1
Radio 3					
CDD Mode					
2412-2462	25.42	3.78	23	0.125	1
5180-5240	26.27	5.47	23	0.225	1
5745-5825	26.60	5.42	23	0.240	1
Beamforming Mode					
2412-2462	22.31	6.78	23	0.122	1
5180-5240	26.27	7.78	23	0.382	1
5745-5825	26.60	8.38	23	0.474	1
BT					
2402-2482	9.23	3.96	23	0.003	1
Zigbee					
2405-2480	17.88	3.96	23	0.023	1

Frequency Band (MHz)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
CDD Mode				
5955-6415	24.11	23	0.039	1
6435-6525	23.62	23	0.035	1
6525-6875	23.87	23	0.037	1
6875-7115	23.66	23	0.035	1
Beamforming Mode				
5955-6415	23.84	23	0.036	1
6435-6525	23.41	23	0.033	1
6525-6875	23.84	23	0.036	1
6875-7115	23.63	23	0.035	1

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2.4G:

Radio 1: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 6.87 \text{ dBi}$

Radio 3: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 6.78 \text{ dBi}$

5.0G

Radio 1:

5745-5825 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.67 \text{ dBi}$

Radio 2:

5180-5240 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 7.94 \text{ dBi}$

5745-5825 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.43 \text{ dBi}$

Radio 3:

5180-5240 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 7.78 \text{ dBi}$

5745-5825 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.38 \text{ dBi}$

6GHz:

5955-6415 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.62 \text{ dBi}$

6435-6525 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.30 \text{ dBi}$

6525-6875 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.76 \text{ dBi}$

6875-7115 MHz: Directional gain =  $10 \log[(10^{\text{Chain0/20}} + 10^{\text{Chain1/20}})^2 / 2] = 8.72 \text{ dBi}$

### Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

No	Mode
1	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + BLE = 0.145 + 0.334 + 0.125 + 0.003 = 0.607
2	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + Zigbee = 0.145 + 0.334 + 0.125 + 0.023 = 0.627
3	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 5GHz radio (Radio 3) + BLE = 0.145 + 0.334 + 0.474 + 0.003 = 0.956
4	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 5GHz radio (Radio 3) + Zigbee = 0.145 + 0.334 + 0.474 + 0.023 = 0.976
5	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 6GHz radio (Radio 3) + BLE = 0.145 + 0.334 + 0.039 + 0.003 = 0.521
6	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 6GHz radio (Radio 3) + Zigbee = 0.145 + 0.334 + 0.039 + 0.023 = 0.541
7	5GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + BLE = 0.483 + 0.334 + 0.125 + 0.003 = 0.945
8	5GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + Zigbee = 0.483 + 0.334 + 0.125 + 0.023 = 0.965

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

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