



# RF Exposure Evaluation Report

**Equipment** : Secured Wireless Access Point  
**Brand Name** : Fortinet, Inc.  
**Model No.** : FORTIAP-U321EVxxxxxx, FAP-U321EVxxxxxx;  
FORTIAP-U323EVxxxxxx, FAP-U323EVxxxxxx.  
(Refer to Section 1.2 for more details)  
**FCC ID** : TVE-261DD011  
**Standard** : 47 CFR Part 2.1091  
**Applicant** : Fortinet, Inc.  
899 Kifer Road, Sunnyvale, CA 94086, USA  
**Manufacturer** : Universal Global Scientific Industrial Co., Ltd  
141, Lane 351, Sec. 1, Taiping Road., Tsaotuen,  
Nantou 54261, Taiwan

The product sample received on May 15, 2017 and completely tested on Jun. 27, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit.

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Kevin Liang  
SPORTON INTERNATIONAL INC.





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### REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FA751119   | Rev. 01 | Initial issue of report | Aug. 10, 2017 |
| FA751119   | Rev. 02 | Revise typo             | Sep. 04, 2017 |
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# 1 General Description

## 1.1 EUT General Information

| RF General Information |                        |                           |   |
|------------------------|------------------------|---------------------------|---|
| Evaluation Mode        | Frequency Range (MHz)  | Operating Frequency (MHz) | Modulation Type   |
| 2.4GHz WLAN            | 2400-2483.5            | 2412-2462                 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)                 |
| 5GHz WLAN              | 5150-5250<br>5725-5850 | 5180-5240<br>5745-5825    | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| Bluetooth              | 2400-2483.5            | 2402-2480                 | BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK)<br>LE: DSSS (GFSK)                               |

## 1.2 Table for Multiple Listing

The detail in the following table are all refer to the identical product.

| Model  | Difference       | Description   |
|--|------------------|---|
| FORTIAP-U321EVxxxxxx   | Internal antenna | where"x" can be used as "A-Z", or "-0-9, or"-",or blank for software changes or marketing purposes only |
| FAP-U321EVxxxxxx   |                  |   |
| FORTIAP-U323EVxxxxxx   | External antenna | where"x" can be used as "A-Z", or "-0-9, or"-",or blank for software changes or marketing purposes only |
| FAP-U323EVxxxxxx   |                  |   |
| Note 1: The sample is the same one, only the antenna configuration is different.                     |                  |   |
| Note 2: For more detailed features description, please refer to the specifications or user's manual. |                  |   |

## 1.3 Testing Location

| Testing Location                           |        |  |                      |
|--|--------|--|----------------------|
| <input checked="" type="checkbox"/>        | HWA YA | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)    |                      |
|  |        | TEL : 886-3-327-3456   | FAX : 886-3-327-0973 |
| Test site Designation No. 553509 with FCC. |        |  |                      |
| <input type="checkbox"/>                   | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) |                      |
|  |        | TEL : 886-3-656-9065   | FAX : 886-3-656-9085 |
| Test site Designation No. TW0006 with FCC. |        |  |                      |



## 2 Maximum Permissible Exposure

### 2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6  |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f <sup>2</sup> )*                 | 6  |
| 30-300                | 61.4                              | 0.163                             | 1.0                                      | 6  |
| 300-1500              | -                                 | -                                 | F/300                                    | 6  |
| 1500-100,000          | -                                 | -                                 | 5  | 6  |

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 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   |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



## 2.3 Calculated Result and Limit

**Exposure Environment: General Population / Uncontrolled Exposure**

| Mode       | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| 2.4G;BT-BR | 4.50     | 9.85        | 14.35      | 0.02723  | 26            | 0.00321                 | 1.00000                       | 0.00321         |
| 2.4G;G1D   | 5.20     | 26.91       | 32.11      | 1.62555  | 26            | 0.19136                 | 1.00000                       | 0.19136         |
| 5.8G;D1D   | 7.30     | 28.64       | 35.94      | 3.92645  | 26            | 0.46221                 | 1.00000                       | 0.46221         |
|            |          |             |            |          |               |                         | Sum Ratio                     | 0.65678         |
|            |          |             |            |          |               |                         | Ratio Limit                   | 1               |

| Mode       | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| 5.8G;D1D   | 7.30     | 28.64       | 35.94      | 3.92645  | 26            | 0.46221                 | 1.00000                       | 0.46221         |
| 5.8G;D1D   | 7.30     | 28.64       | 35.94      | 3.92645  | 26            | 0.46221                 | 1.00000                       | 0.46221         |
| 2.4G;BT-BR | 4.50     | 9.85        | 14.35      | 0.02723  | 26            | 0.00321                 | 1.00000                       | 0.00321         |
|            |          |             |            |          |               |                         | Sum Ratio                     | 0.92763         |
|            |          |             |            |          |               |                         | Ratio Limit                   | 1               |