# RF Exposure Report

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|---|---|
| **Report No.:** | MFBDYS-WTW-P20110432C |
| **FCC ID:** | TVE-4617T111266 |
| **Test Model:** | FAP-432F |
| **Series Model:** | FortiAP 432Fxxxxxx, FAP-432Fxxxxxx, FORTIAP-432Fxxxxxx (Where "x" can be used as "A-Z", or "0-9", or “-", or blank for software changes or marketing purposes only) |
| **Received Date:** | Dec. 22, 2021 |
| **Test Date:** | Dec. 22, 2021 ~ Jul. 19, 2022 |
| **Issued Date:** | Sep. 23, 2022 |
| **Applicant:** | Fortinet, Inc. |
| **Address:** | 899 Kifer Road Sunnyvale, CA 94086 USA |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch<br>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., Kwei Shan Dist., Taoyuan City 33383, Taiwan |
| **FCC Registration / Designation Number:** | 788550 / TW0003 |

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## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| MFBDYS-WTW-P20110432C | Original Release | Sep. 23, 2022 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | Secured Wireless Access Point |
| **Brand:** | Fortinet |
| **Test Model:** | FAP-432F |
| **Series Model:** | FortiAP 432Fxxxxxx, FAP-432Fxxxxxx, FORTIAP-432Fxxxxxx (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:** | Dec. 22, 2021 ~ Jul. 19, 2022 |
| **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 :** Gina Liu , **Date:** **Sep. 23, 2022**

Gina Liu / Specialist

**Approved by :** Jeremy Lin , **Date:** **Sep. 23, 2022**

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 ($mW/cm^2$) | 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 | ($180/f^2$)* | 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

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

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 26cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 3 Calculation Result of Maximum Conducted Power

| Radio | Frequency Band (MHz) | Max AV Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) | Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|
| 2G traffic radio (Radio 1) | Mode A_CDD Mode | | | | | |
| | 2412-2462 | 28.95 | 6 | 26 | 0.368 | 1 |
| | Mode A_Beamforming Mode | | | | | |
| | 2412-2462 | 22.56 | 12.02 | 26 | 0.338 | 1 |
| 5GHz traffic radio (Radio 2) | Mode A_CDD Mode | | | | | |
| | 5180-5240 | 26.73 | 6 | 26 | 0.221 | 1 |
| | 5260-5320 | 20.56 | 6 | 26 | 0.053 | 1 |
| | 5500-5720 | 22.35 | 6 | 26 | 0.081 | 1 |
| | 5745-5826 | 28.75 | 6 | 26 | 0.351 | 1 |
| | Mode A_Beamforming Mode | | | | | |
| | 5180-5240 | 22.65 | 12.02 | 26 | 0.345 | 1 |
| | 5260-5320 | 16.61 | 12.02 | 26 | 0.086 | 1 |
| | 5500-5720 | 16.59 | 12.02 | 26 | 0.085 | 1 |
| | 5745-5826 | 22.58 | 12.02 | 26 | 0.340 | 1 |
| 2G traffic radio (Radio 1) | Mode B_CDD Mode | | | | | |
| | 2412-2462 | 21.89 | 14 | 26 | 0.457 | 1 |
| | Mode B_Beamforming Mode | | | | | |
| | 2412-2462 | 15.71 | 20.02 | 26 | 0.440 | 1 |
| 5GHz traffic radio (Radio 2) | Mode B_CDD Mode | | | | | |
| | 5180-5240 | 18.92 | 14 | 26 | 0.231 | 1 |
| | 5250-5320 | 15.98 | 14 | 26 | 0.117 | 1 |
| | 5500-5720 | 15.72 | 14 | 26 | 0.110 | 1 |
| | 5745-5825 | 21.96 | 14 | 26 | 0.464 | 1 |
| | Mode B_Beamforming Mode | | | | | |
| | 5180-5240 | 15.92 | 20.02 | 26 | 0.462 | 1 |
| | 5250-5320 | 12.55 | 20.02 | 26 | 0.213 | 1 |
| | 5500-5720 | 9.97 | 20.02 | 26 | 0.117 | 1 |
| | 5745-5825 | 15.70 | 20.02 | 26 | 0.439 | 1 |

| Radio | Frequency Band (MHz) | Max AV Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) | Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|
| 2G traffic radio (Radio 1) | Mode C_CDD Mode | | | | | |
| | 2412-2462 | 27.97 | 8 | 26 | 0.465 | 1 |
| | Mode C_Beamforming Mode | | | | | |
| | 2412-2462 | 21.72 | 14.02 | 26 | 0.441 | 1 |
| 5GHz traffic radio (Radio 2) | Mode C_CDD Mode | | | | | |
| | 5180-5240 | 26.31 | 6.5 | 26 | 0.225 | 1 |
| | 5260-5320 | 20.43 | 6.5 | 26 | 0.058 | 1 |
| | 5500-5720 | 22.54 | 6.5 | 26 | 0.094 | 1 |
| | 5745-5826 | 28.50 | 6.5 | 26 | 0.372 | 1 |
| | Mode C_Beamforming Mode | | | | | |
| | 5180-5240 | 22.37 | 12.52 | 26 | 0.363 | 1 |
| | 5260-5320 | 17.18 | 12.52 | 26 | 0.110 | 1 |
| | 5500-5720 | 17.35 | 12.52 | 26 | 0.114 | 1 |
| | 5745-5826 | 22.70 | 12.52 | 26 | 0.392 | 1 |
| 2G+5G Scanning radio (Radio 3) | 2412-2462 | 18.74 | 5.5 | 26 | 0.031 | 1 |
| | 5180-5240 | 16.26 | 7.2 | 26 | 0.026 | 1 |
| | 5260-5320 | 15.74 | 7.2 | 26 | 0.023 | 1 |
| | 5500-5720 | 15.79 | 7.2 | 26 | 0.023 | 1 |
| | 5745-5825 | 18.39 | 7.2 | 26 | 0.043 | 1 |
| BT LE | 2402-2480 | 9.39 | 4.5 | 26 | 0.003 | 1 |
| Zigbee | 2405-2480 | 9.31 | 4.5 | 26 | 0.003 | 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.
3. This report is prepared for FCC class II permissive change. The difference compared with the original report (BV CPS report no.: SABDYS-WTW-P20110432) is adding three antennas.
4. The new antennas information is listed as below.

| Optional Antennas | # Of Ant | Type | Connector | 2.4GHz (dBi) | 5GHz B1 (dBi) | 5GHz B2 (dBi) | 5GHz B3 (dBi) | 5GHz B4 (dBi) |
|---|---|---|---|---|---|---|---|---|
| FANT-04ABGN-0606-O-N | 4 | Omni | 4 N-Type | 6 | 6 | 6 | 6 | 6 |
| FANT-04ABGN-1414-P-N | 4 | Patch | 4 N-Type | 14 | 14 | 14 | 14 | 14 |
| FANT-04ABGN-8065-P-N | 4 | Patch | 4 N-Type | 8 | 6.5 | 6.5 | 6.5 | 6.5 |

**Mode A (FANT-04ABGN-0606-O-N)**
Radio 1:
2.4GHz: Directional gain = 6 dBi + 10log(4) = 12.02 dBi
Radio 2:
5GHz: Directional gain = 6 dBi + 10log(4) = 12.02 dBi
**Mode B (FANT-04ABGN-1414-P-N)**
Radio 1:
2.4GHz: Directional gain = 14 dBi + 10log(4) = 20.02 dBi
Radio 2:
5GHz: Directional gain = 14 dBi + 10log(4) = 20.02 dBi
**Mode C (FANT-04ABGN-8065-P-N)**
Radio 1:
2.4GHz: Directional gain = 8 dBi + 10log(4) = 14.02 dBi
Radio 2:
5GHz: Directional gain = 6.5 dBi + 10log(4) = 12.52 dBi

**Conclusion:**
Both of the WLAN 2.4G & WLAN 5G 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

**Mode A**

1. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + BLE = 0.368 / 1 + 0.351 / 1 + 0.043 / 1 + 0.003 / 1 = 0.765
2. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + Zigbee = 0.368 / 1 + 0.351 / 1 + 0.043 / 1 + 0.003 / 1 = 0.765
3. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + BLE = 0.351 / 1 + 0.031 / 1 + 0.003 / 1 = 0.385
4. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + Zigbee = 0.351 / 1 + 0.031 / 1 + 0.003 / 1 = 0.385

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

**Mode B**

1. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + BLE = 0.457 / 1 + 0.464 / 1 + 0.043 / 1 + 0.003 / 1 = 0.967
2. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + Zigbee = 0.457 / 1 + 0.464 / 1 + 0.043 / 1 + 0.003 / 1 = 0.967
3. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + BLE = 0.464 / 1 + 0.031 / 1 + 0.003 / 1 = 0.498
4. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + Zigbee = 0.464 / 1 + 0.031 / 1 + 0.003 / 1 = 0.498

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

**Mode C**

1. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + BLE = 0.465 / 1 + 0.392 / 1 + 0.043 / 1 + 0.003 / 1 = 0.903
2. 2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) + Zigbee = 0.465 / 1 + 0.392 / 1 + 0.043 / 1 + 0.003 / 1 = 0.903
3. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + BLE = 0.392 / 1 + 0.031 / 1 + 0.003 / 1 = 0.426
4. 5GHz traffic radio (Radio 2) + 2G Scanning radio (Radio 3) + Zigbee = 0.392 / 1 + 0.031 / 1 + 0.003 / 1 = 0.426

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

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