

RF Exposure Report

Report No.: MFBDIS-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.

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

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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/cm²

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:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- Detail antenna specification please refer to antenna datasheet.
- 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.
- 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:

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

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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