

RF EXPOSURE EVALUATION REPORT

FCC ID : TVE-121757B
Equipment : Network Security Gateway
Brand Name : FORTINET 
Model Name : FWF-41Fxxxxxx, FortiWiFi 41Fxxxxxx, FORTIWIFI-41Fxxxxxx
FWF-40Fxxxxxx, FortiWiFi 40Fxxxxxx, FORTIWIFI-40Fxxxxxx
FWF-41F-3G4Gxxxxxx, FortiWiFi 41F-3G4Gxxxxxx, FORTIWIFI-41F-3G4Gxxxxxx
FWF-40F-3G4Gxxxxxx, FortiWiFi 40F-3G4Gxxxxxx, FORTIWIFI-40F-3G4Gxxxxxx
(Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software purposes or marketing purposes only)
Marketing Name : FortiWiFi 41F, FortiWiFi 40F, FortiWiFi 41F-3G4G, FortiWiFi 40F-3G4G
Applicant : FORTINET, INC.
899 KIFER RD
SUNNYVALE CA 94086-5301
UNITED STATES
Manufacturer : FORTINET, INC.
899 KIFER RD
SUNNYVALE CA 94086-5301
UNITED STATES
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.



Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
3. RF EXPOSURE LIMIT INTRODUCTION	9
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	10
4.1. Standalone Power Density Calculation	10



History of this test report

Report No.	Version	Description	Issued Date
FA992436-02	Rev. 01	Initial issue of report	Mar. 20, 2020

1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Network Security Gateway
Brand Name	FORTINET 
Model Name	FWF-41Fxxxxxx, FortiWiFi 41Fxxxxxx, FORTIWIFI-41Fxxxxxx FWF-40Fxxxxxx, FortiWiFi 40Fxxxxxx, FORTIWIFI-40Fxxxxxx FWF-41F-3G4Gxxxxxx, FortiWiFi 41F-3G4Gxxxxxx, FORTIWIFI-41F-3G4Gxxxxxx FWF-40F-3G4Gxxxxxx, FortiWiFi 40F-3G4Gxxxxxx, FORTIWIFI-40F-3G4Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software purposes or marketing purposes only)
Marketing Name	FortiWiFi 41F, FortiWiFi 40F, FortiWiFi 41F-3G4G, FortiWiFi 40F-3G4G
FCC ID	TVE-121757B
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20 / HT40 / VHT20 / VHT40 / VHT80
EUT Stage	Production Unit
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. Variant report to enable 5.3GHz / 5.5GHz WLAN, for 2.4GHz / 5.2GHz / 5.8GHz WLAN power density calculation please refers to Sporton RF Exposure Report, report number FA992436-01 (FCC ID: TVE-121757B)	

Reviewed by: Jason Wang

Report Producer: Daisy Peng

2. Maximum RF average output power among production units

<Non-beamforming mode>

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit
	802.11a	CH 52	5260	19.00
		CH 56	5280	19.50
		CH 60	5300	19.50
		CH 64	5320	19.50
	802.11n-HT20	CH 52	5260	19.00
		CH 56	5280	19.50
		CH 60	5300	19.50
		CH 64	5320	19.50
	802.11n-HT40	CH 54	5270	23.00
		CH 62	5310	21.00
	802.11ac-VHT20	CH 52	5260	19.00
		CH 56	5280	19.50
		CH 60	5300	19.50
		CH 64	5320	19.50
	802.11ac-VHT40	CH 54	5270	23.00
		CH 62	5310	21.00
	802.11ac-VHT80	CH 58	5290	17.50

5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit
	802.11a	CH 100	5500	19.50
		CH 116	5580	19.50
		CH 124	5620	19.50
		CH 132	5660	19.50
		CH 140	5700	19.00
		CH 144	5720	20.00
	802.11n-HT20	CH 100	5500	19.50
		CH 116	5580	19.50
		CH 124	5620	23.00
		CH 132	5660	21.00
		CH 140	5700	19.50
		CH 144	5720	20.00
	802.11n-HT40	CH 102	5510	21.50
		CH 110	5550	22.50
		CH 126	5630	22.50
		CH 134	5670	22.50
		CH 142	5710	23.00
	802.11ac-VHT20	CH 100	5500	19.50
		CH 116	5580	19.50
		CH 124	5620	23.00
		CH 132	5660	21.00
		CH 140	5700	19.50
		CH 144	5720	20.00
	802.11ac-VHT40	CH 102	5510	21.50
		CH 110	5550	22.50
		CH 126	5630	22.50
		CH 134	5670	22.50
		CH 142	5710	23.00
	802.11ac-VHT80	CH 106	5530	19.00
		CH 122	5610	21.00
		CH 138	5690	23.00

**<Beamforming mode>**

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit
	802.11a	CH 52	5260	18.50
		CH 56	5280	18.50
		CH 60	5300	19.50
		CH 64	5320	19.00
	802.11n-HT20	CH 52	5260	18.50
		CH 56	5280	18.50
		CH 60	5300	19.50
		CH 64	5320	19.00
	802.11n-HT40	CH 54	5270	22.00
		CH 62	5310	20.00
	802.11ac-VHT20	CH 52	5260	18.50
		CH 56	5280	18.50
		CH 60	5300	19.50
		CH 64	5320	19.00
	802.11ac-VHT40	CH 54	5270	22.00
		CH 62	5310	20.00
	802.11ac-VHT80	CH 58	5290	17.00

5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit
	802.11a	CH 100	5500	19.50
		CH 116	5580	19.00
		CH 124	5620	19.00
		CH 132	5660	19.00
		CH 140	5700	18.50
		CH 144	5720	19.50
	802.11n-HT20	CH 100	5500	19.00
		CH 116	5580	19.00
		CH 124	5620	18.50
		CH 132	5660	18.50
		CH 140	5700	19.00
		CH 144	5720	20.00
	802.11n-HT40	CH 102	5510	21.00
		CH 110	5550	21.50
		CH 126	5630	21.50
		CH 134	5670	21.50
		CH 142	5710	21.50
	802.11ac-VHT20	CH 100	5500	19.00
		CH 116	5580	19.00
		CH 124	5620	18.50
		CH 132	5660	18.50
		CH 140	5700	19.00
		CH 144	5720	20.00
	802.11ac-VHT40	CH 102	5510	21.00
		CH 110	5550	21.50
		CH 126	5630	21.50
		CH 134	5670	21.50
		CH 142	5710	21.50
	802.11ac-VHT80	CH 106	5530	18.50
		CH 122	5610	21.00
		CH 138	5690	22.00

3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	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				
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

The MPE was calculated at 27 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

<Non-beamforming mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 27cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
5GHz WLAN	5260.0	3.46	23.00	26.460	0.443	442.588	0.048	1.000	0.048

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

<Beamforming mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 27cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
5GHz WLAN	5260.0	8.23	22.00	30.230	1.054	1054.387	0.115	1.000	0.115

Note:

1. For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.
2. This device supports Beamforming for WLAN 5GHz a / HT20 / HT40 / VHT20 / VHT40 / VHT80 only; therefore, in the table above which consider maximum directional Gain 8.23dBi for WLAN 5GHz Beamforming mode.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.