



Report No.: FYCR220500019603

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RF EXPOSURE EVALUATION REPORT

Application No.: FYCR2205000196AT

Applicant: Fortinet Inc.

Address of Applicant: 899 Kifer Road, Sunnyvale, California 94086 United States

Manufacturer: Fortinet Inc.

Address of Manufacturer: 899 Kifer Road, Sunnyvale, California 94086 United States

Equipment Under Test (EUT):

EUT Name: Secured Network Extension Device **Model No.:** FortiExtender 201F-AMxxxxxxxxxx,

FORTIEXTENDER-201F-AMxxxxxxxxxxx, FEX-201F-AMxxxxxxxxxx(where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or

marketing purposes only) •

Please refer to section 3.1 of this report which indicates which model was

actually tested and which were electrically identical.

 Trade Mark:
 FORTINET

 FCC ID:
 TVE-2401M01A

 Standard(s):
 47 CFR Part 1.1307

 47 CFR Part 1.1310

47 CFR Part 2.1091

Date of Receipt: 2022-05-26

Date of Evaluation: 2022-06-24 to 2022-07-12

Date of Issue: 2022-07-19

Evaluation Result: Pass*

Winkey Wang

Winkey Wang

EMC Technical Manager



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^{*} In the configuration evaluated, the EUT complied with the standards specified above.



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Revision Record						
Version	Version Chapter Date Modifier					
01		2022-07-19		Original		

Authorized for issue by:		
	Tree Zhan	
	Tree Zhan/Project Engineer	
	WinkeyWang	
	Winkey Wang/Reviewer	



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3 General Information

3.1 Details of E.U.T.

Power supply:	DC 12V by AC adapter or POE adapter.			
	AC adapter, model: WA-36W12R			
	Input: AC 100-240V, 50/60Hz. 0.9A Max			
	Output: DC 12V, 3.0A, 36.0W			
	POE Adapter: PD-9001GR/AC			
	Input: AC 100-240V 50/60Hz, 0.67A			
	Output: DC 55V 0.6A			
	The EUT support two type adapters (AC to DC adapter and POE adapter), all the mode had been tested and only record the worst case in the report.			
Cable(s):	DC cable from the adapter 150cm without core;			
	3 PCS antennas 21.5cm			
For BT:				
Operation Frequency:	2402MHz to 2480MHz			
Bluetooth Version:	V5.0 Dual mode			
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK			
Number of Channels:	79			
Channel Spacing:	1MHz			
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)			
Antenna Type:	PIFA Antenna			
Antenna Gain:	3.5dBi			

For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Modulation Type:	GFSK
Data Rate:	1M/bps, 2M/bps
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	3.5dBi



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For WCDMA/LTE	
Operation Frequency Band:	WCDMA Band II/IV/V, LTE Band 2/4/5/7/12/13/14/25/26/41/48/66/71 LTE CA Band 5B, LTE CA Band 7C, LTE CA Band 41C
Modulation Type:	QPSK, 16QAM, 64QAM, 256QAM
HSDPA UE Category:	13
HSUPA UE Category:	6
LTE Power Class:	Level 3
Antenna Type:	Dipole Antenna
Antenna Gain:	WCDMA Band II: 2.29dBi, WCDMA Band IV: 1.95dBi, WCDMA Band V: 1.74dBi, LTE Band 2: 2.29dBi, LTE Band 4: 1.95dBi, LTE Band 5: 1.74dBi, LTE Band 7: 2.11dBi, LTE Band 12: 1.72dBi, LTE Band 13: 1.66dBi, LTE Band 14: 1.49dBi, LTE Band 25: 2.29dBi, LTE Band 26: 1.74dBi, LTE Band 41: 2.45dBi, LTE Band 66: 1.97dBi, LTE Band 71: 1.77dBi, LTE CA Band 7C: 2.11dBi, LTE CA Band 41C: 2.45dBi, LTE CA Band 5B: 1.74dBi, LTE Band 48: -0.38dBi
Based on Module certific	ation (FCC ID: N7NEM74B)

Declaration of EUT Family Grouping:

Model No.: FortiExtender 201F-AMxxxxxxxxxx, FORTIEXTENDER-201F-AMxxxxxxxxxx,

FEX-201F-AMxxxxxxxxx(where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)

Only the model FEX-201F-AM was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used, internal wiring and functions were identical for all the above models, with only difference as below: "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only.



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3.2 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark,Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China Tel: +86 755 8866 3988 Fax: +86 755 2671 0594

No tests were sub-contracted.

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA (Certificate No. 6606.01)

Compliance Certification Services (Kunshan) Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6606.01.

• FCC -Designation Number: CN1322

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

• Innovation, Science and Economic Development Canada

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

3.4 Deviation from Standards

None

3.5 Abnormalities from Standard Conditions

None



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4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 **Limits**

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field Magnetic fi strength strength (V/m) (A/m)		Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupationa	/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	ion/Uncontrolled Exp	posure	
0.3–1.34 1.34–30 30–300 300–1500 1500–100,000	614 824/f 27.5	1.63 2.19/f 0.073	*(100) *(180/f²) 0.2 f/1500 1.0	30 30 30 30 30

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*Pi*R2)

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

Pd id the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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4.2 EUT RF Exposure Evaluation

For BT:

Antenna Gain: 3.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.24 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)	Peak Output	to Antenna	at R = 20 cm		
	Power (dBm)	(mW)	(mW/cm²)		
2480	8.34	6.82	0.003	1.0	PASS

Note: Refer to report No. FYCR220500019601 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 3.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.24 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency	Max Conducted	Output Power	Power Density	Limit	Result
(MHz)	Peak Output	to Antenna	at R = 20 cm		
	Power (dBm)	(mW)	(mW/cm ²)		
2402	10.05	10.12	0.0045	1.0	PASS

Note: Refer to report No. FYCR220500019602 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For standalone WCDMA/LTE

Based on Module certification(FCC ID: N7NEM74B), refer to the Module certification EM7411 for WCDMA/LTE Module test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



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Test Mode	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Power (mW)	Power Density at 20cm (mW/cm2)	Limit (mW/ cm2)	MPE Ratio
WCDMA B2	24.00	2.29	251.19	0.0845	1	0.0845
WCDMA B4	24.00	1.95	251.19	0.0785	1	0.0785
WCDMA B5	24.00	1.74	251.19	0.0745	0.566	0.1316
LTE B2	24.00	2.29	251.19	0.0845	1	0.0845
LTE B4	24.00	1.95	251.19	0.0785	1	0.0785
LTE B5	24.00	1.74	251.19	0.0745	0.566	0.1316
LTE B7	24.00	2.11	251.19	0.0815	1	0.0815
LTE B12	24.00	1.72	251.19	0.0685	0.477	0.1436
LTE B13	24.00	1.66	251.19	0.0735	0.523	0.1405
LTE B14	24.00	1.49	251.19	0.0705	0.532	0.1325
LTE B25	24.00	2.29	251.19	0.0845	1	0.0845
LTE B26	24.00	1.74	251.19	0.0745	0.596	0.125
LTE B41	24.00	2.45	251.19	0.088	1	0.088
LTE B48	23.00	-0.38	199.53	0.0365	1	0.0365
LTE B66	24.00	1.97	251.19	0.0785	1	0.0785
LTE B71	24.00	1.77	251.19	0.075	0.435	0.1724
LTE CA Band 5B	24.00	1.74	251.19	0.0745	0.566	0.1316
LTE CA Band 7C	24.00	2.11	251.19	0.0815	1	0.0815
LTE CA Band 41C	24.00	2.45	251.19	0.088	1	0.088

The simultaneous transmission result between of BT and WCDMA/LTE module:

The SAR Exclusion Threshold Level:

=CPD1 / LPD1 + CPD2 / LPD2

(CPD = Calculation power density, LPD = Limit of power density)

= 0.0045 + 0.1724 = 0.1769 < 1

Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

-- End of the Report--



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