

Radio Exposure Evaluation Report

FCC ID : QXO-AP460
Equipment : Wireless Access Point
Brand Name : Extreme Networks, Inc.



Model Name : AP460e
Applicant : Extreme Networks, Inc.
6480 Via Del Oro, San Jose, CA 95119, United States
Manufacturer : Extreme Networks, Inc.
6480 Via Del Oro, San Jose, CA 95119, United States
Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Mar. 25, 2021, and testing was started from Mar. 28, 2021 and completed on Apr. 09, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 2.1091 and shown compliance with the applicable technical standards.

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



Approved by: Allen Lin

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Photographs of EUT V01





Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

None

Reviewed by: Ben Tseng

Report Producer: Debby Hung



1 General Description

1.1 Information

1.1.1 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) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11 ax: OFDMA(BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11 ax: OFDMA(BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	LE: DSSS (GFSK)
Thread	2400-2483.5	2405-2480	DSSS (O-QPSK)

1.1.2 Antenna Information

(AP460e) External Antenna

Group	Brand	Model Number (P/N)	Antenna Type	Connector	Antenna Gain (dBi)		
					2.4GHz	5GHz	BLE/Thread
1	Extreme	ML-2452-APA2-01	Omni	RP SMA male	3.17	4.85	-
2	Extreme	ML-2452-APA2-02	Omni	RP SMA male	3.17	4.85	-
3	Extreme	ML-2452-HPA5-036	Omni	RP SMA male	3.9	5.7	-
4	Extreme	ML-2452-HPAG4A6-01	Omni	N male	4	7.3	-
5	Extreme	ML-2452-PNA5-01R	Panel	Type N-Male	4.5	5	-
6	Extreme	ML-2452-PTA4M4-036	Omni	Rev-Polarity SMA Male 4x	5	6.6	-
7	Extreme	ML-2452-HPAG5A8-01	Omni	N male	5	8	-
8	Extreme	WS-AO-DQ04360N	Omni	N male	5.5	6	-
9	Extreme	AI-DQ04360S	Omni	RP SMA male	5.5	6	-
10	Extreme	ML-2452-SEC6M4-036 / WS-AI-DQ05120	Panel	RP SMA male	6.92	7.23	-
11	Extreme	WS-AI-DE07025	Panel	RP SMA male	7.5	6.5	-

12	Extreme	ML-2452-PNA7-01R	Panel 1	Type N-Male	7.8	10.7	7.8
13	Extreme	WS-AI-DE10055	Panel 2	RP SMA male	10.5	7.5	-
14	Extreme	ML-2499-HPA8-01	Dipole	N male	-	-	8
15	Extreme	AO-DD19017N	Panel	N male	-	20	-

Note 1: Group 15 were measured during the test for WLAN 5G Mode.

Note 2: Group 15 only for radio 2 (5G) use.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax mode (1TX/1RX)

Only port 1 can be used as transmitting/receiving antenna.

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX)

Port 1 and port 2 could transmit/receive simultaneously.

For IEEE 802.11 a/n/ac/ax mode (4TX/4RX)

Port 1, port 2, port 3 and port 4 could transmit/receive simultaneously.

1.1.3 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA970235

& FA970235-01. Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
According to the applicant's declaration on the product application. The model name "AP460e" add the below function : - Fixed P2P AP Function was added. - Antenna(Group 15) was added. The antenna(Group 15) only can be used when the EUT operates using Radio 2 with the Fixed P2P AP mode.	MPE was evaluated.

1.2 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory			
☒	Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.) TEL: 886-3-327-3456	FAX: 886-3-327-0973
Test site Designation No. TW3785 with FCC.			
☐	Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: 886-3-318-0787	FAX: 886-3-318-0287
Test site Designation No. TW0008 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 ²)	Averaging Time E ² , H ² or S (minutes)
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

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

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

Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode:

1. WLAN 2.4G+ WLAN 5G+ WLAN 2.4G+Thread
2. WLAN 2.4G+ WLAN 5G+ WLAN 2.4G+BT
3. WLAN 2.4G+ WLAN 5G+ WLAN 5G+Thread
4. WLAN 2.4G+ WLAN 5G+ WLAN 5G+BT



2.2 MPE Calculation Method

The MPE was calculated at 32 cm to show compliance with the power density limit.
The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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

2.4G(Radio1)+ 5G(Radio 2)+ 2.4G(Radio 3)+Thread(Radio 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	13.51	22.46	35.97	0.00	35.97	3.95367	32	0.30725	1.00000	0.30725
5.8G;D1D	20.00	16.45	36.45	0.00	36.45	4.41570	32	0.34315	1.00000	0.34315
2.4G;D1D	13.51	22.34	35.85	0.00	35.85	3.84592	32	0.29888	1.00000	0.29888
2.4G;D1D	8.00	1.09	9.09	0.00	9.09	0.00811	32	0.00063	1.00000	0.00063
									Sum Ratio	0.94991
									Ratio Limit	1

2.4G(Radio 1)+ 5G(Radio 2)+ 2.4G(Radio 3)+ Bluetooth (Radio 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	10.50	25.47	35.97	0.00	35.97	3.95367	32	0.30725	1.00000	0.30725
5.8G;D1D	20.00	16.45	36.45	0.00	36.45	4.41570	32	0.34315	1.00000	0.34315
2.4G;D1D	13.51	22.34	35.85	0.00	35.85	3.84592	32	0.29888	1.00000	0.29888
2.4G;BT-LE	8.00	-0.76	7.24	0.00	7.24	0.00530	32	0.00041	1.00000	0.00041
									Sum Ratio	0.94969
									Ratio Limit	1

2.4G(Radio 1)+ 5G(Radio 2)+ 5G(Radio 3)+Thread(Radio 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	10.50	25.47	35.97	0.00	35.97	3.95367	32	0.30725	1.00000	0.30725
5.8G;D1D	20.00	16.45	36.45	0.00	36.45	4.41570	32	0.34315	1.00000	0.34315
5.8G;D1D	8.00	27.47	35.47	0.00	35.47	3.52371	32	0.27384	1.00000	0.27384
2.4G;D1D	8.00	1.09	9.09	0.00	9.09	0.00811	32	0.00063	1.00000	0.00063
									Sum Ratio	0.92487
									Ratio Limit	1

**2.4G(Radio 1)+ 5G(Radio 2)+ 5G(Radio 3)+ Bluetooth (Radio 4)**

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	10.50	25.47	35.97	0.00	35.97	3.95367	32	0.30725	1.00000	0.30725
5.8G;D1D	20.00	16.45	36.45	0.00	36.45	4.41570	32	0.34315	1.00000	0.34315
5.8G;D1D	8.00	27.47	35.47	0.00	35.47	3.52371	32	0.27384	1.00000	0.27384
2.4G;BT-LE	8.00	-0.76	7.24	0.00	7.24	0.00530	32	0.00041	1.00000	0.00041
									Sum Ratio	0.92465
									Ratio Limit	1

————THE END————