

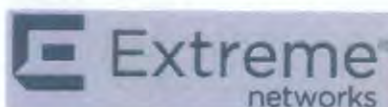


FCC RADIO EXPOSURE TEST REPORT

FCC ID : QXO-AP410

Equipment : Wireless Access Point

Brand Name :



or Extreme Networks

Model Name : AP410i, AP410e

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 Part 2.1091

The product was received on Aug. 20, 2019, and testing was started from Sep. 26, 2019 and completed on Nov. 12, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

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

The test results in this variant 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.


Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.0



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:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan



1 General Description

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) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5250 5250-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK
Thread	2400-2483.5	2405-2480	Thread: O-QPSK (250kbps)

1.2 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	EUT	Description
AP410i	EUT 1	The "i" in AP410i indicates that it comes with internal antennas and the "e" in AP410e indicates that the access point comes with external antenna connectors.
AP410e	EUT 2	

1.3 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA970232

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device. 2. Adding 802.11ac 160MHz and 802.11ax 160MHz Mode.	Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of 2.4GHz, Bluetooth, Thread and 5GHz band 1, 4 are based on original test report.



1.4 Testing Location

Testing Location		
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



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)*	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)*	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

2.2 MPE Calculation Method

The MPE was calculated at 31 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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

For Internal Antenna

Test Mode: 1TX

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)
2.4G;G1D (Radio 1)	4.56	27.91	32.47	0.50	32.97	1.98153	31	0.16408	1
5.2G;D1D (Radio 2)	5.36	23.82	29.18	0.50	29.68	0.92897	31	0.07692	1
5.3G;D1D (Radio 2)	5.36	23.76	29.12	0.50	29.62	0.91622	31	0.07587	1
5.6G;D1D (Radio 2)	5.36	22.48	27.84	0.50	28.34	0.68234	31	0.05650	1
5.8G;D1D (Radio 2)	5.36	25.68	31.04	0.50	31.54	1.42561	31	0.11805	1
2.4G;G1D (Radio 3)	4.47	23.28	27.75	0.50	28.25	0.66834	31	0.05534	1
5.2G;D1D (Radio 3)	5.02	24.37	29.39	0.50	29.89	0.97499	31	0.08073	1
5.3G;D1D (Radio 3)	5.02	23.68	28.70	0.50	29.20	0.83176	31	0.06887	1
5.6G;D1D (Radio 3)	5.02	23.61	28.63	0.50	29.13	0.81846	31	0.06777	1
5.8G;D1D (Radio 3)	5.02	23.33	28.35	0.50	28.85	0.76736	31	0.06354	1
2.4G;BT-LE (Radio 4)	4.37	1.62	5.99	0.50	6.49	0.00446	31	0.00037	1
2.4G;Thread (Radio 4)	4.37	2.27	6.64	0.50	7.14	0.00518	31	0.00043	1

**Test Mode: 2TX**

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)
2.4G;G1D (Radio 1)	7.57	26.01	33.58	0.50	34.08	2.55859	31	0.21186	1
5.2G;D1D (Radio 2)	5.36	26.29	31.65	0.50	32.15	1.64059	31	0.13585	1
5.3G;D1D (Radio 2)	5.36	23.96	29.32	0.50	29.82	0.95940	31	0.07944	1
5.6G;D1D (Radio 2)	5.36	23.96	29.32	0.50	29.82	0.95940	31	0.07944	1
5.8G;D1D (Radio 2)	5.36	28.91	34.27	0.50	34.77	2.99916	31	0.24835	1
2.4G;G1D (Radio 3)	7.48	23.99	31.47	0.50	31.97	1.57398	31	0.13033	1
5.2G;D1D (Radio 3)	8.03	25.82	33.85	0.50	34.35	2.72270	31	0.22545	1
5.3G;D1D (Radio 3)	8.03	21.83	29.86	0.13	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 3)	8.03	21.92	29.95	0.04	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 3)	8.03	24.32	32.35	0.50	32.85	1.92752	31	0.15961	1

Test Mode: 4TX

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)
5.2G;D1D (Radio 2)	11.38	24.48	35.86	0.13	35.99	3.97192	31	0.32889	1
5.3G;D1D (Radio 2)	11.38	18.56	29.94	0.05	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	11.38	18.57	29.95	0.04	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	11.38	24.55	35.93	0.06	35.99	3.97192	31	0.32889	1

**For External Antenna 7****Test Mode: 1TX**

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)
2.4G;G1D (Radio 1)	5.00	25.67	30.67	0.50	31.17	1.30918	31	0.10841	1
5.2G;D1D (Radio 2)	8.00	22.47	30.47	0.50	30.97	1.25026	31	0.10353	1
5.3G;D1D (Radio 2)	8.00	20.85	28.85	0.50	29.35	0.86099	31	0.07129	1
5.6G;D1D (Radio 2)	8.00	21.63	29.63	0.36	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	8.00	24.02	32.02	0.50	32.52	1.78649	31	0.14793	1
2.4G;G1D (Radio 3)	5.00	22.89	27.89	0.50	28.39	0.69024	31	0.05716	1
5.2G;D1D (Radio 3)	8.00	23.06	31.06	0.50	31.56	1.43219	31	0.11859	1
5.3G;D1D (Radio 3)	8.00	21.96	29.96	0.03	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 3)	8.00	21.95	29.95	0.04	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 3)	8.00	22.78	30.78	0.50	31.28	1.34276	31	0.11119	1

Test Mode: 2TX

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)
2.4G;G1D (Radio 1)	8.01	25.65	33.66	0.50	34.16	2.60615	31	0.21580	1
5.2G;D1D (Radio 2)	8.00	24.65	32.65	0.50	33.15	2.06538	31	0.17102	1
5.3G;D1D (Radio 2)	8.00	21.96	29.96	0.03	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	8.00	21.96	29.96	0.03	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	8.00	26.53	34.53	0.50	35.03	3.18420	31	0.26367	1
2.4G;G1D (Radio 3)	8.01	24.23	32.24	0.50	32.74	1.87932	31	0.15562	1
5.2G;D1D (Radio 3)	8.00	24.68	32.68	0.50	33.18	2.07970	31	0.17221	1
5.3G;D1D (Radio 3)	11.01	18.94	29.95	0.04	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 3)	11.01	18.95	29.96	0.03	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 3)	8.00	24.63	32.63	0.50	33.13	2.05589	31	0.17024	1

**Test Mode: 4TX**

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)
5.2G;D1D (Radio 2)	14.02	21.94	35.96	0.03	35.99	3.97192	31	0.32889	1
5.3G;D1D (Radio 2)	14.02	15.95	29.97	0.02	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	14.02	15.94	29.96	0.03	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	8.00	27.98	35.98	0.01	35.99	3.97192	31	0.32889	1

**For External Antenna 12****Test Mode: 1TX**

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)
2.4G;G1D (Radio 1)	7.80	23.27	31.07	0.50	31.57	1.43549	31	0.11887	1
5.2G;D1D (Radio 2)	10.70	21.62	32.32	0.50	32.82	1.91426	31	0.15851	1
5.3G;D1D (Radio 2)	10.70	19.26	29.96	0.03	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	10.70	19.22	29.92	0.07	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	10.70	23.86	34.56	0.50	35.06	3.20627	31	0.26550	1
2.4G;D1D (Radio 3)	7.80	21.85	29.65	0.50	30.15	1.03514	31	0.08571	1
5.2G;D1D (Radio 3)	10.70	23.11	33.81	0.50	34.31	2.69774	31	0.22339	1
5.3G;D1D (Radio 3)	10.70	19.26	29.96	0.03	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 3)	10.70	19.23	29.93	0.06	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 3)	10.70	24.27	34.97	0.50	35.47	3.52371	31	0.29178	1
2.4G;BT-LE (Radio 4)	7.80	-1.53	6.27	0.50	6.77	0.00475	31	0.00039	1
2.4G;Thread (Radio 4)	7.80	0.57	8.37	0.50	8.87	0.00771	31	0.00064	1

**Test Mode: 2TX**

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)
2.4G;G1D (Radio 1)	10.81	23.91	34.72	0.50	35.22	3.32660	31	0.27546	1
5.2G;D1D (Radio 2)	10.70	23.95	34.65	0.50	35.15	3.27341	31	0.27105	1
5.3G;D1D (Radio 2)	10.70	19.24	29.94	0.05	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	10.70	19.24	29.94	0.05	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	10.70	24.96	35.66	0.33	35.99	3.97192	31	0.32889	1
2.4G;G1D (Radio 3)	10.81	21.96	32.77	0.50	33.27	2.12324	31	0.17582	1
5.2G;D1D (Radio 3)	10.70	24.83	35.53	0.46	35.99	3.97192	31	0.32889	1
5.3G;D1D (Radio 3)	10.70	19.25	29.95	0.04	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 3)	10.70	19.26	29.96	0.03	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 3)	13.71	21.94	35.65	0.34	35.99	3.97192	31	0.32889	1

Test Mode: 4TX

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)
5.2G;D1D (Radio 2)	10.70	24.86	35.56	0.43	35.99	3.97192	31	0.32889	1
5.3G;D1D (Radio 2)	10.70	19.26	29.96	0.03	29.99	0.99770	31	0.08261	1
5.6G;D1D (Radio 2)	10.70	19.26	29.96	0.03	29.99	0.99770	31	0.08261	1
5.8G;D1D (Radio 2)	10.70	24.97	35.67	0.32	35.99	3.97192	31	0.32889	1

**For External Antenna 13****Test Mode: 1TX**

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)
2.4G;G1D (Radio 1)	10.50	25.46	35.96	0.03	35.99	3.97192	31	0.32889	1
2.4G;G1D (Radio 3)	10.50	23.44	33.94	0.50	34.44	2.77971	31	0.23017	1

Test Mode: 2TX

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)
2.4G;G1D (Radio 1)	10.50	25.44	35.94	0.05	35.99	3.97192	31	0.32889	1
2.4G;G1D (Radio 3)	13.51	21.71	35.22	0.50	35.72	3.73250	31	0.30907	1

For External Antenna 14

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)
2.4G;BT-LE (Radio 4)	8.00	-1.53	6.47	0.50	6.97	0.00498	31	0.00041	1
2.4G;Thread (Radio 4)	8.00	0.57	8.57	0.50	9.07	0.00807	31	0.00067	1



Simultaneous Transmission Analysis Mode: Radio 1 + Radio 2 + Radio 3 (2.4GHz) + Radio 4 (BT LE)

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;G1D (Radio 1)	10.50	25.46	35.96	0.03	35.99	3.97192	31	0.32889	1	0.32889
5.8G;D1D (Radio 2)	8.00	27.98	35.98	0.01	35.99	3.97192	31	0.32889	1	0.32889
2.4G;G1D (Radio 3)	13.51	21.71	35.22	0.50	35.72	3.73250	31	0.30907	1	0.30907
2.4G;BT-LE (Radio 4)	8.00	-1.53	6.47	0.50	6.97	0.00498	31	0.00041	1	0.00041
									Sum Ratio	0.96726
									Ratio Limit	1

Simultaneous Transmission Analysis Mode: Radio 1 + Radio 2 + Radio 3 (5GHz) + Radio 4 (BT LE)

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;G1D (Radio 1)	10.50	25.46	35.96	0.03	35.99	3.97192	31	0.32889	1	0.32889
5.8G;D1D (Radio 2)	8.00	27.98	35.98	0.01	35.99	3.97192	31	0.32889	1	0.32889
5.2G;D1D (Radio 3)	10.70	24.83	35.53	0.46	35.99	3.97192	31	0.32889	1	0.32889
2.4G;BT-LE (Radio 4)	8.00	-1.53	6.47	0.50	6.97	0.00498	31	0.00041	1	0.00041
									Sum Ratio	0.98708
									Ratio Limit	1



Simultaneous Transmission Analysis Mode: Radio 1 + Radio 2 + Radio 3 (2.4GHz) + Radio 4 (Thread)

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;G1D (Radio 1)	10.50	25.46	35.96	0.03	35.99	3.97192	31	0.32889	1	0.32889
5.8G;D1D (Radio 2)	8.00	27.98	35.98	0.01	35.99	3.97192	31	0.32889	1	0.32889
2.4G;G1D (Radio 3)	13.51	21.71	35.22	0.50	35.72	3.73250	31	0.30907	1	0.30907
2.4G;Thread (Radio 4)	8.00	0.57	8.57	0.50	9.07	0.00807	31	0.00067	1	0.00067
									Sum Ratio	0.96752
									Ratio Limit	1

Simultaneous Transmission Analysis Mode: Radio 1 + Radio 2 + Radio 3 (5GHz) + Radio 4 (Thread)

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;G1D (Radio 1)	10.50	25.46	35.96	0.03	35.99	3.97192	31	0.32889	1	0.32889
5.8G;D1D (Radio 2)	8.00	27.98	35.98	0.01	35.99	3.97192	31	0.32889	1	0.32889
5.2G;D1D (Radio 3)	10.70	24.83	35.53	0.46	35.99	3.97192	31	0.32889	1	0.32889
2.4G;Thread (Radio 4)	8.00	0.57	8.57	0.50	9.07	0.00807	31	0.00067	1	0.00067
									Sum Ratio	0.98734
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

—————THE END—————