

# Radio Exposure Evaluation Report

**FCC ID** : QXO-AP460

**Equipment** : Wireless Access Point

**Brand Name** : Extreme Networks, Inc.

**Model Name** : AP460i, 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 Part 2.1091

The product was received on Aug. 13, 2019, and testing was started from Aug. 26, 2019 and completed on Nov. 09, 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 United States government.

The test 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.



Approved by: Allen Lin

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

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



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## 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:** Sam Tsai

**Report Producer:** Jenny Yang

# 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)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11 ax: OFDMA(BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)                 |
| 5GHz WLAN              | 5150-5250<br>5725-5850 | 5180-5240<br>5745-5825    | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)<br>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)                                                                                                                                                  |

## 1.2 Table for Multiple Listing

| Sample Number | Model Name | Description                                                                                                                                                    |
|---------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | AP460i     | The "i" in AP460i indicates that it comes with internal antennas and the "e" in AP460e indicates that the access point comes with external antenna connectors. |
| 2             | AP460e     |                                                                                                                                                                |

## 1.3 Testing Location

| Testing Location                           |        |                                                                              |                      |
|--------------------------------------------|--------|------------------------------------------------------------------------------|----------------------|
| <input checked="" type="checkbox"/>        | HWA YA | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)    |                      |
|                                            |        | TEL : 886-3-327-3456                                                         | FAX : 886-3-327-0973 |
| Test site Designation No. TW1190 with FCC. |        |                                                                              |                      |
| <input type="checkbox"/>                   | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) |                      |
|                                            |        | TEL : 886-3-656-9065                                                         | FAX : 886-3-656-9085 |
| Test site Designation No. TW0006 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6                                                                |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f <sup>2</sup> )*                 | 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                   | 30                                                               |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f <sup>2</sup> )*                   | 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

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

| Mode     | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | Tolerance<br>(dB) | Tune-up<br>EIRP<br>(dBm) | Tune-up<br>EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | S Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|----------|-------------|----------------|---------------|-------------------|--------------------------|------------------------|------------------|----------------------------|----------------------------------|--------------------|
| 2.4G;D1D | 13.51       | 22.46          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 5.8G;D1D | 11.60       | 24.37          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 2.4G;D1D | 13.51       | 22.34          | 35.85         | 0.00              | 35.85                    | 3.84592                | 31               | 0.31847                    | 1.00000                          | 0.31847            |
| 2.4G;D1D | 8.00        | 1.09           | 9.09          | 0.00              | 9.09                     | 0.00811                | 31               | 0.00067                    | 1.00000                          | 0.00067            |
|          |             |                |               |                   |                          |                        |                  |                            | Sum Ratio                        | 0.97392            |
|          |             |                |               |                   |                          |                        |                  |                            | Ratio Limit                      | 1                  |

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

| Mode       | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | Tolerance<br>(dB) | Tune-up<br>EIRP<br>(dBm) | Tune-up<br>EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | S Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|------------|-------------|----------------|---------------|-------------------|--------------------------|------------------------|------------------|----------------------------|----------------------------------|--------------------|
| 2.4G;D1D   | 10.50       | 25.47          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 5.8G;D1D   | 11.60       | 24.37          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 2.4G;D1D   | 13.51       | 22.34          | 35.85         | 0.00              | 35.85                    | 3.84592                | 31               | 0.31847                    | 1.00000                          | 0.31847            |
| 2.4G;BT-LE | 8.00        | -0.76          | 7.24          | 0.00              | 7.24                     | 0.00530                | 31               | 0.00044                    | 1.00000                          | 0.00044            |
|            |             |                |               |                   |                          |                        |                  |                            | Sum Ratio                        | 0.97369            |
|            |             |                |               |                   |                          |                        |                  |                            | Ratio Limit                      | 1                  |

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

| Mode     | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | Tolerance<br>(dB) | Tune-up<br>EIRP<br>(dBm) | Tune-up<br>EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | S Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|----------|-------------|----------------|---------------|-------------------|--------------------------|------------------------|------------------|----------------------------|----------------------------------|--------------------|
| 2.4G;D1D | 10.50       | 25.47          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 5.8G;D1D | 11.60       | 24.37          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 5.8G;D1D | 8.00        | 27.47          | 35.47         | 0.00              | 35.47                    | 3.52371                | 31               | 0.29179                    | 1.00000                          | 0.29179            |
| 2.4G;D1D | 8.00        | 1.09           | 9.09          | 0.00              | 9.09                     | 0.00811                | 31               | 0.00067                    | 1.00000                          | 0.00067            |
|          |             |                |               |                   |                          |                        |                  |                            | Sum Ratio                        | 0.94724            |
|          |             |                |               |                   |                          |                        |                  |                            | Ratio Limit                      | 1                  |

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

| Mode       | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | Tolerance<br>(dB) | Tune-up<br>EIRP<br>(dBm) | Tune-up<br>EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | S Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|------------|-------------|----------------|---------------|-------------------|--------------------------|------------------------|------------------|----------------------------|----------------------------------|--------------------|
| 2.4G;D1D   | 10.50       | 25.47          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 5.8G;D1D   | 11.60       | 24.37          | 35.97         | 0.00              | 35.97                    | 3.95367                | 31               | 0.32739                    | 1.00000                          | 0.32739            |
| 2.4G;D1D   | 8.00        | 27.47          | 35.47         | 0.00              | 35.47                    | 3.52371                | 31               | 0.29179                    | 1.00000                          | 0.29179            |
| 2.4G;BT-LE | 8.00        | -0.76          | 7.24          | 0.00              | 7.24                     | 0.00530                | 31               | 0.00044                    | 1.00000                          | 0.00044            |
|            |             |                |               |                   |                          |                        |                  |                            | Sum Ratio                        | 0.94701            |
|            |             |                |               |                   |                          |                        |                  |                            | Ratio Limit                      | 1                  |

—THE END—