



# RF Exposure Evaluation Declaration

Product Name: Wireless Access Point

Model No. : AP460C

FCC ID : QXO-AP460C

Applicant: Extreme Networks, Inc.

Address: 6480 Via Del Oro, San Jose, CA 95119

Date of Receipt: Sep. 20, 2019

Issued Date : May. 15, 2020

Report No. : 19A2144R-RF-US-P20V02

Report Version: V1.0

The test results presented in this report relate only to the object tested.

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements

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## **Test Report Certification**

Issued Date: May. 15, 2020

Report No.: 19A2144R-RF-US-P20V02



Product Name : Wireless Access Point Applicant : Extreme Networks, Inc

Address : 6480 Via Del Oro, San Jose, CA 95119

Manufacturer : Extreme Networks, Inc

Address : 6480 Via Del Oro, San Jose, CA 95119

Model No. : AP460C

Brand : Extreme Networks
FCC ID : QXO-AP460C
EUT Voltage : DC 37~57V

Applicable Standard : KDB 447498D01V06

FCC Part1.1310

Test Result : Complied

Performed Location : DEKRA Testing and Certification (Suzhou) Co., Ltd.

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215006, Jiangsu, China

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FCC Designation Number: CN1199

Documented By :

(Project Assistant: Kitty Li)

Reviewed By : Frank h

(Senior Engineer: Frank He)

Approved By : Jack 2 hang

(Engineer Supervisor: Jack Zhang)



## 1. RF Exposure Evaluation

#### 1.1. Limits

According to FCC 1.1310: 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 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency<br>Range (MHz) | Electric<br>Field<br>Strength                             | Magnetic<br>Field<br>Strength | Power Density (mW/cm2) | Average<br>Time<br>(Minutes) |  |  |  |  |  |  |
|--------------------------|---|-------------------------------|------------------------|------------------------------|--|--|--|--|--|--|
| (A) Limits for (         | (V/m)<br>Occupational/ Con                                | (A/m)                         |                        |                              |  |  |  |  |  |  |
| 300-1500                 |   |                               | F/300                  | 6                            |  |  |  |  |  |  |
| 1500-100,000             |   |                               | 5                      | 6                            |  |  |  |  |  |  |
| (B) Limits for (         | (B) Limits for General Population/ Uncontrolled Exposures |                               |                        |                              |  |  |  |  |  |  |
| 300-1500                 |   |                               | F/1500                 | 6                            |  |  |  |  |  |  |
| 1500-100,000             |   |                               | 1                      | 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 is 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.

Report No: 1992128R-RF-US-P20V02



#### 1.2. Test Procedure

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

The temperature and related humidity:  $18^{\circ}$ C and  $78^{\circ}$  RH.

1.3. Test Result of RF Exposure Evaluation

| Product   | : | Wireless Access Point  |  |  |  |
|-----------|---|------------------------|--|--|--|
| Test Item | : | RF Exposure Evaluation |  |  |  |
| Test Site | : | AC-6                   |  |  |  |

#### **Antenna Information:**

#### BLE 2.4GHz:

| N/A                 | N/A      |                                |                            |   |         |                         |  |  |  |
|---------------------|----------|--------------------------------|----------------------------|---|---------|-------------------------|--|--|--|
| N/A                 | N/A      |                                |                            |   |         |                         |  |  |  |
|                     | 1*TX+1*F | 1*TX+1*RX                      |                            | 2*TX+2*RX   |         | 3*TX+3*RX               |  |  |  |
|                     | SISO     |                                |                            |   |         |                         |  |  |  |
|                     | MIMO     |                                | Basic methodology          |   |         |                         |  |  |  |
|                     |          |                                | Sectorized antenna systems |   |         |                         |  |  |  |
| $\mathbb{I}_{\neg}$ |          |                                | Cross-polarized antennas   |   |         |                         |  |  |  |
| $\  \cdot \ $       |          |                                | Uneq                       | ual antenna gains   | s, with | n equal transmit powers |  |  |  |
|                     |          |                                | Spatial Multiplexing       |   |         |                         |  |  |  |
|                     |          |                                | Cyclic                     | Delay Diversity   | (CDD    | ))                      |  |  |  |
| PIF                 | PIFA     |                                |                            |   |         |                         |  |  |  |
| 3.20                | 3.20dBi  |                                |                            |   |         |                         |  |  |  |
|                     | N/A      | N/A    1*TX+1*F   SISO    MIMO | N/A    1*TX+1*RX   SISO    | N/A    1*TX+1*RX       SISO   Basic   Secto   Cross   Unequired   Spatial   Cyclic   PIFA | N/A     | N/A    1*TX+1*RX        |  |  |  |



## WLAN 2.4GHz:

| Ante           | enna Mo  | odel        | No.      | N/A                                |          |             |                              |                 |      |        |                       |  |
|----------------|----------|-------------|----------|------------------------------------|----------|-------------|------------------------------|-----------------|------|--------|-----------------------|--|
| Ante           | enna Ma  | anufa       | acturer  | N/A                                |          |             |                              |                 |      |        |                       |  |
| Ante           | enna De  | eliver      | У        | $\boxtimes$                        |          |             |                              |                 |      |        |                       |  |
| Ante           | enna Te  | echno       | ology    | $\boxtimes$                        | SISO     |             |                              |                 |      |        |                       |  |
|                |          |             |          |                                    |          |             | Basic                        | methodology     |      |        |                       |  |
|                |          |             |          |                                    |          |             | Secto                        | rized antenna   | sys  | tems   | 3                     |  |
|                |          |             |          |                                    | MIMO     |             | Cross                        | -polarized an   | tenn | as     |                       |  |
|                |          |             |          |                                    | IVIIIVIO |             | Uneq                         | ual antenna g   | ains | , with | equal transmit powers |  |
|                |          |             |          |                                    |          | $\boxtimes$ | Spatia                       | al Multiplexing | J    |        |                       |  |
|                |          |             |          |                                    |          | $\boxtimes$ | Cyclic Delay Diversity (CDD) |                 |      |        |                       |  |
| Ante           | enna Ty  | ⁄ре         |          | PIFA                               | ١        |             |                              |                 |      |        |                       |  |
| Ante           | enna Ga  | ain(R       | adio 1)  |                                    |          |             |                              |                 |      |        |                       |  |
| ∧ nta          | enna Te  | ochn        | ology    | Ant Gain                           |          |             |                              |                 |      |        |                       |  |
| And            | ziiia ie | CHIL        | ology    | (dBi)                              |          |             |                              |                 |      |        |                       |  |
| Ant            | 4(Radio  | o 1)        |          | 3.74                               |          |             |                              |                 |      |        |                       |  |
| Ante           | enna Ga  | ain(R       | adio 2)  |                                    |          |             |                              |                 |      |        |                       |  |
| A 10.4.6       | Ta       | ، مام ه     | ala eu c | Ant Gain                           |          |             |                              |                 |      |        |                       |  |
| Ante           | enna Te  | CHIL        | ology    | (dBi)                              |          |             |                              |                 |      |        |                       |  |
|                |          | $\boxtimes$ | Ant1     |                                    | 2.94     |             |                              |                 |      |        |                       |  |
| ⊠siso          |          | (Radio 2)   |          |                                    |          |             |                              |                 |      |        |                       |  |
| Ant2 (Radio 2) |          |             | 3.24     |                                    |          |             |                              |                 |      |        |                       |  |
| $\boxtimes$    | CDD      |             |          | 3.24dBi for Power; 6.25dBi for PSD |          |             |                              |                 |      |        |                       |  |
| $\boxtimes$    | Beam-    | formi       | ng       | 6.25dBi for Power; 6.25dBi for PSD |          |             |                              |                 |      | PSD    |                       |  |



## **WLAN 5GHz:**

| Ante               | enna Mo | odel  | No.       | N/A                                |          |             |             |                              |             |                 |             |             |   |
|--------------------|---------|-------|-----------|------------------------------------|----------|-------------|-------------|------------------------------|-------------|-----------------|-------------|-------------|---|
| Ante               | enna Ma | anufa | acturer   | N/A                                |          |             |             |                              |             |                 |             |             |   |
| Ante               | enna De | elive | ry        |                                    | 1*TX+1*F | RX          | $\boxtimes$ | 2*TX+2*RX                    | $\boxtimes$ | 3*TX+3*RX       | $\boxtimes$ | 4*TX+4*R    | X |
| Ante               | enna Te | chn   | ology     |                                    | SISO     |             |             |                              |             |                 |             |             |   |
|                    |         |       |           |                                    |          |             | ] B         | asic methodo                 | logy        |                 |             |             |   |
|                    |         |       |           |                                    |          |             | ] s         | ectorized ante               | enna        | systems         |             |             |   |
|                    |         |       |           |                                    | MIMO     |             | ] C         | ross-polarized               | d ant       | tennas          |             |             |   |
|                    |         |       |           |                                    | IVIIIVIO |             | ] U         | nequal anteni                | na g        | ains, with equa | al tra      | nsmit power | s |
|                    |         |       |           |                                    |          | $\boxtimes$ | ] s         | patial Multiple              | xing        |                 |             |             |   |
|                    |         |       |           |                                    |          | $\boxtimes$ | ] C         | Cyclic Delay Diversity (CDD) |             |                 |             |             |   |
| Ante               | enna Ty | ре    |           | PIF/                               | A        |             |             |                              |             |                 |             |             |   |
| Ante               | enna Ga | ain(R | Radio 1)  |                                    |          |             |             |                              |             |                 |             |             |   |
| Antenna Technology |         |       |           | Ant Gain                           |          |             |             |                              |             |                 |             |             |   |
| Anu                | enna re | CHIL  | ology     |                                    | (dBi)    |             |             |                              |             |                 |             |             |   |
| Ant                | 4(Radio | o 1)  |           |                                    | 3.42     |             |             |                              |             |                 |             |             |   |
| Ante               | enna Ga | ain(F | Radio 2)  |                                    |          |             |             |                              |             |                 |             |             |   |
| A 4                | T.      |       | - l · ·   | Ant Gain                           |          |             |             |                              |             |                 |             |             |   |
| Ant                | enna Te | ecnn  | ology     | (dBi)                              |          |             |             |                              |             |                 |             |             |   |
|                    |         |       | Ant1      |                                    |          | 3.56        |             |                              |             |                 |             |             |   |
|                    | CICO    |       | (Radio 2) |                                    |          |             |             |                              |             |                 |             |             |   |
| ⊠siso              |         | Ant2  |           |                                    |          |             | 2.1         | 51                           |             |                 |             |             |   |
| (Radio 2)          |         |       | 3.51      |                                    |          |             |             |                              |             |                 |             |             |   |
|                    | CDD     |       |           | 3.56dBi for Power; 6.57dBi for PSD |          |             |             |                              |             |                 |             |             |   |
|                    | Beam-   | form  | ing       | 6.57dBi for Power; 6.57dBi for PSD |          |             |             |                              |             |                 |             |             |   |



| Antenna Gain(Radio 3)   |                    |                   |                   |                                      |  |  |  |  |  |
|-------------------------|--------------------|-------------------|-------------------|--------------------------------------|--|--|--|--|--|
| Anten                   | Antenna Technology |                   |                   | Ant Gain<br>(dBi)                    |  |  |  |  |  |
|                         |                    | $\boxtimes$       | Ant3<br>(Radio 3) | 4.19                                 |  |  |  |  |  |
|                         | ⊠ siso □           | Ant5<br>(Radio 3) | 3.22              |                                      |  |  |  |  |  |
|                         |                    | $\boxtimes$       | Ant6<br>(Radio 3) | 3.96                                 |  |  |  |  |  |
|                         |                    |                   | Ant7<br>(Radio 3) | 4.21                                 |  |  |  |  |  |
|                         | ≥ 2*2 CDD          |                   |                   | 4.21dBi for Power; 7.22dBi for PSD   |  |  |  |  |  |
| <b>⊠</b> 2 <sup>3</sup> | ≥ 2*2 Beam-forming |                   | orming            | 7.22dBi for Power; 7.22dBi for PSD   |  |  |  |  |  |
| <b>4</b>                | *4 CD              | D                 |                   | 4.21dBi for Power; 10.23dBi for PSD  |  |  |  |  |  |
|                         |                    |                   | orming            | 10.23dBi for Power; 10.23dBi for PSD |  |  |  |  |  |

Note: The device supports 3 radios, radio 1(1\*1 2.4GHz & 1\*1 5GHz full band); radio 2(2\*2 2.4GHz & 2\*2 5GHz low band); radio 3(4\*4 5GHz full band & 1\*1 BLE), and radio 2 & 3 can works with Dual 2.4GHz & 5GHz mode and Dual 5GHz mode. As the 5GHz high band filter is different between two modes, additional Radio 3 5GHz high band mode is tested for compliance. Dual 2.4GHz & 5GHz mode: Radio 2(2.4GHz 2\*2) + Radio 3(5GHz full band 4\*4) Dual 5GHz mode: Radio 2(5GHz low band 2\*2) + Radio 3(5GHz high band 4\*4)



## **Power Density**

#### **Standalone modes:**

## AP460C:

| Wireless<br>Radio    | Test Mode       | Frequency<br>Band (MHz) | Maximum<br>EIRP<br>(dBm) | Power Density at<br>R = 30cm<br>(mW/cm2) | Power Density Limit<br>at R = 30 cm<br>(mW/cm2) |
|----------------------|-----------------|-------------------------|--------------------------|--|---|
| Radio 3              | BLE             | 2400 ~ 2483.5           | 9.51                     | 0.001                                    | 1.0   |
| Radio 1              | 802.11b/g/n/ax  | 2400 ~ 2483.5           | 26.53                    | 0.040                                    | 1.0   |
| Radio 2              | 802.11b/g/n/ax  | 2400 ~ 2483.5           | 31.06                    | 0.113                                    | 1.0   |
| Radio 1              | 802.11a/n/ac/ax | 5150 ~ 5850             | 23.41                    | 0.019                                    | 1.0   |
| Radio 2              | 802.11a/n/ac/ax | 5150 ~ 5350             | 26.76                    | 0.042                                    | 1.0   |
| Radio 3 Full<br>band | 802.11a/n/ac/ax | 5150 ~ 5850             | 35.85                    | 0.340                                    | 1.0   |
| Radio 3<br>High band | 802.11a/n/ac/ax | 5470 ~ 5850             | 35.71                    | 0.329                                    | 1.0   |

Report No: 1992128R-RF-US-P20V02



#### Simultaneous transmission:

| Wireless         | Frequency<br>Range | (dBm) |       |       | Limit of<br>Power |                      |       |       |       | Total  | Limit |   |
|------------------|--------------------|-------|-------|-------|-------------------|----------------------|-------|-------|-------|--------|-------|---|
| Configure        | (MHz)              | Radio | Radio | Radio | BI F              | Density<br>S(mW/cm2) | Radio | Radio | Radio | BLE    | Rate  |   |
|                  |                    | 1     | 2     | 3     | DLL               | S(mvv/cm2)           | 1     | 2     | 3     | ם<br>ט |       |   |
| Radio 1 + Radio  |                    |       |       |       |                   |                      |       |       |       |        |       |   |
| 2(2.4GHz Only)   | 2.4G+5G            | 26 53 | 31.06 | 35 85 | Q 51              | 1.0                  | 0 040 | ∩ 113 | 0.340 | 0 001  | n 494 | 1 |
| + Radio 3(5GHz   | 2.40100            | 20.00 | 31.00 | 00.00 | 3.51              | 1.0                  | 0.040 | 0.115 | 0.540 | 0.001  | 0.434 | ' |
| Full Band) + BLE |                    |       |       |       |                   |                      |       |       |       |        |       |   |
| Radio 1 + Radio  |                    |       |       |       |                   |                      |       |       |       |        |       |   |
| 2(5GHz Low       |                    |       |       |       |                   |                      |       |       |       |        |       |   |
| Band) + Radio    | 2.4G+5G            | 26.53 | 26.76 | 35.71 | 9.51              | 1.0                  | 0.040 | 0.042 | 0.329 | 0.001  | 0.412 | 1 |
| 3(5GHz High      |                    |       |       |       |                   |                      |       |       |       |        |       |   |
| Band) + BLE      |                    |       |       |       |                   |                      |       |       |       |        |       |   |

The EUT support simultaneously transmit with Radio 1 + Radio 2+ Radio 3 + BLE.

The worst combination should be shown in the report. The simultaneously safety distance is 30cm for installed for Wireless Access Point without any other radio equipment.

| The End |  |
|---------|--|