# 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 |

# 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<br>FCC Part1.1310 |
| Test Result | : | Complied |
| Performed Location | : | DEKRA Testing and Certification (Suzhou) Co., Ltd.<br>No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China<br>TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098<br>FCC Designation Number: CN1199 |

Documented By : Kitty Li

(Project Assistant: Kitty Li )

Reviewed By : Frank he

(Senior Engineer: Frank He )

Approved By : Jack Zhang

( 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 Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm2) | Average Time (Minutes) |
|---|---|---|---|---|
| (A) Limits for Occupational/ Control Exposures | | | | |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |
| (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.

## 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℃and 78％ 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:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Antenna Model No. | N/A | | | | | |
| Antenna Manufacturer | N/A | | | | | |
| Antenna Delivery | ☒ | 1*TX+1*RX | ☐ | 2*TX+2*RX | ☐ | 3*TX+3*RX |
| Antenna Technology | ☒ | SISO | | | | |
| | ☐ | MIMO | ☐ | Basic methodology | | |
| | | | ☐ | Sectorized antenna systems | | |
| | | | ☐ | Cross-polarized antennas | | |
| | | | ☐ | Unequal antenna gains, with equal transmit powers | | |
| | | | ☐ | Spatial Multiplexing | | |
| | | | ☐ | Cyclic Delay Diversity (CDD) | | |
| Antenna Type | PIFA | | | | | |
| Antenna Gain | 3.20dBi | | | | | |

**WLAN 2.4GHz:**

<table>
<tr><td colspan="3">Antenna Model No.</td><td colspan="6">N/A</td></tr>
<tr><td colspan="3">Antenna Manufacturer</td><td colspan="6">N/A</td></tr>
<tr><td colspan="3">Antenna Delivery</td><td colspan="6">☒ 1*TX+1*RX ☒ 2*TX+2*RX ☐ 3*TX+3*RX</td></tr>
<tr><td colspan="3" rowspan="8">Antenna Technology</td><td>☒</td><td>SISO</td><td colspan="4"></td></tr>
<tr><td rowspan="6">☒</td><td rowspan="6">MIMO</td><td>☐</td><td colspan="3">Basic methodology</td></tr>
<tr><td>☐</td><td colspan="3">Sectorized antenna systems</td></tr>
<tr><td>☐</td><td colspan="3">Cross-polarized antennas</td></tr>
<tr><td>☐</td><td colspan="3">Unequal antenna gains, with equal transmit powers</td></tr>
<tr><td>☒</td><td colspan="3">Spatial Multiplexing</td></tr>
<tr><td>☒</td><td colspan="3">Cyclic Delay Diversity (CDD)</td></tr>
<tr><td colspan="3">Antenna Type</td><td colspan="6">PIFA</td></tr>
<tr><td colspan="9">Antenna Gain(Radio 1)</td></tr>
<tr><td colspan="3">Antenna Technology</td><td colspan="6">Ant Gain<br>(dBi)</td></tr>
<tr><td colspan="3">Ant 4(Radio 1)</td><td colspan="6">3.74</td></tr>
<tr><td colspan="9">Antenna Gain(Radio 2)</td></tr>
<tr><td colspan="3">Antenna Technology</td><td colspan="6">Ant Gain<br>(dBi)</td></tr>
<tr><td rowspan="2">☒</td><td rowspan="2">SISO</td><td>☒</td><td colspan="6">Ant1<br>(Radio 2)</td></tr>
<tr><td>☒</td><td colspan="6">Ant2<br>(Radio 2)</td></tr>
<tr><td>☒</td><td colspan="2">CDD</td><td colspan="6">3.24dBi for Power; 6.25dBi for PSD</td></tr>
<tr><td>☒</td><td colspan="2">Beam-forming</td><td colspan="6">6.25dBi for Power; 6.25dBi for PSD</td></tr>
</table>

**WLAN 5GHz:**

<table>
<tr><td colspan="3">Antenna Model No.</td><td colspan="6">N/A</td></tr>
<tr><td colspan="3">Antenna Manufacturer</td><td colspan="6">N/A</td></tr>
<tr><td colspan="3">Antenna Delivery</td><td colspan="6">☒ 1*TX+1*RX ☒ 2*TX+2*RX ☒ 3*TX+3*RX ☒ 4*TX+4*RX</td></tr>
<tr><td colspan="3" rowspan="8">Antenna Technology</td><td>☒</td><td>SISO</td><td colspan="2"></td></tr>
<tr><td rowspan="7">☒</td><td rowspan="7">MIMO</td><td>☐</td><td>Basic methodology</td></tr>
<tr><td>☐</td><td>Sectorized antenna systems</td></tr>
<tr><td>☐</td><td>Cross-polarized antennas</td></tr>
<tr><td>☐</td><td>Unequal antenna gains, with equal transmit powers</td></tr>
<tr><td>☒</td><td>Spatial Multiplexing</td></tr>
<tr><td>☒</td><td>Cyclic Delay Diversity (CDD)</td></tr>
<tr><td colspan="3">Antenna Type</td><td colspan="6">PIFA</td></tr>
<tr><td colspan="9">Antenna Gain(Radio 1)</td></tr>
<tr><td colspan="3">Antenna Technology</td><td colspan="6">Ant Gain<br>(dBi)</td></tr>
<tr><td colspan="3">Ant 4(Radio 1)</td><td colspan="6">3.42</td></tr>
<tr><td colspan="9">Antenna Gain(Radio 2)</td></tr>
<tr><td colspan="3">Antenna Technology</td><td colspan="6">Ant Gain<br>(dBi)</td></tr>
<tr><td rowspan="2">☒</td><td rowspan="2">SISO</td><td>☒</td><td>Ant1<br>(Radio 2)</td><td colspan="5">3.56</td></tr>
<tr><td>☒</td><td>Ant2<br>(Radio 2)</td><td colspan="5">3.51</td></tr>
<tr><td>☒</td><td colspan="3">CDD</td><td colspan="5">3.56dBi for Power; 6.57dBi for PSD</td></tr>
<tr><td>☒</td><td colspan="3">Beam-forming</td><td colspan="5">6.57dBi for Power; 6.57dBi for PSD</td></tr>
</table>

| Antenna Gain(Radio 3) | | | | |
|---|---|---|---|---|
| Antenna Technology | | | | Ant Gain (dBi) |
| ☒ | SISO | ☒ | Ant3 (Radio 3) | 4.19 |
| | | ☒ | Ant5 (Radio 3) | 3.22 |
| | | ☒ | Ant6 (Radio 3) | 3.96 |
| | | ☒ | Ant7 (Radio 3) | 4.21 |
| ☒ | 2*2 CDD | | | 4.21dBi for Power; 7.22dBi for PSD |
| ☒ | 2*2 Beam-forming | | | 7.22dBi for Power; 7.22dBi for PSD |
| ☒ | 4*4 CDD | | | 4.21dBi for Power; 10.23dBi for PSD |
| ☒ | 4*4 Beam-forming | | | 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 Radio | Test Mode | Frequency Band (MHz) | Maximum EIRP (dBm) | Power Density at R = 30cm (mW/cm2) | Power Density Limit at R = 30 cm (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 band | 802.11a/n/ac/ax | 5150 ~ 5850 | 35.85 | 0.340 | 1.0 |
| Radio 3 High band | 802.11a/n/ac/ax | 5470 ~ 5850 | 35.71 | 0.329 | 1.0 |

**Simultaneous transmission:**

| Wireless Configure | Frequency Range (MHz) | Maximum EIRP (dBm) | | | | Limit of Power Density S(mW/cm2) | Power Density Rate at R = 30 cm | | | | Total Rate | Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Radio 1 | Radio 2 | Radio 3 | BLE | | Radio 1 | Radio 2 | Radio 3 | BLE | | |
| Radio 1 + Radio 2(2.4GHz Only) + Radio 3(5GHz Full Band) + BLE | 2.4G+5G | 26.53 | 31.06 | 35.85 | 9.51 | 1.0 | 0.040 | 0.113 | 0.340 | 0.001 | 0.494 | 1 |
| Radio 1 + Radio 2(5GHz Low Band) + Radio 3(5GHz High Band) + BLE | 2.4G+5G | 26.53 | 26.76 | 35.71 | 9.51 | 1.0 | 0.040 | 0.042 | 0.329 | 0.001 | 0.412 | 1 |

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