

RF Exposure Report

Report No.: SA170609C20A

FCC ID: QXO-AP3915E

Test Model: AP3915e

Series Model: AP7632

Received Date: Jun. 09, 2017

Test Date: Jun. 09 ~ Aug. 09, 2017

Issued Date: Sep. 05, 2017

Applicant: Extreme Networks, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
SA170609C20A	Original release.	Sep. 05, 2017

1 Certificate of Conformity

Product: Wireless 802.11 a/ac+b/g/n Indoor Access Point

Brand: Extreme Networks

Test Model: AP3915e

Series Model: AP7632

Sample Status: Engineering sample

Applicant: Extreme Networks, Inc.

Test Date: Jun. 09 ~ Aug. 09, 2017

Standards: FCC Part 2 (Section 2.1091)
KDB 447498 D01 General RF Exposure Guidance v06
IEEE C95.1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Sep. 05, 2017
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Sep. 05, 2017
Ken Liu / Senior Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 31 cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

Function	Frequency Band (MHz)	Mode	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN	ML-2452-APA2-01, ML-2452-APA2-02 and ML-2452-HPA5-036 Ant. (ML-2452-APA2-01 Ant. with the maximum gain was chosen for evaluate)						
	2412-2462	CDD	25.41	6.18	31	0.119	1
		Beamforming	22.25	6.18	31	0.058	1
	ML-2452-APA2-01, ML-2452-APA2-02 and ML-2452-HPA5-036 Ant. (ML-2452-APA2-02 Ant. with the maximum gain was chosen for evaluate)						
	5180-5240	CDD	25.50	8.01	31	0.186	1
		Beamforming	22.49	8.01	31	0.093	1
	5260-5320	CDD	23.49	8.01	31	0.117	1
		Beamforming	20.48	8.01	31	0.058	1
	5500-5720	CDD	23.75	8.01	31	0.124	1
		Beamforming	20.74	8.01	31	0.062	1
	5745-5825	CDD	25.83	8.01	31	0.200	1
		Beamforming	22.82	8.01	31	0.100	1
	ML-2452-HPAG4A6-01 Ant.						
	2412-2462	CDD	25.29	7.01	31	0.141	1
		Beamforming	22.24	7.01	31	0.070	1
	5180-5240	CDD	25.73	10.31	31	0.333	1
		Beamforming	22.72	10.31	31	0.166	1
	5260-5320	CDD	22.05	10.31	31	0.143	1
		Beamforming	19.04	10.31	31	0.071	1
	5500-5720	CDD	22.48	10.31	31	0.157	1
Beamforming		19.47	10.31	31	0.079	1	
5745-5825	CDD	25.70	10.31	31	0.330	1	
	Beamforming	22.69	10.31	31	0.165	1	

Function	Frequency Band (MHz)	Mode	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN	ML-2452-HPA6M4-S36 Ant.						
	2412-2462	CDD	25.29	9.01	31	0.223	1
		Beamforming	22.24	9.01	31	0.110	1
	5180-5240	CDD	25.73	9.01	31	0.247	1
		Beamforming	22.72	9.01	31	0.123	1
	5260-5320	CDD	22.34	9.01	31	0.113	1
		Beamforming	19.33	9.01	31	0.057	1
	5500-5720	CDD	22.48	9.01	31	0.117	1
		Beamforming	19.47	9.01	31	0.058	1
	5745-5825	CDD	25.70	9.01	31	0.245	1
		Beamforming	22.69	9.01	31	0.122	1
	ML-2452-PNL9M3-036 Ant.						
	2412-2462	CDD	24.86	11.00	31	0.319	1
		Beamforming	24.72	11.00	31	0.309	1
	5180-5240	CDD	25.06	10.70	31	0.312	1
		Beamforming	25.06	10.70	31	0.312	1
	5260-5320	CDD	19.11	10.70	31	0.079	1
		Beamforming	19.11	10.70	31	0.079	1
	5500-5720	CDD	19.21	10.70	31	0.081	1
		Beamforming	19.21	10.70	31	0.081	1
5745-5825	CDD	25.25	10.70	31	0.326	1	
	Beamforming	25.25	10.70	31	0.326	1	

Function	Frequency Band (MHz)	Mode	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN	ML-2452-PNL6M3-N36, ML-2452-PNA5-01R and ML-2452-PNA7-01R Ant. (ML-2452-PNA7-01R Ant. with the maximum gain was chosen for evaluate)						
	2412-2462	CDD	25.20	10.81	31	0.330	1
		Beamforming	22.08	10.81	31	0.161	1
	5180-5240	CDD	23.90	13.71	31	0.478	1
		Beamforming	20.89	13.71	31	0.239	1
	5260-5320	CDD	18.31	13.71	31	0.132	1
		Beamforming	15.30	13.71	31	0.066	1
	5500-5720	CDD	18.98	13.71	31	0.154	1
		Beamforming	15.97	13.71	31	0.077	1
	5745-5825	CDD	25.23	13.71	31	0.649	1
		Beamforming	22.12	13.71	31	0.317	1
	ML-2452-PTA2M2-036 and ML-2452-PTA4M4-036 Ant. (ML-2452-PTA4M4-036 Ant. with the maximum gain was chosen for evaluate)						
	2412-2462	CDD	25.57	8.01	31	0.189	1
		Beamforming	22.29	8.01	31	0.089	1
	5180-5240	CDD	25.74	9.61	31	0.284	1
		Beamforming	22.73	9.61	31	0.142	1
	5260-5320	CDD	22.60	9.61	31	0.138	1
		Beamforming	19.59	9.61	31	0.069	1
	5500-5720	CDD	23.10	9.61	31	0.155	1
		Beamforming	20.09	9.61	31	0.077	1
5745-5825	CDD	25.82	9.61	31	0.289	1	
	Beamforming	22.81	9.61	31	0.145	1	
BT LE	ML-2499-HPA8-01 and ML-2452-PNA7-01R Ant. (ML-2499-HPA8-01 Ant. with the maximum gain was chosen for evaluate)						
	2402-2480	-	1.00	8.00	31	0.001	1
Zigbee	ML-2499-HPA8-01 and ML-2452-PNA7-01R Ant. (ML-2499-HPA8-01 Ant. with the maximum gain was chosen for evaluate)						
	2405-2480	-	2.10	8.00	31	0.001	1

Note:

2.4GHz:

ML-2452-APA2-01 Ant. directional gain = $3.17\text{dBi} + 10\log(2) = 6.18\text{dBi}$.

ML-2452-HPAG4A6-01 Ant. directional gain = $4\text{dBi} + 10\log(2) = 7.01\text{dBi}$.

ML-2452-HPA6M4-S36 Ant. directional gain = $6\text{dBi} + 10\log(2) = 9.01\text{dBi}$.

ML-2452-PNL9M3-036 Ant. gain = 11dBi

ML-2452-PNA7-01R Ant. directional gain = $7.8\text{dBi} + 10\log(2) = 10.81\text{dBi}$.

ML-2452-PTA4M4-036 Ant. directional gain = $5\text{dBi} + 10\log(2) = 8.01\text{dBi}$.

5GHz:

ML-2452-APA2-02 Ant. directional gain = $5\text{dBi} + 10\log(2) = 8.01\text{dBi}$.

ML-2452-HPAG4A6-01 Ant. directional gain = $7.3\text{dBi} + 10\log(2) = 10.31\text{dBi}$.

ML-2452-HPA6M4-S36 Ant. directional gain = $6\text{dBi} + 10\log(2) = 9.01\text{dBi}$.

ML-2452-PNL9M3-036 Ant. gain = 10.7dBi

ML-2452-PNA7-01R Ant. directional gain = $10.7\text{dBi} + 10\log(2) = 13.71\text{dBi}$.

ML-2452-PTA4M4-036 Ant. directional gain = $6.6\text{dBi} + 10\log(2) = 9.61\text{dBi}$

BT LE & Zigbee:

ML-2499-HPA8-01 Ant. gain = 8dBi.

Frequency Band	Max Power (dBm)			Total Power (dBm)	Power Limit (dBm)
	WLAN	BT LE	Zigbee		
2.4GHz	25.57	1.00	-	25.59	30
2.4GHz	25.57	-	2.10	25.59	30

Conclusion:

2.4GHz & 5GHz & BT LE or 2.4GHz & 5GHz & Zigbee technology can transmit at same time.

BT LE and Zigbee cannot transmit simultaneously.

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

WLAN: ML-2452-APA2-01, ML-2452-APA2-02 & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.119 + 0.200 + 0.001 = 0.320$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.119 + 0.200 + 0.001 = 0.320$

WLAN: ML-2452-HPAG4A6-01 & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.141 + 0.333 + 0.001 = 0.475$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.141 + 0.333 + 0.001 = 0.475$

WLAN: ML-2452-HPA6M4-S36 & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.223 + 0.247 + 0.001 = 0.471$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.223 + 0.247 + 0.001 = 0.471$

WLAN: ML-2452-PNL9M3-036 & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.319 + 0.326 + 0.001 = 0.646$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.319 + 0.326 + 0.001 = 0.646$

WLAN: ML-2452-PNA7-01R & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.330 + 0.649 + 0.001 = 0.980$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.330 + 0.649 + 0.001 = 0.980$

ML-2452-PTA4M4-036 Ant. & BT LE / Zigbee: ML-2499-HPA8-01 Ant.

1. WALN 2.4GHz + WALN 5GHz + BT LE = $0.189 + 0.289 + 0.001 = 0.479$

2. WALN 2.4GHz + WALN 5GHz + Zigbee = $0.189 + 0.289 + 0.001 = 0.479$

Therefore the maximum calculations of above situations are less than the "1" limit.

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