RF Exposure Report

Report No.:	SA160922E02
FCC ID:	UZ7AP7602
Test Model:	AP-7602
Received Date:	Sep. 22, 2016
Test Date:	Nov. 12, 2016
Issued Date:	Dec. 02, 2016
Applicant:	Zebra Technologies Corporation
Address:	One Zebra Plaza, Holtsville, NY,11742, USA
Manufacturer:	Zebra Technologies Corporation
Address:	One Zebra Plaza, Holtsville, NY,11742, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA160922E02	Original release.	Dec. 02, 2016

1 Certificate of Conformity

Product:	Access Point
Brand:	ZEBRA
Test Model:	AP-7602
Sample Status:	ENGINEERING SAMPLE
Applicant:	Zebra Technologies Corporation
Test Date:	Nov. 12, 2016
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1-1992

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 : Wendy Wu , **Date:** Dec. 02, 2016

Wendy Wu / Specialist

Approved by : , **Date:** Dec. 02, 2016

May Chen / 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

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

No.	PCB Chain No	Brand	Model	Antenna Gain(dBi) Including cable loss	Frequency range	Antenna Type	Connector type	Cable Length (mm)
1	Chain 0	NA	NA	2.61	2.4~2.4835GHz	Dipole	i-pex(MHF)	155
				4.39	5.15~5.25GHz			
				4.2	5.25~5.35GHz			
				4.28	5.47~5.725GHz			
				5.61	5.725~5.85GHz			
2	Chain 1	NA	NA	3.76	2.4~2.4835GHz	Dipole	i-pex(MHF)	182
				5.18	5.15~5.25GHz			
				5.22	5.25~5.35GHz			
				4.44	5.47~5.725GHz			
				5.95	5.725~5.85GHz			
3	BT	NA	NA	1.8	2.4~2.483GHz	Dipole	i-pex(MHF)	88

2.5 Calculation Result of Maximum Conducted Power

For Bluetooth:

BT-EDR

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2402-2480	5.957	1.8	20	0.00179	1

BT-LE

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2402-2480	2.244	1.8	20	0.00068	1

For WLAN / BT coexistence mode:

Condition	Technology		
1	WLAN (2.4GHz-Chain0)	WLAN (5GHz-Chain1)	BT
2	WLAN (2.4GHz-Chain1)	WLAN (5GHz-Chain0)	BT
3	WLAN (2.4GHz-Chain0)	WLAN (2.4GHz-Chain1)	BT
4	WLAN (5GHz-Chain0)	WLAN (5GHz-Chain1)	BT

Condition 1					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462 (Chain 0)	92.257	2.61	20	0.03348	1
5180-5240 5745-5825 (Chain 1)	146.893	5.95	20	0.11501	1
2402-2480	5.957	1.8	20	0.00179	1
Condition 2					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462 (Chain 1)	90.782	3.76	20	0.04293	1
5180-5240 5745-5825 (Chain 0)	116.681	5.61	20	0.08448	1
2402-2480	5.957	1.8	20	0.00179	1
Condition 3					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462 (2TX)	183.039	6.21	20	0.15215	1
2402-2480	5.957	1.8	20	0.00179	1
Condition 4					
Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
5180-5240 5745-5825 (2TX)	260.394	8.79	20	0.39207	1
2402-2480	5.957	1.8	20	0.00179	1

NOTE:

2.4GHz: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.21$dBi

5GHz: UNII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} / 2] = 7.8$dBi

UNII-3: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 8.79$dBi

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Condition 1:

Therefore, the worst-case situation is 0.03348 / 1 + 0.11501 / 1 + 0.00179 / 1 = 0.15028, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 2:

Therefore, the worst-case situation is 0.04293 / 1 + 0.08448 / 1 + 0.00179 / 1 = 0.12920, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 3:

Therefore, the worst-case situation is 0.15215 / 1 + 0.00179 / 1 = 0.15394, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

Condition 4:

Therefore, the worst-case situation is 0.39207 / 1 + 0.00179 / 1 = 0.39386, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

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