

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
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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.

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Wendy Wu / Specialist

Approved by : May Chen , **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

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

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 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 = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.21\text{dBi}$

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

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

Conclusion:

The formula of calculated the MPE is:

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

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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