RF Exposure Report

Report No.:	SA150423E12
FCC ID:	UZ7RFD8500
Test Model:	RFD8500
Received Date:	Apr. 23, 2015
Test Date:	June 17, 2015
Issued Date:	July 20, 2015
Applicant:	Zebra Technologies Corporation
Address:	1 Zebra Plaza, Holtsville, NY 11742
Manufacturer:	Zebra Technologies Corporation
Address:	1 Zebra Plaza, Holtsville, NY 11742
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA150423E12	Original release.	July 20, 2015

1 Certificate of Conformity

Product:	RFD8500 UHF RFID READER
Brand:	ZEBRA
Test Model:	RFD8500
Sample Status:	ENGINEERING SAMPLE
Applicant:	Zebra Technologies Corporation
Test Date:	June 17, 2015
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D03 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 : _____ , **Date:** July 20, 2015

Claire Kuan / Specialist

Approved by : _____ , **Date:** July 20, 2015

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				
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz
*Plane-wave equivalent power density

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 23cm away from the body of the user.

3 Antenna Gain

The antenna provided to the EUT, please refer to the following table:

Bluetooth						
No.	**Brand**	**Antenna Type**	**Gain (dBi) < excluded cable loss>**	**Connecter Type**	**Frequency range (MHz)**	**Cable Loss (dB)**
1	Auden	PIFA and PCB chip	2.6	NA	2400~2483.5	1

RFID Antenna Spec.							
No.	**Brand**	**Antenna Type**	**Gain (dBi) < included cable loss>**	**Connecter Type**	**Frequency range (MHz)**	**Cable Loss (dB)**	**Cable Length (mm)**
1	Auden	Patch	4.63	U.fl	902~928	0.4	130

4 Calculation Result Of Maximum Conducted Power

For BT-EDR:

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2402-2480	3.428	1.6	23	0.00075	1

For BT-LE:

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2402-2480	2.188	1.6	23	0.00028	1

For RFID:

RFID Power	
Max Avg. Power (mW)	*Max Time Avg. Power (mW)
679.204	428.549

***Time Avg. power was measured from power meter in frequency hopping mode**

Frequency Band (MHz)	Max Time Avg. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
902.75-927.25	428.549	4.63	23	0.18721	0.61816

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

Bluetooth + RFID = (0.00075 / 1) + (0.18721 / 0.61816) = 0.304

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

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