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Project No: CB10612046

Maximum Permissible Exposure Report

Applicant's company	RIVERBED TECHNOLOGY INC
Applicant Address	680 Folsom Street San Francisco, California 94107-1397, USA
Manufacturer's company	RIVERBED TECHNOLOGY INC
Manufacturer Address	680 Folsom Street San Francisco, California 94107-1397, USA

Product Name	Wireless Access Point
Brand Name	riverbed
Model No.	XD2240
Ref. Standard(s)	NCC LP0002 (Aug. 23, 2016) Section 5.20 (5.20.2)
Received Date	Aug. 17, 2015
Final Test Date	Sep. 28, 2017
Submission Type	Original Equipment



Cliff Chang

SPORTON INTERNATIONAL INC.



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
TA582537-04	Rev. 01	Initial issue of report	Dec. 28, 2017
TA582537-04	Rev. 02	Changing the Applicant's company / Manufacturer's company and address.	Jan. 05, 2018

1. GENERAL DESCRIPTION

1.1. EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: DSSS (GFSK)

1.2. Testing Location

Testing Location			
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973	
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2. MAXIMUM PERMISSIBLE EXPOSURE

2.1. Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*100	6
3-30	1842 / f	4.89 / f	*900 / f ²	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5.0	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*100	30
3-30	1842/f	4.89/f	*180/f ²	30
30-300	27.5	0.073	1.0	30
300-1500			f/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

2.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 5GHz Band(Band 1+Band 4):

Antenna Type : PIFA Ant.

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT40): 26.73 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)		(dBm)	(mW)			
20	5755	7.29	5.358	26.730	210.112	0.180	34.200	2630.267	0.502	1	Complies

$$\text{Note: Directional Gain} = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

For 5GHz Band(Band 2 + Band 3):

Antenna Type : PIFA Ant.

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 22.96dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)		(dBm)	(mW)			
20	5320	7.01	5.023	22.963	197.836	0.270	30.000	1000.000	0.199	1	Complies

$$\text{Note: Directional Gain} = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

For 2.4GHz Band:

Antenna Type : PIFA Ant.

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 24.23 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)		(dBm)	(mW)			
20	2437	7.02	5.035	24.233	265.024	0.490	31.500	1412.540	0.281	1	Complies

$$\text{Note: Directional Gain} = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

For Bluetooth:

Antenna Type : PIFA Ant.

Conducted Power for BR (GFSK) 1 Mbps: 8.89 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)		(dBm)	(mW)			
20	2441	3.2	2.089	8.888	7.741	0.410	12.500	17.780	0.004	1	Complies