



SPORTON International Inc.

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Project No: CB10410072

Maximum Permissible Exposure Report

Applicant's company	Xirrus, Inc.
Applicant Address	2101 Corporate Center Drive, Thousand Oaks, CA 91320 USA
FCC ID	SK6-XD2240
Manufacturer's company	Lite-On Network Communication (Dongguan) Limited
Manufacturer Address	30#Keji Rd., Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China

Product Name	Wireless Access Point
Brand Name	XIRRUS
Model Name	XD2240
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Aug. 17, 2015
Final Test Date	Oct. 02, 2015
Submission Type	Original Equipment

Sam Chen

SPORTON INTERNATIONAL INC.



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA582537	Rev. 01	Initial issue of report	Oct. 14, 2015

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 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)

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
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	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)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	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:

Antenna Type : PIFA Ant.

Conducted Power for IEEE 802.11a: 23.89dBm

Distance (cm)	Test Freq. (MHz)	Uncorrelated Composite Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5825	1.56	1.4322	23.8861	244.6837	0.069752	1	Complies

Note: Uncorrelated gain = $10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10})/N_{ANT}]$ dBi

For 2.4GHz Band:

Antenna Type : PIFA Ant.

Conducted Power for IEEE 802.11b: 24.27 dBm

Distance (cm)	Test Freq. (MHz)	Uncorrelated Composite Gain (dBi)	Antenna Gain (numeric)	Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	2462	1.68	1.4723	24.2685	267.2071	0.078307	1	Complies

Note: Uncorrelated gain = $10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10})/N_{ANT}]$ dBi

Conclusion:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can 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

Mode 1 : 2.4GHz WLAN (Radio 1)+ 2.4GHz WLAN (Radio 2) Mode

Therefore, the worst-case situation is $0.078307 / 1 + 0.078307 / 1 = 0.156613$, which is less than "1". This confirmed that the device complies.

Mode 2 : 2.4GHz WLAN (Radio 1)+5GHz WLAN (Radio 2) Mode

Therefore, the worst-case situation is $0.078307 / 1 + 0.069752 / 1 = 0.148058$, which is less than "1". This confirmed that the device complies.

Mode 3 : 5GHz WLAN (Radio 1) +2.4GHz WLAN (Radio 2) Mode

Therefore, the worst-case situation is $0.069752 / 1 + 0.078307 / 1 = 0.148058$, which is less than "1". This confirmed that the device complies.

Mode 4 : 5GHz WLAN (Radio 1) +5GHz WLAN (Radio 2) Mode

Therefore, the worst-case situation is $0.069752 / 1 + 0.069752 / 1 = 0.139504$, which is less than "1". This confirmed that the device complies.