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Project No: CB10503278

Maximum Permissible Exposure Report

Applicant's company	Xirrus, Inc.
Applicant Address	2101 Corporate Center Drive, Thousand Oaks, CA 91320 USA
FCC ID	SK6-XD240B
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	XD4240
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Mar. 09, 2016
Final Test Date	Mar. 29, 2016
Submission Type	Original Equipment



Sam Chen

SPORTON INTERNATIONAL INC.

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA5D1826-02	Rev. 01	Initial issue of report	Apr. 12, 2016

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, 1024QAM)
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, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: DSSS (GFSK)

Note 1: WLAN MPE of 2.4GHz and 5GHz (Band 1/ Band 4) please refer to the Sporton test report:FA5D1826.

Note 2: This device contains transmitter module FCC ID: SK6-XDR240.

Note 3: This antenna is designed as sector antenna. Each module is only responsible 90~120 degree coverage so that max. MPE will be only two WIFI + BT to calculate.

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 30 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: (WLAN Module FCC ID: SK6-XDR240)

Antenna Type : PIFA Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 25.47 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
30	5785	10.23	10.5510	25.4653	351.9862	0.328539	1	Complies

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: (WLAN Module FCC ID: SK6-XDR240)

Antenna Type : PIFA Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 27.05 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
30	2437	6.21	4.1800	27.0452	506.4299	0.187267	1	Complies

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 Antenna

Conducted Power for BR (GFSK) 1 Mbps: 11.690 dBm

Distance (cm)	Test Freq. (MHz)	Antenna 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)			
30	2480	2.60	1.8197	11.6900	14.7571	0.002376	1	Complies

Conclusion:

Both of the WLAN 2.4GHz, 5GHz Band and Bluetooth can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.1873/1 + 0.3285/1 + 0.0024/1 = 0.5182$, which is less than "1". This confirmed that the device complies.