



RF Exposure Evaluation Report

Equipment : Wireless Access Point Radio module
Brand Name : XIRRUS
Model No. : XDR241
FCC ID : SK6-XDR241
Standard : 47 CFR Part 2.1091
Applicant : Xirrus, Inc.
2101 Corporate Center Drive, Thousand Oaks, CA
91320 USA
Manufacturer : Lite-On Network Communication (Dongguan)
Limited
30#Keji Rd.,Yin Hu Industrial Area, Qingxi Town,
DongGuan City, Guangdong, China

The product sample received on Jul. 22, 2016 and completely tested on Oct. 13, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit.

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Sam Chen
SPORTON INTERNATIONAL INC.





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1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
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, 1024QAM)

Note 1: The EUT is a limited module which only limited to the Wireless Access Point (brand: XIRRUS / model: XA4240).

The EUT was installed to the Wireless Access Point (brand: XIRRUS / model: XA4240) to perform all the tests.

Note 2: The Wireless Access Point (brand: XIRRUS / model:

XA4240) will install four radio modules (Radio 1(FCC ID: SK6-XDR240), Radio 2~ Radio 4(FCC ID: SK6-XDR241). These four radios will be operated in different bands.

1.2 Testing Location

Testing Location		
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

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 for this 5GHz device and 34 cm for system device to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

E = Electric field (V/m)

P = 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 Dipole Antenna:

Mode 1: Radio 1 (2.4GHz) + Radio 2 (5GHz Band 1) + Radio 3 (5GHz Band 2) + Radio 4 (5GHz Band 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 2.4GHz	8.02	26.30	34.32	2.70396	34	0.18623	1	0.18623
Radio 2 5GHz Band 1	9.02	26.72	35.74	3.74973	34	0.25825	1	0.25825
Radio 3 5GHz Band 2	9.02	20.95	29.97	0.99312	34	0.06839	1	0.06839
Radio 4 5GHz Band 4	9.02	26.94	35.96	3.94457	34	0.27167	1	0.27167
							Sum Ratio	0.78454
							Ratio Limit	1

Mode 2: Radio 1 (5GHz Band 1) + Radio 2 (5GHz Band 2) + Radio 3 (5GHz Band 3) + Radio 4 (5GHz Band 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 1	9.02	24.50	33.52	2.24905	34	0.15490	1	0.15490
Radio 2 5GHz Band 2	9.02	20.95	29.97	0.99312	34	0.06839	1	0.06839
Radio 3 5GHz Band 3	9.02	20.88	29.90	0.97724	34	0.06730	1	0.06730
Radio 4 5GHz Band 4	9.02	26.94	35.96	3.94457	34	0.27167	1	0.27167
							Sum Ratio	0.56226
							Ratio Limit	1

Mode 3: Radio 1 (5GHz Band 2) + Radio 2 (5GHz Band 3) + Radio 3 (5GHz Band 4) + Radio 4 (5GHz Band 1)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 2	9.02	18.58	27.60	0.57544	34	0.03963	1	0.03963
Radio 2 5GHz Band 3	9.02	20.88	29.90	0.97724	34	0.06730	1	0.06730
Radio 3 5GHz Band 4	9.02	26.94	35.96	3.94457	34	0.27167	1	0.27167
Radio 4 5GHz Band 1	9.02	26.72	35.74	3.74973	34	0.25825	1	0.25825
							Sum Ratio	0.59722
							Ratio Limit	1



Mode 4: Radio 1 (5GHz Band 3) + Radio 2 (5GHz Band 4) + Radio 3 (5GHz Band 1) + Radio 4 (5GHz Band 2)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 3	9.02	20.86	29.88	0.97275	34	0.06699	1	0.06699
Radio 2 5GHz Band 4	9.02	26.94	35.96	3.94457	34	0.27167	1	0.27167
Radio 3 5GHz Band 1	9.02	26.72	35.74	3.74973	34	0.25825	1	0.25825
Radio 4 5GHz Band 2	9.02	20.95	29.97	0.99312	34	0.06839	1	0.06839
							Sum Ratio	0.59831
							Ratio Limit	1

Mode 5: Radio 1 (5GHz Band 4) + Radio 2 (5GHz Band 1) + Radio 3 (5GHz Band 2) + Radio 4 (5GHz Band 3)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 4	9.02	25.68	34.70	2.95121	34	0.20326	1	0.20326
Radio 2 5GHz Band 1	9.02	26.72	35.74	3.74973	34	0.25825	1	0.25825
Radio 3 5GHz Band 2	9.02	20.95	29.97	0.99312	34	0.06839	1	0.06839
Radio 4 5GHz Band 3	9.02	20.88	29.90	0.97724	34	0.06730	1	0.06730
							Sum Ratio	0.39394
							Ratio Limit	1

Note: Radio 1 FCC ID: SK6-XDR240 and Radio 2 ~ Radio 4 FCC ID: SK6-XDR241.



For Simultaneous Transmission Analysis

For Directional Antenna:

Mode 1: Radio 1 (2.4GHz) + Radio 2 (5GHz Band 1) + Radio 3 (5GHz Band 2) + Radio 4 (5GHz Band 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 2.4GHz	14.62	21.30	35.92	3.90841	34	0.26918	1	0.26918
Radio 2 5GHz Band 1	15.42	20.40	35.82	3.81944	34	0.26305	1	0.26305
Radio 3 5GHz Band 3	15.42	14.55	29.97	0.99312	34	0.06839	1	0.06839
Radio 4 5GHz Band 4	9.40	26.57	35.97	3.95367	34	0.27230	1	0.27230
							Sum Ratio	0.87292
							Ratio Limit	1

Mode 2: Radio 1 (5GHz Band 1) + Radio 2 (5GHz Band 2) + Radio 3 (5GHz Band 3) + Radio 4 (5GHz Band 4)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 1	15.42	20.52	35.94	3.92645	34	0.27042	1	0.27042
Radio 2 5GHz Band 2	15.42	14.51	29.93	0.98401	34	0.06777	1	0.06777
Radio 3 5GHz Band 3	15.42	14.55	29.97	0.99312	34	0.06839	1	0.06839
Radio 4 5GHz Band 4	9.40	26.57	35.97	3.95367	34	0.27230	1	0.27230
							Sum Ratio	0.67888
							Ratio Limit	1

Mode 3: Radio 1 (5GHz Band 2) + Radio 2 (5GHz Band 3) + Radio 3 (5GHz Band 4) + Radio 4 (5GHz Band 1)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 2	15.42	14.54	29.96	0.99083	34	0.06824	1	0.06824
Radio 2 5GHz Band 3	15.42	14.55	29.97	0.99312	34	0.06839	1	0.06839
Radio 3 5GHz Band 4	9.40	26.57	35.97	3.95367	34	0.27230	1	0.27230
Radio 4 5GHz Band 1	15.42	20.40	35.82	3.81944	34	0.26305	1	0.26305
							Sum Ratio	0.40893
							Ratio Limit	1



Mode 4: Radio 1 (5GHz Band 3) + Radio 2 (5GHz Band 4) + Radio 3 (5GHz Band 1) + Radio 4 (5GHz Band 2)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 3	15.42	14.54	29.96	0.99083	34	0.06824	1	0.06824
Radio 2 5GHz Band 4	9.40	26.57	35.97	3.95367	34	0.27230	1	0.27230
Radio 3 5GHz Band 1	15.42	20.40	35.82	3.81944	34	0.26305	1	0.26305
Radio 4 5GHz Band 2	15.42	14.51	29.93	0.98401	34	0.06777	1	0.06777
							Sum Ratio	0.34054
							Ratio Limit	1

Mode 5: Radio 1 (5GHz Band 4) + Radio 2 (5GHz Band 1) + Radio 3 (5GHz Band 2) + Radio 4 (5GHz Band 3)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
Radio 1 5GHz Band 4	15.42	20.47	35.89	3.88150	34	0.26733	1	0.26733
Radio 2 5GHz Band 1	15.42	20.40	35.82	3.81944	34	0.26305	1	0.26305
Radio 3 5GHz Band 2	15.42	14.51	29.93	0.98401	34	0.06777	1	0.06777
Radio 4 5GHz Band 3	15.42	14.55	29.97	0.99312	34	0.06839	1	0.06839
							Sum Ratio	0.13616
							Ratio Limit	1

Note: Radio 1 FCC ID: SK6-XDR240 and Radio 2 ~ Radio 4 FCC ID: SK6-XDR241.