

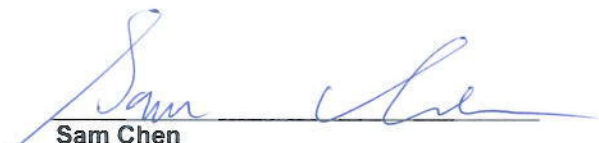


# RF Exposure Evaluation Report

**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 Sep. 09, 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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## REVISION HISTORY

[illegible]

# 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<br>5725-5850 | 5180-5240<br>5745-5825    | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>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.<br>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.<br>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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> 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 34 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:

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

**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     | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) |
|----------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|
| 5.8G;D1D | 9.02     | 26.94       | 35.96      | 3.94457  | 20            | 0.78475                 | 1                             |

**For Directional Antenna:**

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) |
|----------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|
| 5.8G;D1D | 9.40     | 26.57       | 35.97      | 3.95367  | 20            | 0.78656                 | 1                             |

**For Simultaneous Transmission Analysis**

**For Dipole Antenna:**

Mode 1: Radio 1 (2.4GHz) + 5GHz Band 1 (one of the radio 2~4) + 5GHz Band 4(one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 2.4GHz                        | 8.02     | 26.30       | 34.32      | 2.7040   | 34            | 0.1862                  | 1                             | 0.1862          |
| 5GHz Band 1<br>(one of the radio 2~4) | 9.02     | 26.72       | 35.74      | 3.7497   | 34            | 0.3120                  | 1                             | 0.3120          |
| 5GHz Band 4<br>(one of the radio 2~4) | 9.02     | 26.94       | 35.96      | 3.9446   | 34            | 0.2729                  | 1                             | 0.2729          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.7711          |
|                                       |          |             |            |          |               |                         | Ratio Limit                   | 1               |

Mode 2: Radio 1 (5GHz Band 1) + 5GHz Band 4 (one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 5GHz Band 1                   | 9.02     | 24.50       | 33.52      | 2.2491   | 34            | 0.1863                  | 1                             | 0.1863          |
| 5GHz Band 4<br>(one of the radio 2~4) | 9.02     | 26.94       | 35.96      | 3.9446   | 34            | 0.2729                  | 1                             | 0.2729          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.4592          |
|                                       |          |             |            |          |               |                         | Ratio Limit                   | 1               |

Mode 3: Radio 1 (5GHz band 4) + 5GHz band 1(one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 5GHz Band 4                   | 9.02     | 25.68       | 34.70      | 2.9512   | 34            | 0.2041                  | 1                             | 0.2041          |
| 5GHz Band 1<br>(one of the radio 2~4) | 9.02     | 26.72       | 35.74      | 3.7497   | 34            | 0.3120                  | 1                             | 0.3120          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.5161          |
|                                       |          |             |            |          |               |                         | 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) + 5GHz Band 1 (one of the radio 2~4)+ 5GHz Band 4(one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 2.4GHz                        | 14.62    | 21.30       | 35.92      | 3.9084   | 34            | 0.2691                  | 1                             | 0.2691          |
| 5GHz Band 1<br>(one of the radio 2~4) | 15.42    | 20.40       | 35.82      | 3.8194   | 34            | 0.2630                  | 1                             | 0.2630          |
| 5GHz Band 4<br>(one of the radio 2~4) | 9.4      | 26.57       | 35.97      | 3.9537   | 34            | 0.2723                  | 1                             | 0.2723          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.8044          |
|                                       |          |             |            |          |               |                         | Ratio Limit                   | 1               |

Mode 2: Radio 1 (5GHz Band 1) + 5GHz Band 4 (one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 5GHz Band 1                   | 15.42    | 20.52       | 35.94      | 3.9264   | 34            | 0.2704                  | 1                             | 0.2704          |
| 5GHz Band 4<br>(one of the radio 2~4) | 9.4      | 26.57       | 35.97      | 3.9537   | 34            | 0.2723                  | 1                             | 0.2723          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.5427          |
|                                       |          |             |            |          |               |                         | Ratio Limit                   | 1               |

Mode 3: Radio 1 (5GHz band 4) + 5GHz band 1(one of the radio 2~4)

| Mode                                  | DG (dBi) | Power (dBm) | EIRP (dBm) | EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|---------------------------------------|----------|-------------|------------|----------|---------------|-------------------------|-------------------------------|-----------------|
| Radio 1 5GHz Band 4                   | 15.42    | 20.47       | 35.89      | 3.8815   | 34            | 0.2673                  | 1                             | 0.2673          |
| 5GHz Band 1<br>(one of the radio 2~4) | 15.42    | 20.40       | 35.82      | 3.8194   | 34            | 0.2630                  | 1                             | 0.2630          |
|                                       |          |             |            |          |               |                         | Sum Ratio                     | 0.5303          |
|                                       |          |             |            |          |               |                         | Ratio Limit                   | 1               |

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