



## SPORTON International Inc.

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Project No: CB10501307

### 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 | Life-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, AVAYA                               |
| Model No.        | XD2240, WAP9144                             |
| Ref. Standard(s) | 47 CFR FCC Part 2 Subpart J, section 2.1091 |
| Received Date    | Aug. 17, 2015                               |
| Final Test Date  | Jan. 26, 2016                               |
| Submission Type  | Class II Change                             |

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SPORTON INTERNATIONAL INC.



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## History of This Test Report

| REPORT NO.  | VERSION | DESCRIPTION             | ISSUED DATE   |
|-------------|---------|-------------------------|---------------|
| FA582537-01 | Rev. 01 | Initial issue of report | Feb. 03, 2016 |
|             |         |                         |               |
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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                                                                                                                      |
| 2.4GHz WLAN            | 2400-2483.5            | 2412-2462                 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| 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)                                      |

### 1.2. Table for Multiple List

The brand name and model numbers in the following table are all refer to the identical product.

| Brand Name | Model Name | Description                                                   |
|------------|------------|---------------------------------------------------------------|
| XIRRUS     | XD2240     | All the design is the same, just for different marketing use. |
| AVAYA      | WAP9144    |                                                               |

From the above models, model: XD2240 was selected as representative model for the test and its data was recorded in this report.

### 1.3. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA582537

Below is the table for the change of the product with respect to the original one.

| Modifications                                                    | Performance Checking                                             |
|------------------------------------------------------------------|------------------------------------------------------------------|
| 1. Adding beam-forming function.                                 | Maximum Permissible Exposure                                     |
| 2. Adding a model name: WAP9144<br>3. Adding a trade name: AVAYA | After evaluating, it is not necessary to re-test all test items. |

### 1.4. 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 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 802.11ac MCS0/Nss1 (VHT40): 23.22 dBm

| Distance (cm) | Test Freq. (MHz) | Directional Gain (dBi) | Antenna Gain (numeric) | Average Output Power |          | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|---------------|------------------|------------------------|------------------------|----------------------|----------|-----------------------------------------|--------------------------------------------------|-------------|
|               |                  |                        |                        | (dBm)                | (mW)     |                                         |                                                  |             |
| 20            | 5795             | 7.29                   | 5.3580                 | 23.2245              | 210.1109 | 0.224078                                | 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:

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 |          | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|---------------|------------------|------------------------|------------------------|----------------------|----------|-----------------------------------------|--------------------------------------------------|-------------|
|               |                  |                        |                        | (dBm)                | (mW)     |                                         |                                                  |             |
| 20            | 2437             | 7.02                   | 5.0350                 | 24.2328              | 265.0239 | 0.265604                                | 1                                                | Complies    |

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

**Conclusion:**

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

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

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

Therefore, the worst-case situation is  $0.265604 / 1 + 0.265604 / 1 = 0.531209$ , which is less than "1". This confirmed that the device complies.

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

Therefore, the worst-case situation is  $0.265604 / 1 + 0.224078 / 1 = 0.489682$ , which is less than "1". This confirmed that the device complies.

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

Therefore, the worst-case situation is  $0.224078 / 1 + 0.265604 / 1 = 0.489682$ , which is less than "1". This confirmed that the device complies.

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

Therefore, the worst-case situation is  $0.224078 / 1 + 0.224078 / 1 = 0.448156$ , which is less than "1". This confirmed that the device complies.