



## SPORTON International Inc.

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Project No: CB10504174

### Maximum Permissible Exposure Report

|                        |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| Applicant's company    | AirTies Wireless Networks                                                                     |
| Applicant Address      | Gülbahar Mah. Avni Dilligil Sok. Celik Is Merkezi No 5 meclidiyekoy<br>ISTANBUL, 34394 Turkey |
| FCC ID                 | Z3WAIR4820                                                                                    |
| Manufacturer's company | SHENZHEN GONGJIN ELECTRONICS CO.,LTD.                                                         |
| Manufacturer Address   | 2F/3F/4F Baiying Building, 1019#Naihui RD, Nanshan<br>Dist., Shenzhen, Guangdong, CHINA       |

|                  |                                                  |
|------------------|--------------------------------------------------|
| Product Name     | 2 Port Gigabit Ethernet 11ac/11n Wireless Router |
| Brand Name       | AirTies                                          |
| Model Name       | Air 4820                                         |
| Ref. Standard(s) | 47 CFR FCC Part 2 Subpart J, section 2.1091      |
| Received Date    | Apr. 02, 2014                                    |
| Final Test Date  | Apr. 15, 2016                                    |
| Submission Type  | Class II Change                                  |



Sam Chen

SPORTON INTERNATIONAL INC.

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## History of This Test Report

| REPORT NO.  | VERSION | DESCRIPTION             | ISSUED DATE   |
|-------------|---------|-------------------------|---------------|
| FA440257-08 | Rev. 01 | Initial issue of report | Apr. 21, 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                                                                                 |
| 5GHz WLAN              | 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850 | 5180-5240<br>5260-5320<br>5500-5700<br>5745-5825 | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |

### 1.2. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 440257-01, 440257-02 and FA440257-03

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

| Modifications                                                                                                                                           | Performance Checking                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Changing 5GHz Band 4 to "New Rules" from "Old Rules".                                                                                                   | Maximum Permissible Exposure.                                    |
| Changing Applicant Address.<br><b>Applicant Address:</b> Gülbahar Mah. Avni Dilligil Sok. Celik Is<br>Merkezi No 5 meciyekoy ISTANBUL,<br>34394 Turkey. | After evaluating, it is not necessary to re-test all test items. |

Note: Maximum Permissible Exposure of 5GHz Band 1 (Sporton test report:440257-03), and Band 2~ Band 3 (Sporton test report:440257-02) is based on original report.

### 1.3. 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 1:

Antenna Type : Printed Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT40: 25.91dBm

| Distance (cm) | Test Freq. (MHz) | Directional Gain (dBi) | Antenna Gain (numeric) | The maximum combined 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            | 5230             | 6.46                   | 4.4265                 | 25.9069                                   | 389.6669 | 0.343324                                | 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 5GHz Band 2~Band 3:

Antenna Type : Printed Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 22.93 dBm

| Distance (cm) | Test Freq. (MHz) | Directional Gain (dBi) | Antenna Gain (numeric) | The maximum combined 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            | 5500             | 7.05                   | 5.0699                 | 22.9334                                   | 196.4891 | 0.198284                                | 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 5GHz Band 4:

Antenna Type : Printed Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 26.70 dBm

| Distance (cm) | Test Freq. (MHz) | Directional Gain (dBi) | Antenna Gain (numeric) | The maximum combined 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            | 5785             | 7.05                   | 5.0706                 | 26.6999                                   | 467.7226 | 0.472062                                | 1                                                | Complies    |

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