



# SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.  
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / [www.sporton.com.tw](http://www.sporton.com.tw)

Project No: CB10503224

## Maximum Permissible Exposure Report

|                        |                                        |
|------------------------|----------------------------------------|
| Applicant's company    | Qualcomm Atheros, Inc                  |
| Applicant Address      | 1700 Technology Dr, San Jose, CA 95110 |
| FCC ID                 | PPD-AR5BHB116                          |
| Manufacturer's company | Qualcomm Atheros, Inc                  |
| Manufacturer Address   | 1700 Technology Dr, San Jose, CA 95110 |

|                  |                                             |
|------------------|---------------------------------------------|
| Product Name     | AR5BHB116 2x2 802.11n PCIe module           |
| Brand Name       | Atheros                                     |
| Model Name       | AR5BHB116                                   |
| Ref. Standard(s) | 47 CFR FCC Part 2 Subpart J, section 2.1091 |
| Received Date    | Aug. 06, 2010                               |
| Final Test Date  | Mar. 29, 2016                               |
| Submission Type  | Class II Change                             |

Sam Chen

SPORTON INTERNATIONAL INC.



Testing Laboratory  
1190

## Table of Contents

|                                                  |          |
|--------------------------------------------------|----------|
| <b>1. GENERAL DESCRIPTION.....</b>               | <b>1</b> |
| 1.1. EUT General Information .....               | 1        |
| 1.2. Table for Class II Change .....             | 1        |
| 1.3. Testing Location.....                       | 1        |
| <b>2. MAXIMUM PERMISSIBLE EXPOSURE.....</b>      | <b>2</b> |
| 2.1. Limit of Maximum Permissible Exposure ..... | 2        |
| 2.2. MPE Calculation Method .....                | 3        |
| 2.3. Calculated Result and Limit.....            | 3        |

## History of This Test Report

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FA5D1608   | Rev. 01 | Initial issue of report | Apr. 08, 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)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| 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)                                      |

### 1.2. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 080603

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

| Modifications                                           | Performance Checking         |
|---------------------------------------------------------|------------------------------|
| Updating 5GHz Band 1~3 to "New Rules" from "Old Rules". | it's no need to re-test.     |
| Updating 5GHz Band 4 to "New Rules" from "Old Rules".   | Maximum Permissible Exposure |

Note: Maximum Permissible Exposure of 2.4GHz Band and 5GHz Band 1~3 are based on original test 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:

Antenna Type : PIFA Antenna

Conducted Power for IEEE 802.11n MCS0 HT20: 18.85 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             | 7.77                   | 5.9841                 | 18.8501                                   | 76.7387 | 0.091404                                | 1                                                | Complies    |

Note: Directional gain=7.77 dBi