



# SPORTON International Inc.

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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

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SPORTON INTERNATIONAL INC.



Testing Laboratory  
1190



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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) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 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. 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 <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:

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

**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