



# SPORTON International Inc.

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Project No: CB10610378

## Maximum Permissible Exposure Report

Applicant's company	Ubiquiti Networks, Inc.
Applicant Address	685 Third Avenue, 27th Floor New York, New York 10017 USA
FCC ID	SWX-M445GL
Manufacturer's company	Ubiquiti Networks, Inc.
Manufacturer Address	685 Third Avenue, 27th Floor New York, New York 10017 USA

Product Name	WiFi 5G Module
Brand Name	UBIQUITI
Model Name	4x4-5GL
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Sep. 12, 2017
Final Test Date	Oct. 20, 2017
Submission Type	Class II Change

  
Cliff Chang  
SPORTON INTERNATIONAL INC.





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### History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA661623-15	Rev. 01	Initial issue of report	Oct. 27 , 2017

## 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 5250-5350	5180-5240 5260-5320	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 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: FA661623-12  
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Removing the beamforming function. 2. Increasing the antenna gain to "8dBi" from "6dBi".	Maximum Permissible Exposure.

### 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:

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

**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

5GHz Band 1

Conducted Power for IEEE 802.11ac VHT40: 24.53 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Tune-up EIRP		Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
20	5230	8.00	6.3096	24.53	283.8166	33.0000	1995.2623	0.3971	1	Complies

5GHz Band 2

Conducted Power for IEEE 802.11ac VHT80: 20.69 dBm

Distance (cm)	Test Freq. (MHz)	Directional Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Tune-up EIRP		Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
20	5290	8.00	6.3096	20.69	117.1143	29.0000	794.3282	0.1581	1	Complies