

Champion Power Equipment, Inc.

# TEST REPORT

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# Maximum Permissible Exposure (MPE) Evaluation Report

Applicant:	Champion Power Equipment, Inc. 12039 Smith Avenue, Santa Fe Springs, CA 90670, USA
Product:	WIFI Module
Model No.:	CPEWIFI01
Brand Name:	CHAMPION POWER EQUIPMENT, 
FCC ID:	YA3-CPEWIFI01
Test Method/ Standard:	FCC 1.1310
Test By:	Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan



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**TEST REPORT****Revision History**

<b>Report No.</b>	<b>Issue Date</b>	<b>Revision Summary</b>
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## Table of Contents

Summary of Tests .....	4
1. General Information .....	5
1.1 Identification of the EUT .....	5
1.2 Antenna description .....	5
1.3 Peripherals equipment .....	5
2. Test specifications.....	6
2.1 Introduction.....	6
2.2 RF Exposure Limit .....	7
2.3 RF Exposure calculations .....	7
2.4 Operation mode .....	8
2.5 Test equipment.....	8
2.6 Test Set-up .....	9
3. Test results .....	10

### Summary of Tests

#### **MPE Evaluation meet FCC OET No. 65: 1997, IEEE C95.1-2005**

Test	Reference	Results
MPE Evaluation	FCC Guidelines for Human Exposure IEEE C95.1	Complies

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.

Other Testing: the specification, standard and not taking into account the measurement uncertainty.

## 1. General Information

### 1.1 Identification of the EUT

<b>Product:</b>	WIFI Module
<b>Model No.:</b>	CPEWIFI01
<b>Operating Frequency:</b>	2412 MHz ~ 2462 MHz for 802.11b, 802.11g, 802.11n HT20
<b>Channel Number:</b>	11 channels for 2412 MHz ~ 2462 MHz
<b>Access scheme:</b>	DSSS, OFDM
<b>Rated Power:</b>	DC 5V
<b>Power Cord:</b>	N/A
<b>Sample receiving date:</b>	Jun. 04, 2020
<b>Sample condition:</b>	Workable
<b>Test Date(s):</b>	Jul. 02, 2020

### 1.2 Antenna description

Antenna Gain : 5.09 dBi  
Antenna Type : Dipole Antenna  
Connector Type : I-Pex

### 1.3 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	HP	HP Probook 440 G3	5CD8021S9H	USB shielded cable 1 meter

## **2. Test specifications**

### **2.1 Introduction**

The EUT operates in the 2.4 band. Due to the EUT (include antenna) at its normal operation distance is at least 20 cm from the human body, the EUT was defined as a Mobile Device.

The reason to do the MPE Evaluation is to avoid the RF hazard to human body. The maximum output power and gain of the antenna were used to calculate the limited Power density (S) at 20 cm distance away from the product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and Safety Code 6 are followed.

According to 1.1307 (b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

## 2.2 RF Exposure Limit

According to FCC 1.1310 table 1:

TABLE 1 TO § 1.1310(e)(1) - LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(i) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

## 2.3 RF Exposure calculations

From §FCC 1.1310 table 1, the maximum permissible RF exposure for an uncontrolled environment is 1 mW/(cm<sup>2</sup>) (or 10 W/m<sup>2</sup>)\*

Power density (S) is calculated by the following formula:

$$S = (P * G) / 4\pi R^2$$

where, S = Power density (mW/cm<sup>2</sup>)

P = Output power to antenna (mW)

R = Distance between radiating structure and observation point (cm)

G = Gain of antenna in numeric

π = 3.1416

Example:

Assume a mobile device operates at 2412MHz and its maximum output power is 50mW, and the maximum gain of antenna is 1 (numeric) /0dBi.

then the power density (S) = (50 \* 1) / 4 \* π \* 20<sup>2</sup> = 0.00995 (mW/cm<sup>2</sup>) (or = 0.0995 W/m<sup>2</sup>)

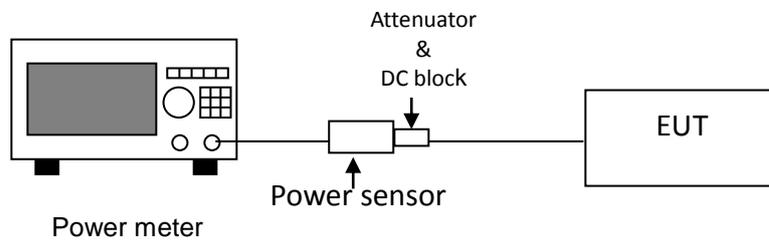
## 2.4 Operation mode

- (1) Connected to Notebook PC via USB cable, executing "CMD" and enter command to select different frequency and modulation.
- (2) With individual verifying, the maximum output power were found out 1 Mbps data rate for 802.11b mode, 6 Mbps data rate for 802.11g mode, 6.5 Mbps data rate for 802.11n(HT20) mode , the final tests were executed under these conditions recorded in this report individually.

## 2.5 Test equipment

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
Power Meter	Anritsu	ML2495A	0844001	2019/10/23	2020/10/21
Power Sensor	Anritsu	MA2411B	0738452	2019/10/23	2020/10/21

## 2.6 Test Set-up



**Remark: Attenuator + Cable loss = 22 dB**

### 3. Test results

Mode	Channel	Frequency (MHz)	Antenna Gain (mW)	Output power (dBm)	Output power (mW)	Tune-up Power Tolerance (dB)	Max Tune-up Power (dBm)	Max Tune-up Power (mW)	Power density (mW/cm <sup>2</sup> )	Limit of power density (mW/cm <sup>2</sup> )
802.11b	1	2412	3.23	19.05	80.35	2.00	21.05	127.35	0.0516	1.0
	6	2437	3.23	19.18	82.79	2.00	21.18	131.22	0.0532	1.0
	11	2462	3.23	19.35	86.10	2.00	21.35	136.46	0.0553	1.0
802.11g	1	2412	3.23	21.02	126.47	2.00	23.02	200.45	0.0812	1.0
	6	2437	3.23	21.11	129.12	2.00	23.11	204.64	0.0829	1.0
	11	2462	3.23	21.05	127.35	2.00	23.05	201.84	0.0818	1.0
802.11n (HT20)	1	2412	3.23	20.05	101.16	2.00	22.05	160.32	0.0650	1.0
	6	2437	3.23	20.30	107.15	2.00	22.30	169.82	0.0688	1.0
	11	2462	3.23	20.25	105.93	2.00	22.25	167.88	0.0680	1.0

The Notice in Installation Manual has been stated as below:

While installing and operating this transmitter, the radio frequency exposure limit of 1 mW/ (cm<sup>2</sup>) may be exceeded at distances close to the transmitter. Therefore, the user must maintain a minimum distance of 20 cm from the device at all time.