



SPORTON International Inc.

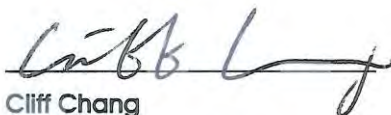
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Project No: CB10610367

Maximum Permissible Exposure Report

Applicant's company	聯洲國際有限公司
Applicant Address	新北市板橋區中山路一段 156 號 13 樓
Manufacturer's company	聯洲國際有限公司
Manufacturer Address	深圳市南山區深南路科技園工業廠房 24 棟南段 1,3,4,5 層, 28 棟 1-4 層

Product Name	AC5400 MU-MIMO 無線三頻 Gigabit 路由器
Brand Name	TP-Link
Model Name	Archer C5400
Ref. Standard(s)	NCC LP0002 (Aug. 23, 2016) Section 5.20 (5.20.2)
Received Date	Oct. 28, 2015
Final Test Date	Oct. 23, 2017
Submission Type	Original Equipment



Cliff Chang

SPORTON INTERNATIONAL INC.



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PHOTOGRAPHS OF EUT V01

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA5N0101-05	Rev. 01	Initial issue of report	Nov. 03, 2017

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) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
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) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)

1.2. Testing Location

Testing Location		
☐	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
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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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*100	6
3-30	1842 / f	4.89 / f	*900 / f ²	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5.0	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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*100	30
3-30	1842/f	4.89/f	*180/f ²	30
30-300	27.5	0.073	1.0	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 31 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 : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT40): 28.10dBm

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 ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
31	5230	7.82	6.0542	28.10	646.2108	36.00	3981.0717	0.3298	1	Complies

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

For 5GHz Band 2:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT40): 22.12dBm

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 ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
31	5310	7.82	6.0542	22.12	162.7977	30.00	1000.0000	0.0828	1	Complies

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

For 5GHz Band 3:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT40): 22.14dBm

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 ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
31	5550	7.82	6.0542	22.14	163.6264	30.00	1000.0000	0.0828	5550	Complies

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

For 5GHz Band 4:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT40): 28.12dBm

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 ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
31	5795	7.82	6.0542	28.12	648.9395	36.00	3981.0717	0.3298	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 2.4GHz Band:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 28.14dBm

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 ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)	(dBm)	(mW)			
31	2437	7.82	6.0542	28.14	652.2950	36.00	3981.0717	0.3298	1	Complies

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