



SPORTON International Inc.

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Project No: CB10508025

Maximum Permissible Exposure Report

Applicant's company	Mojo Networks, Inc.
Applicant Address	339 N. Bernardo Avenue, Suite #200, Mountain View, CA USA
FCC ID	TOR-C75
Manufacturer's company	Lite-On Network Communication (Dongguan) Limited
Manufacturer Address	30#Keji Rd., Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China

Product Name	AirTight Access Point
Brand Name	MOJO, WatchGuard
Model Name	C-75, C-75-E, AP320
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Jan. 10, 2014
Final Test Date	Jul. 16, 2016
Submission Type	Class II Change

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SPORTON INTERNATIONAL INC.





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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA411023-07	Rev. 01	Initial issue of report	Mar. 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)
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)

1.2. Table for Multiple Listing

The EUT has three model numbers which are identical to each other in all aspects except for the following table:

Brand Name	Model No.	Antenna	Description
MOJO	C-75	Internal antenna	EUT 1
	C-75-E	External antenna	EUT 2
WatchGuard	AP320	Internal antenna	EUT 3

From the above models, EUT 1 and EUT 2 were selected as representative model for the test and their data was recorded in this report.

1.3. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA411023-06
Below is the table for the change of the product with respect to the original one.

Modifications
Add Band 2 and Band 3 (5250~5350 MHz, 5470~5725 MHz) for this device, and it evaluated for Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of 2.4GHz Band and 5GHz Band 1/4 are based on original test report.

1.4. 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 ²)	Averaging Time E ² , H ² 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 ²)	Averaging Time E ² , H ² 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

EUT 1 (Model No.: C-75)

For 5GHz Band 1 and Band 4:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT20: 26.47 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5745	6.60	4.5709	26.47	443.5261	0.4035	1	Complies

For 5GHz Band 2 and Band 3:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT80: 23.26 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5610	6.60	4.5709	23.26	212.0138	0.1928	1	Complies

For 2.4GHz Band:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11n MCS0 HT20: 24.98 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	2437	6.00	3.9811	24.98	315.1112	0.2496	1	Complies

Conclusion:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously, the formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.2496 / 1 + 0.4035 / 1 = 0.6531$, which is less than "1". This confirmed that the device complies.

EUT 2 (Model No.: C-75-E)

For 5GHz Band 1 and Band 4:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT20: 25.27 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5240	5.00	3.1623	25.27	336.1745	0.2115	1	Complies

For 5GHz Band 2 and Band 3:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11a: 23.75 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5260	5.00	3.1623	23.75	237.1374	0.1492	1	Complies

For 2.4GHz Band:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11n MCS0 HT20: 24.30 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	2437	5.00	3.1623	24.2974	268.9929	0.1693	1	Complies

Conclusion:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously, the formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.1693 / 1 + 0.2115 / 1 = 0.3808$, which is less than "1". This confirmed that the device complies.