



SPORTON International Inc.

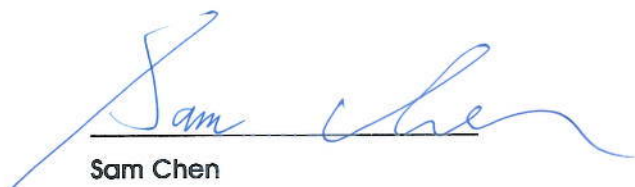
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Project No: CB10507133

Maximum Permissible Exposure Report

Applicant's company	Buffalo Inc.
Applicant Address	AKAMONDORI Bldg., 30-20, Ohsu 3-chome, Naka-ku, Nagoya 460-8315 Japan
FCC ID	FDI000000022
Manufacturer's company	Buffalo Inc.
Manufacturer Address	AKAMONDORI Bldg., 30-20, Ohsu 3-chome, Naka-ku, Nagoya 460-8315 Japan

Product Name	AirStation
Brand Name	Buffalo Inc.
Model Name	WXR-1900DHP, WXR-1900DHPD
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Aug. 15, 2014
Final Test Date	Jul. 05, 2016
Submission Type	Class II Change



Sam Chen

SPORTON INTERNATIONAL INC.



Table of Contents

1. GENERAL DESCRIPTION.....	1
1.1. EUT General Information	1
1.2. Table for Class II Change	1
1.3. Table for Multiple Listing.....	1
1.4. Testing Location.....	1
2. MAXIMUM PERMISSIBLE EXPOSURE.....	2
2.1. Limit of Maximum Permissible Exposure	2
2.2. MPE Calculation Method	2
2.3. Calculated Result and Limit.....	3

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA481508-08	Rev. 01	Initial issue of report	Aug. 01, 2016

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 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)

1.2. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 481508-07

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding client mode and updating 5GHz band 1	It evaluated for Maximum Permissible Exposure
1. Adding an adapter (model name: WA-36A12FU). 2. Adding model name: WXR-1900DHPD.	It's not necessary to re-test.

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

1.3. Table for Multiple Listing

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

Model Name	Description
WXR-1900DHP	The different model names served as marketing strategy.
WXR-1900DHPD	

Note: From the above models, model: WXR-1900DHP was selected as representative model for the test and its data was recorded in this report.

1.4. 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
☒	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:

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

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 4:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11ac MCS0//Nss1 (VHT40): 27.03 dBm

Distance (cm)	Test Freq. (MHz)	Directional 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	5795	7.77	5.9858	27.0327	504.9771	0.6016	1	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{AQ}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.77 \text{ dBi}$

For 5GHz Band 1:

Antenna Type : Dipole Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 (VHT20): 22.02 dBm

Distance (cm)	Test Freq. (MHz)	Directional 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	7.77	5.9858	22.02	159.1510	0.1896	1	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{AQ}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.77 \text{ dBi}$

For 2.4GHz Band:

Antenna Type Dipole Antenna

Conducted Power for IEEE 802.11b: 29.44 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	2.00	1.5849	29.4353	878.0643	0.2769	1	Complies

Conclusion:

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

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

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.2769 / 1 + 0.6016 / 1 = 0.8785$, which is less than "1". This confirmed that the device complies.