



RF EXPOSURE EVALUATION REPORT

FCC ID : UDX-60076025
Equipment : Wi-Fi Router
Brand Name : CISCO
Model Name : MX68W-HW
Applicant : Cisco Systems, Inc.
170 West Tasman Drive, San Jose, CA 95134
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

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Approved by: Jones Tsai / Manager

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Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
3. RF EXPOSURE LIMIT INTRODUCTION	6
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	7
4.1. Standalone Power Density Calculation	7
4.2. Collocated Power Density Calculation.....	7



History of this test report

Report No.	Version	Description	Issued Date
FA832026	Rev. 01	Initial issue of report	Jul. 23, 2018

**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	Wi-Fi Router
Brand Name	CISCO
Model Name	MX68W-HW
FCC ID	UDX-60076025
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
HW Version	0.20
SW Version	T-201807131655-Geff7ac40
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Reviewed by: Eric Huang

Report Producer: Wan Liu

2. Maximum RF average output power among production units

<Non-Beamforming Mode>

	Mode	Maximum Average Power (dBm)
2.4GHz WLAN	802.11b	28
	802.11g	26
	802.11n-HT20	25
	802.11n-HT40	23
	802.11ac-VHT20	25
	802.11ac-VHT40	23
5GHz WLAN	802.11a	29
	802.11n-HT20	29
	802.11n-HT40	29
	802.11ac-VHT20	29
	802.11ac-VHT40	29
	802.11ac-VHT80	24

<Beamforming Mode>

	Mode	Maximum Average Power (dBm)
2.4GHz WLAN	802.11b	
	802.11g	
	802.11n-HT20	26
	802.11n-HT40	25
	802.11ac-VHT20	23
	802.11ac-VHT40	25
5GHz WLAN	802.11a	
	802.11n-HT20	29
	802.11n-HT40	29
	802.11ac-VHT20	29
	802.11ac-VHT40	29
	802.11ac-VHT80	29



3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	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	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 22 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

<Non-Beamforming Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN	2412.0	2.00	28.00	30.000	1.000	1000.000	0.164	1.000	0.164
5GHz WLAN	5180.0	3.10	29.00	32.100	1.622	1621.810	0.267	1.000	0.267

<Beamforming Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
2.4GHz WLAN	2412.0	5.01	26.00	31.010	1.262	1261.828	0.208	1.000	0.208
5GHz WLAN	5180.0	6.01	29.00	35.010	3.170	3169.567	0.521	1.000	0.521

Note:

- For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band
- For this device supports Beamforming for WLAN 2.4GHz HT20/HT40/VHT20/VHT40 and WLAN 5.2GHz/5.8GHz HT20/HT40/VHT20/VHT40/VHT80; therefore, in the table above which consider maximum directional Gain 5.01dBi / 6.01dBi for WLAN2.4GHz / WLAN5GHz Beamforming mode.

4.2. Collocated Power Density Calculation

Maximum 2.4GHz WLAN Power Density / Limit	Maximum 5GHz WLAN Power Density / Limit	Σ (Power Density / Limit) of 2.4GHz WLAN + 5GHz WLAN
0.208	0.521	0.729

Note:

- Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for 2.4GHz WLAN + 5GHz WLAN.
- Considering the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.