



# 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  
**Manufacturer** : Cisco Systems, Inc.  
170 West Tasman Drive, San Jose, CA 95134  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full

Approved by: Cona Huang / Deputy Manager



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### History of this test report

Report No.	Version	Description	Issued Date
FA832026-04	Rev. 01	Initial issue of report	Dec. 28, 2020



**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: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80
HW Version	0.2
SW Version	T-201807131655-Geff7ac40
EUT Stage	Identical Prototype
<b>Remark:</b> 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. Variant report to enable WLAN 5.3GHz & 5.6GHz.	

**Reviewed by: Jason Wang**

**Report Producer: Daisy Peng**



**2. Maximum RF average output power among production units**

<Non-beamforming mode>

Mode		Maximum Average Power (dBm)		
		Ant 1	Ant 2	MIMO
5 GHz Band II WLAN	11a	19.00	19.00	22.00
	11a	19.50	19.50	22.50
	11a	20.00	20.00	23.00
	HT20	19.50	19.50	22.50
	HT20	20.00	20.00	23.00
	HT20	20.00	20.00	23.00
	HT40	21.00	21.00	24.00
	HT40	17.00	17.00	20.00
	VHT20	19.50	19.50	22.50
	VHT20	20.00	20.00	23.00
	VHT20	20.00	20.00	23.00
	VHT40	21.00	21.00	24.00
	VHT40	16.50	16.50	19.50
	VHT80	15.00	15.00	18.00

Mode		Maximum Average Power (dBm)		
		Ant 1	Ant 2	MIMO
5 GHz Band III WLAN	11a	19.00	19.00	22.00
	11a	19.00	19.00	22.00
	11a	20.50	20.50	23.50
	11a	20.50	20.50	23.50
	HT20	19.50	19.50	22.50
	HT20	19.00	19.00	22.00
	HT20	20.50	20.50	23.50
	HT20	20.50	20.50	23.50
	HT40	20.50	20.50	23.50
	HT40	15.00	15.00	18.00
	HT40	21.50	21.50	24.50
	HT40	21.50	21.50	24.50
	VHT20	19.00	19.00	22.00
	VHT20	19.00	19.00	22.00
	VHT20	20.50	20.50	23.50
	VHT20	20.50	20.50	23.50
	VHT40	20.00	20.00	23.00
	VHT40	15.00	15.00	18.00
	VHT40	21.50	21.50	24.50
	VHT40	21.50	21.50	24.50
VHT80	18.00	18.00	21.00	
VHT80	21.00	21.00	24.00	
VHT80	21.50	21.50	24.50	



**<Beamforming mode>**

Mode		Maximum Average Power (dBm)		
		Ant 1	Ant 2	MIMO
5 GHz Band II WLAN	HT20	16.50	16.50	19.50
	HT20	17.00	17.00	20.00
	HT20	17.00	17.00	20.00
	HT40	18.00	18.00	21.00
	HT40	14.00	14.00	17.00
	VHT20	16.50	16.50	19.50
	VHT20	17.00	17.00	20.00
	VHT20	17.00	17.00	20.00
	VHT40	18.00	18.00	21.00
	VHT40	13.50	13.50	16.50
VHT80	12.00	12.00	15.00	

Mode		Maximum Average Power (dBm)		
		Ant 1	Ant 2	MIMO
5 GHz Band III WLAN	HT20	16.50	16.50	19.50
	HT20	16.00	16.00	19.00
	HT20	17.50	17.50	20.50
	HT20	17.50	17.50	20.50
	HT40	17.50	17.50	20.50
	HT40	12.00	12.00	15.00
	HT40	18.50	18.50	21.50
	HT40	18.50	18.50	21.50
	VHT20	16.00	16.00	19.00
	VHT20	16.00	16.00	19.00
	VHT20	17.50	17.50	20.50
	VHT20	17.50	17.50	20.50
	VHT40	17.00	17.00	20.00
	VHT40	12.00	12.00	15.00
	VHT40	18.50	18.50	21.50
	VHT40	18.50	18.50	21.50
	VHT80	15.00	15.00	18.00
VHT80	18.00	18.00	21.00	
VHT80	18.50	18.50	21.50	



### 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</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
300-1500			f/300	6
1500-100,000			5	6
<b>(B) 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
300-1500			f/1500	30
1500-100,000			1.0	30

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:

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

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	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
WLAN5GHz Band	3.10	24.50	27.60	0.58	575.44	0.115	1.000	0.115

**<Beamforming mode>**

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
WLAN5GHz Band	6.11	21.50	27.61	0.58	576.77	0.115	1.000	0.115

**Note:**

1. For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.
2. For this device supports Beamforming for WLAN 5GHz HT20/HT40/VHT20/VHT40/VHT80; therefore, in the table above which consider maximum directional gain 6.76dBi for WLAN5GHz Beamforming mode.

### **4.2. Collocated Power Density Calculation**

Maximum 2.4GHz WLAN Power Density / Limit	Maximum 5GHz WLAN Power Density / Limit	$\Sigma$ (Power Density / Limit) of 2.4GHz WLAN + 5GHz WLAN
0.208	0.115	0.323

**Note:**

1. For 2.4GHz WLAN / 5.2GHz WLAN / 5.8GHz WLAN standalone power density calculation can refer to Sporton RF Exposure Evaluation Original Report, Report No: FA832026.
2.  $\Sigma$ (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.
3. 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.