



## RF Exposure Evaluation Declaration

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**FCC ID:** SFK-WF180

**APPLICANT:** CIG Shanghai Co., Ltd.

**Application Type:** Certification

**Product:** 2x2 dual band 802.11ac indoor AP

**Model No.:** WF-180

**FCC Classification:** Digital Transmission System (DTS)  
Unlicensed National Information Infrastructure (UNII)

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( Robin Wu )

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( Marlin Chen )



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

Report No.	Version	Description	Issue Date
1410RSU03104	Rev. 01	Initial report	11-24-2014

# 1. PRODUCT INFORMATION

## 1.1. Equipment Description

Product Name	2x2 dual band 802.11ac indoor AP
Model No.	WF-180
Frequency Range	<p><b><u>For 2.4G Band:</u></b>            802.11b/g/n-HT20:            2412 ~ 2462MHz            802.11n-HT40:            2422 ~ 2452MHz</p> <p><b><u>For 5.0G Band:</u></b>            For 802.11a/n-HT20/ac-VHT20:            5180~5240MHz, 5745~5825MHz            For 802.11n-HT40/ac-VHT40:            5190~5230MHz, 5755~5795MHz            For 802.11ac-VHT80:            5210MHz, 5775MHz</p>
Type of Modulation	802.11b: DSSS 802.11g/a/n/ac: OFDM
Maximum Average Output Power	802.11b: 18.58dBm 802.11g: 18.69dBm 802.11n-HT20: 18.06dBm 802.11n-HT40: 18.28dBm 802.11a: 18.18dBm 802.11n-HT20: 18.53dBm 802.11n-HT40: 17.65dBm 802.11ac-VHT20: 17.20dBm 802.11ac-VHT40: 16.23dBm 802.11ac-VHT80: 15.61dBm
Adapter	M/N: RD1201000-C5-HOG P/N: JQ-HOG2-1210-21R5 Input: 100-240V ~ 50/60Hz 0.6A MAX OUTPUT: 12Vdc, 1A

## 1.2. Antenna Description

Antenna Type	Frequency Band (GHz)	T <sub>x</sub> Paths	Directional Gain (dBi)	
			Non Beam Forming	Beam Forming
PCB Antenna	2.4	2	1.95	--
	5.2	2	1.67	4.67
	5.8	2	1.87	4.87

Note:

1. Transmit at 2.4GHz & 5GHz support two antennas.
2. The EUT supports Beam Forming mode, and the Beam Forming support 802.11a/n/ac.

## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$r$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

## 2.2. Test Result of RF Exposure Evaluation

Product	2x2 dual band 802.11ac indoor AP
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.95dBi for 2.4GHz, 1.67dBi for 5.2GHz, and 1.87dBi for 5.8GHz in logarithm scale.

### For 2.4G ISM Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	2412 ~ 2462	18.58	0.0225	1
802.11g	2412 ~ 2462	18.69	0.0231	1
802.11n-HT20	2412 ~ 2462	18.06	0.0199	1
802.11n-HT40	2422 ~ 2452	18.28	0.0210	1

### For 5G UNII Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11a	5180 ~ 5240	18.02	0.0185	1
	5745 ~ 5825	18.18	0.0192	1
802.11n-HT20	5180 ~ 5240	17.99	0.0184	1
	5745 ~ 5825	18.53	0.0208	1
802.11n-HT40	5190 ~ 5230	16.87	0.0142	1
	5755 ~ 5795	17.65	0.0170	1
802.11ac-VHT20	5180 ~ 5240	16.54	0.0132	1
	5745 ~ 5825	17.20	0.0153	1
802.11ac-VHT40	5190 ~ 5230	15.34	0.0100	1
	5755 ~ 5795	16.23	0.0123	1
802.11ac-VHT80	5210	10.01	0.0029	1
	5775	15.61	0.0106	1

**CONCLUSION:**

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously. Therefore, the Max Power Density at R (20 cm) =  $0.0231\text{mW}/\text{cm}^2 + 0.0208\text{mW}/\text{cm}^2 = 0.0439\text{mW}/\text{cm}^2 < 1\text{mW}/\text{cm}^2$ . So the EUT complies with the requirement.

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The End