



## RF Exposure Evaluation Declaration

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**FCC ID:** SFK-WF96A

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

**Application Type:** Certification

**Product:** WF-96A 802.11ac 2x2 5G CPE

**Model No.:** WF-96A

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

Reviewed By :

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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.

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## Revision History

Report No.	Version	Description	Issue Date
1506RSU01502	Rev. 01	Initial report	08-04-2015

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

Product Name	WF-96A 802.11ac 2x2 5G CPE
Model No.	WF-96A
Frequency Range	<b>For 5.0GHz Band:</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
Type of Modulation	a/n/ac: OFDM
Maximum Average Output Power	802.11a: 27.88dBm 802.11n-HT20: 27.72dBm 802.11n-HT40: 23.86dBm 802.11ac-VHT20: 28.83dBm 802.11ac-VHT40: 26.59dBm 802.11ac-VHT80: 16.53dBm

### 1.2. Description of Support Units

The EUT has been tested with associated equipment below:

Description	Manufacturer	Model No.
POE	Supply by MRT	PD-3501G/AC

### 1.3. Antenna Description

Antenna Type	Frequency Band (GHz)	Tx Paths	Max Peak Gain (dBi)	Beam Forming Directional Gain (dBi)	CDD Directional Gain (dBi)	
					For Power	For PSD
PCB Antenna	5	2	16	19	16	19

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated. For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ .
  - 1) If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT} + \text{Array Gain}$ , where Array Gain is as follows.
    - For power spectral density (PSD) measurements on all devices, Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB = 6.02;
    - For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for  $N_{ANT} \leq 4$ ;
2. The EUT supports Beam Forming mode, and the Beam Forming mode support 802.11n/ac, not include 802.11a. Correlated signals include, but are not limited to, signals transmitted in any of the following modes:
 

Any transmit Beam Forming mode, whether fixed or adaptive (e.g., phased array modes, closed loop MIMO modes, Transmitter Adaptive Antenna modes, Maximum Ratio Transmission (MRT) modes, and Statistical Eigen Beam Forming (EBF) modes).

  - Unequal antenna gains, with equal transmit powers. For antenna gains given by  $G_1, G_2, \dots, G_N$  dBi transmit signals are correlated, then
  - Directional gain =  $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$  dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

## 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:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

Pout = 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

Pd 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	WF-96A 802.11ac 2x2 5G CPE
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 19dBi for 5.2GHz, and 19dBi for 5.8GHz in logarithm scale.

### For 5GHz UNII Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Limit of Power Density S(mW/cm <sup>2</sup> )	Safety Distance (cm)
802.11a	5180 ~ 5240	27.23	1	57.80
	5745 ~ 5825	27.88	1	62.29
802.11n-HT20	5180 ~ 5240	27.59	1	60.24
	5745 ~ 5825	27.72	1	61.15
802.11n-HT40	5190 ~ 5230	26.64	1	54.00
	5755 ~ 5795	25.13	1	45.38
802.11ac-VHT20	5180 ~ 5240	28.33	1	65.60
	5745 ~ 5825	27.72	1	61.15
802.11ac-VHT40	5190 ~ 5230	26.59	1	53.69
	5755 ~ 5795	25.13	1	45.38
802.11ac-VHT80	5210	16.53	1	16.86
	5775	10.17	1	8.11

### CONCLUSION:

The Safety Distance of the **WF-96A 802.11ac 2x2 5G CPE FCC ID: SFK-WF96A** was 65.60 cm.

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