

RF Exposure Evaluation Declaration

FCC ID: 2AR82-SKIWB7638U1
Applicant: Guangzhou Shikun Electronics Co., Ltd
Product: IEEE 802.11a/b/g/n 2T2R USB Wi-Fi Module
Model No.: SKI.WB7638U.1_ MT7638BU
FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s): FCC Part 2 (Section 2.1091)

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



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	Note
2208RSU019-U3	Rev. 01	Initial Report	2022-08-31	Valid

Note: This is a Class II permissive Change project due to the product adding two antennas with higher gain than before.

CONTENTS

Description	Page
1. General Information	4
1.1. Applicant.....	4
1.2. Manufacturer	4
1.3. Testing Facility.....	4
1.4. Product Information	5
1.5. Antenna Details.....	5
2. RF Exposure Evaluation.....	6
2.1. Test Limits	6
2.2. Test Result.....	7

1.4. Product Information

Product Name	IEEE 802.11a/b/g/n 2T2R USB Wi-Fi Module
Model No.	SKI.WB7638U.1_MT7638BU
Wi-Fi Specification	802.11a/b/g/n
Antenna Information	Refer to Selection 1.5
Working Voltage	Input DC 3.3V
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Antenna Details

Antenna Type	Frequency Band (MHz)	Max Peak Gain (dBi)	CDD Directional Gain (dBi)	
			For Power	For PSD
Antenna 1# (2*2 MIMO)				
PIFA	2400 ~ 2483.5	3.91	3.91	6.92
	5150 ~ 5250	2.80	2.80	5.81
	5250 ~ 5350	2.59	2.59	5.60
	5470 ~ 5725	3.10	3.10	6.11
	5725 ~ 5850	3.53	3.53	6.54
Antenna 2# (2*2 MIMO)				
PIFA	2400 ~ 2483.5	4.43	4.43	7.44
	5150 ~ 5250	3.26	3.26	6.27
	5250 ~ 5350	3.52	3.52	6.53
	5470 ~ 5725	4.39	4.39	7.40
	5725 ~ 5850	4.60	4.60	7.61

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

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,

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$

- For power measurements on IEEE 802.11 devices,

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$

2. We selected the max peak gain antenna 2# to perform all RF testing.

2. RF Exposure Evaluation

2.1. Test 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 ²)	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/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1mW/cm². 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

Product	IEEE 802.11a/b/g/n 2T2R USB Wi-Fi Module
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.5.

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Compliance Distance (cm)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
802.11b/g/n	2412 ~ 2462	22.71	20.00	0.0371	1
802.11a/n	5180 ~ 5825	21.14	20.00	0.0259	1

Note:

1. R=20cm is specified by the manufacturer.
2. WIFI 2.4G and WIFI 5G cannot transmit simultaneously.

CONCLUSION:

The max Power Density at R (20.00 cm) = 0.0371mW/cm² < 1mW/cm².

So the compliance distance is 20.0cm for device installed without any other radio equipment.

_____ The End _____