RF Exposure Evaluation Declaration

FCC ID:	2AR82-SKIWB921A5
Applicant:	Guangzhou Shikun Electronics Co., Ltd
Product:	IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2
Model No.:	SKI.WB921A.5
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII) 15E 6GHz Low Power Indoor Client (6XD)
FCC Rule Part(s)	FCC Part 2.1091
Test Procedure	KDB 447498 D04 Interim General RF Exposure Guidance v01

Reviewed By: Vincent Yu

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2112RSU080-U7	Rev. 01	Initial Report	04-18-2022	Valid

CONTENTS

1. General Information

1.1. Applicant

Guangzhou Shikun Electronics Co., Ltd

NO.6 Liankun Road, Huangpu District, Guangzhou, China

1.2. Manufacturer

Guangzhou Shikun Electronics Co., Ltd

NO.6 Liankun Road, Huangpu District, Guangzhou, China

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2
Model No.	SKI.WB921A.5
EUT Identification No.	20211228Sample#09
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	BT2.1+EDR/4.2/5.2 with BLE
Antenna Information	Refer to Section 1.5
Operating Voltage	3.3Vdc+/-0.3
Operating Temperature	0°C to +40°C
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 (GHz)	Max Peak Gain (dBi)	CDD Directional Gain (dBi)	
			For Power	For PSD
Wi-Fi Antenna (2T2R)				
PIFA	2.4 ~ 2.5	3.76	3.76	6.77
	5.15 ~ 5.9	3.79	3.79	6.80
	5.9 ~ 7.2	3.80	3.80	6.81
Bluetooth Antenna (2T2R)				
PIFA	2.4 ~ 2.5	2.65		

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
2. Bluetooth supports 2T2R, and two antennas cannot transmit simultaneously.

1.6. Device Classification

According to the user manual, the antenna of this device is at least 20cm away from the body of the user, this device is classified as a **Mobile Device**. This device is designed to be installed on TV mainboard, so end product is thus various mobile devices such as televisions, digital interactive whiteboards or digital signage displays.

Therefore, the RF exposure evaluation requirements of FCC Part 2.1091 for mobile device exposure conditions subject to MPE limits.

2. RF Exposure Evaluation

2.1. Test Limits

According to FCC Part 2.1091, A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons.

According to FCC Part 1.1307(b)(3)(i)(C), for the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1.920 R^2
1.34-30	3.450 R^2/f^2
30-300	3.83 R^2
300-1500	0.0128 R^2f
1500-100,000	19.2 R^2
f = frequency in MHz, R = minimum separation distance in meters.	

According to FCC Part 1.1307(b)(3)(ii)(B), in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

2.2. Test Result

Product	IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Max. Antenna Gain (dBi)	EIRP (dBm)	ERP (W)	Compliance Distance (R) (m)	Threshold ERP (W)
Bluetooth-BR/EDR	2402 ~ 2480	6.25	2.65	8.90	0.005	0.2	0.768
Bluetooth-LE	2402 ~ 2480	6.11	2.65	8.76	0.005	0.2	0.768
802.11b/g/n	2412 ~ 2462	19.00	3.76	22.76	0.115	0.2	0.768
802.11a/n/ac/ax	5180 ~ 5825	19.33	3.79	23.12	0.125	0.2	0.768
802.11ax	5955 ~ 7095	5.62	3.80	9.42	0.005	0.2	0.768

Note:

1. EIRP (dBm) = Max. Conducted Power (dBm) + Max. Antenna Gain (dBi)
2. ERP (W) = $10^{[ERP\ (dBm) - 30)]/10}$ = $10^{[EIRP\ (dBm) - 2.15\ (dB) - 30]/10}$
3. Threshold ERP (W) = 19.2 * R^2 (W) = 19.2 * 0.2^2 (W) = 0.768 (W)

The Bluetooth (BR/EDR/BLE) can transmit simultaneously with Wi-Fi (802.11/a/b/g/n/ac/ax).

Exposure Ratio = 0.005 / 0.768 + 0.125 / 0.768 = 0.169 < 1.

Therefore, this device meets the RF Exposure requirements when it is installed and operated with a minimum distance of 20cm between the radiator and user.

The End