

FCC RF EXPOSURE REPORT

For

IEEE 802.11b/g/n/a/ac/ax 2T2R PCIE WiFi Module Integrated BT 2.1+EDR/4.2/5.3

MODEL NUMBER: SKO.WB276P.1

REPORT NUMBER: 4791083360-RF-6

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Prepared for

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Prepared by

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Revision History

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V0	December 25, 2023	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Guangzhou Shikun Electronics Co., Ltd
Address: NO.6 Liankun Road, Huangpu District, Guangzhou China

Manufacturer Information

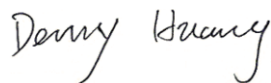
Company Name: Guangzhou Shikun Electronics Co., Ltd
Address: NO.6 Liankun Road, Huangpu District, Guangzhou China

EUT Information

EUT Name: IEEE 802.11b/g/n/a/ac/ax 2T2R PCIE WiFi Module Integrated BT 2.1+EDR/4.2/5.3
Model: SKO.WB276P.1
Brand: /
Sample Received Date: November 27, 2023
Sample Status: Normal
Date of Tested: November 27, 2023 to December 20, 2023

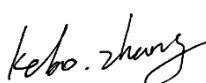
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47CFR§2.1091	PASS
KDB 447498 D04	PASS

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with 47 CFR FCC Part 1 Subpart I, section 1.1307 and KDB 447498 D04 Interim General RF Exposure Guidance v01.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. VCCI (Registration No.: G-20192, R-20202, C-20153 and T-20155) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20192 and C-20153 Shielding Room B, the VCCI registration No. is C-20153 and T-20155
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Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.

4. DESCRIPTION OF EUT

EUT Name:		IEEE 802.11b/g/n/a/ac/ax 2T2R PCIE WiFi Module Integrated BT 2.1+EDR/4.2/5.3
Model:		SKO.WB276P.1
Product Description (2.4G WLAN)	Frequency Range:	2412 MHz to 2462 MHz
	Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (1024-QAM, 64-QAM, 16-QAM, QPSK, BPSK)
	Radio Technology:	IEEE802.11b/g/n HT20/ax HE20
Product Description (5G RLAN)	Frequency Range:	U-NII-1 Band: 5180 MHz to 5240 MHz U-NII-2A Band: 5260 MHz to 5320 MHz U-NII-2C Band: 5500 MHz to 5700 MHz U-NII-3 Band: 5745 MHz to 5825 MHz
	Type of Modulation:	IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
	Radio Technology:	IEEE802.11a/n HT20/n HT40/ ac VHT20/ac VHT40/ac VHT80/ ax HE20/ax HE40/ax HE80
Product Description (6G RLAN)	Operation Frequency:	UNII-5 Band: 5925 MHz ~ 6425 MHz UNII-6 Band: 6425 MHz ~ 6525 MHz
	Type of Modulation:	IEEE 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
	Radio Technology:	IEEE802.11ax HE20/ax HE40/ax HE80
Ratings		DC 3.3 V

5. REQUIREMENT

LIMIT AND CALCULATION METHOD

According to 447498 D04 Interim General RF Exposure Guidance v01,

2.1.4 MPE-Based Exemption

An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.¹⁰ For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

B.4 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

MPE-based Exemption

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

Fixed RF sources operating in the same time-averaging period- § 1.1307(b)(3)(ii)(B)

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated $_k$ term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1 \quad (\text{C.1})$$

CALCULATED RESULTS**For Single RF Source**

Operating Mode	Max. Tune up Power	Antenna Gain	EIRP	ERP	ERP	Distance	Limit Threshold
	(dBm)	(dBi)	(dBm)	(dBm)	(mW)	(cm)	(mW)
BT	9.9	3.83	13.73	11.58	14.39	20	3060
WIFI 2.4GHz	20	3.83	23.83	21.68	147.23	20	3060
WIFI 5GHz	17	5.52	22.52	20.37	108.89	20	3060
WIFI 6GHz	7	5.84	12.84	10.69	11.72	20	3060

For Simultaneous Transmissions

Operating Mode	ERP	Limit Threshold	Ratio	Sum of Ratios	Limit of Ratios
	(mW)	(mW)			
BT	14.39	3060	0.00470	0.05276	1
WIFI 2.4GHz	147.23	3060	0.04806		

Note:

1. The calculated distance is 20 cm.
2. The power comes from operation description.
3. When sharing a common antenna, only BLE/BT & WLAN 5GHz, BLE/BT& WLAN 6GHz can transmit simultaneously; When working in different antennas, BT/BLE & WLAN 2.4GH can transmit simultaneously.
4. All modes had been evaluated, but only the worst data was recorded in the report.

END OF REPORT