

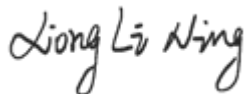
TEST REPORT

Applicant: Sichuan AI-Link Technology Co., Ltd.
Address: Anzhou, Industrial park, Mianyang, Sichuan, P.R.C
Equipment Type: WIFI Module
Model Name: WF-R92F-USH1
Brand Name: AI-LINK
FCC ID: 2AOKI-ALR92F1
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Jul. 03, 2023
Test Date: Jul. 10, 2023 - Jul. 14, 2023
Date of Issue: Aug. 02, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining



Checked by: Xu Rui



Approved by: Tolan Tu
(Testing Director)



Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Aug. 02, 2023</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION.....	3
1.1	Test Laboratory	3
1.2	Test Location	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information	4
2.2	Manufacturer Information.....	4
2.3	Factory Information.....	4
2.4	General Description for Equipment under Test (EUT).....	4
2.5	Ancillary Equipment.....	4
2.6	Technical Information	5
3	SUMMARY OF TEST RESULT	6
3.1	Test Standards	6
4	DEVICE CATEGORY AND LEVELS LIMITS	7
5	ASSESSMENT RESULT	9
5.1	Output Power	9
5.2	Tune-up power	9
5.3	RF Exposure Evaluation Result	9
5.4	Collocated Power Calculation	10
5.5	Conclusion.....	10

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Sichuan AI-Link Technology Co., Ltd.
Address	Anzhou, Industrial park, Mianyang, Sichuan, P.R.C

2.2 Manufacturer Information

Manufacturer	Sichuan AI-Link Technology Co., Ltd.
Address	Anzhou, Industrial park, Mianyang, Sichuan, P.R.C

2.3 Factory Information

Factory	Sichuan AI-Link Technology Co., Ltd.
Address	Anzhou, Industrial park, Mianyang, Sichuan, P.R.C

2.4 General Description for Equipment under Test (EUT)

EUT Name	WIFI Module
Model Name Under Test	WF-R92F-USH1
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	JUI7.820.1436-1
Software Version	1030.40.128.2019
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40)
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WLAN	
Frequency Range	802.11b/g	2412 ~ 2462 MHz
	802.11n(HT20/HT40)	2422 ~ 2452 MHz
Antenna Type	WLAN	PIFA
Exposure Category	General Population/Uncontrolled Exposure	
EUT Type	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Device:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, 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 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

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).

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

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

5 ASSESSMENT RESULT

5.1 Output Power

Mode	2.4G WLAN				
	Main Antenna	Aux. Antenna	MIMO-Main Antenna	MIMO-Aux. Antenna	MIMO
Conducted Power (dBm)	16.89	16.90	10.93	10.83	13.88
Antenna Gain (dBi)	2.32				
EIRP (dBm)	19.21	19.22	13.25	13.15	16.20

Note: This report listed the worst case power value, please refer to BL-SZ2370140-601 report for more details.

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
2.4G WLAN Main Antenna	[15.00, 17.00]	[18.00, 20.00]	[15.85, 17.85]
2.4G WLAN Aux. Antenna	[15.00, 17.00]	[18.00, 20.00]	[15.85, 17.85]
2.4G WLAN MIMO-Main Antenna	[9.00, 11.00]	[12.00, 14.00]	[9.85, 11.85]
2.4G WLAN MIMO-Aux. Antenna	[9.00, 11.00]	[12.00, 14.00]	[9.85, 11.85]
2.4G WLAN MIMO	[12.00, 14.00]	[15.00, 17.00]	[12.85, 14.85]

Note 1: ERP= EIRP -2.15dB.
Note 2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

5.3 RF Exposure Evaluation Result

Mode	Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
2.4G WLAN Main Antenna	17.85	60.95	200	3060.00	0.02	Pass
2.4G WLAN Aux. Antenna	17.85	60.95	200	3060.00	0.02	Pass
2.4G WLAN MIMO-Main Antenna	11.85	15.31	200	3060.00	0.01	Pass
2.4G WLAN MIMO-Aux. Antenna	11.85	15.31	200	3060.00	0.01	Pass
2.4G WLAN MIMO	14.85	30.55	200	3060.00	0.01	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency(MHz)	Power / Limit	Σ (Power / Limit) of 2.4G WLAN Main Antenna + 2.4G WLAN Aux. Antenna	Verdict
2.4G WLAN Main Antenna	2462	0.02	0.04	Pass
2.4G WLAN Aux. Antenna	2462	0.02		

Note:

1. Σ (Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for 2.4G WLAN Main Antenna + 2.4G WLAN Aux. Antenna.
2. Both of the 2.4G WLAN Main Antenna and 2.4G WLAN Aux. Antenna can transmit simultaneously, the formula of calculated the Power is
 $CP1 / LP1 + CP2 / LP2 + \dots \text{etc.} < 1$
 CP = Calculation power
 LP = Limit of power
3. The worst-case situation is 0.04, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. The DUT work frequency range used is 2412 MHz ~ 2462 MHz and 2422 MHz~2452 MHz he result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
5. More power list please refer to RF test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

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--END OF REPORT--