

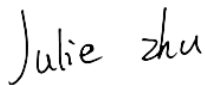
TEST REPORT

Applicant: E&S International Enterprises, Inc.
Address: 7801 Hayvenhurst Avenue, Van Nuys, California
91406, United States.
Equipment Type: LAPTOP
Model Name: PC8970C11L (refer section 2.4)
Brand Name: VAIO
FCC ID: 2AYPE-VWFC14INCH
Test Standard: 47 CFR Part 2.1093
KDB 447498 D04 v01
Sample Arrival Date: Mar. 01, 2023
Test Date: Mar. 07, 2023 - Apr. 01, 2023
Date of Issue: Apr. 03, 2023

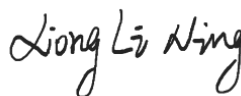
ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie zhu



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Approved by: Tolan Tu

(Testing Director)



Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Apr. 03, 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	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	E&S International Enterprises, Inc.
Address	7801 Hayvenhurst Avenue, Van Nuys, California 91406, United States.

2.2 Manufacturer Information

Manufacturer	E&S International Enterprises, Inc.
Address	7801 Hayvenhurst Avenue, Van Nuys, California 91406, United States.

2.3 Factory Information

Factory	E&S International Enterprises, Inc.
Address	7801 Hayvenhurst Avenue, Van Nuys, California 91406, United States.

2.4 General Description for Equipment under Test (EUT)

EUT Name	LAPTOP
Model Name Under Test	PC8970C11L
Series Model Name	PC897xxxxx (x can be 0-9, A-Z, a-z, dash or blank)
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name (this information provided by the customer).
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	VAIO
	Model No.	VJ8BPS61
	Serial No.	N/A
	Capacity	6644 mAh
	Rated Voltage	7.7V
	Limit Charge Voltage	8.8V
	Manufacturer	Dongguan Ampere Technology Limited

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac and 802.11ax U-NII-1/2A/2C/3
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth; WLAN	
Frequency Range	802.11b/g/n(HT20)/ax(HE20)	2412 MHz ~ 2472 MHz
	802.11n(HT40)/ax(HE40)	2422 MHz ~ 2462 MHz
	802.11a /n(HT20/HT40) /ac(VHT20/VHT40/VHT80) /ax(HE20/HE40/HE80)	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
		5725 MHz ~ 5850 MHz
	Bluetooth	2400 ~ 2483.5 MHz
Antenna Type	WLAN	PIFA
	Bluetooth	PIFA
Exposure Category	General Population/Uncontrolled Exposure	
EUT Type	Portable Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices
2	KDB 447498 D04 v01	KDB 447498 D04 Interim General RF Exposure Guidance v01

4 DEVICE CATEGORY AND LEVELS LIMITS

Portable Derives:

CFR Title 47 §2.1093(b)

(b) For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

FCC KDB 447498 Derives:

According with FCC KDB 447498 D04, Appendix B, The SAR-based exemption formula 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). The following table shows the power threshold from 5mm to 50mm.

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

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
2. Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D04, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D04, for separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive), the threshold Pth (mW) is given by Following:

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

where

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

- a. f(GHz) is the RF channel transmit frequency in GHz
- b. d is the separation distance (cm), The result is rounded to one decimal place for comparison
- c. ERP_{20cm} are determined by:

$$ERP_{20cm} (mW) = f(x) = \begin{cases} 2040f & 0.3GHz \leq f < 1.5GHz \\ 3060 & 1.5GHz \leq f \leq 6GHz \end{cases}$$

5 ASSESSMENT RESULT

5.1 Output Power

Mode	Bluetooth	WLAN 2.4G Aux.	WLAN 2.4G Main	WLAN 2.4G MIMO	WLAN 5G Aux.	WLAN 5G Main	WLAN 5G MIMO
Conducted Power (dBm)	9.67	19.65	19.89	19.26	19.98	19.97	19.97
Antenna Gain (dBi)	2.88	2.90	2.88	2.90	1.56	0.87	1.56
EIRP (dBm)	12.55	22.55	22.77	22.16	21.54	20.84	21.53

Note: This report listed the worst case power value, please refer to BL-SZ2330184-601~604 report for more details.

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
Bluetooth	[8.00, 10.00]	[11.00, 13.00]	[8.85, 10.85]
WLAN 2.4G Aux.	[18.00, 20.00]	[21.00, 23.00]	[18.85, 20.85]
WLAN 2.4G Main	[18.00, 20.00]	[21.00, 23.00]	[18.85, 20.85]
WLAN 2.4G MIMO	[18.00, 20.00]	[21.00, 23.00]	[18.85, 20.85]
WLAN 5G Aux.	[18.00, 20.00]	[20.00, 22.00]	[17.85, 19.85]
WLAN 5G Main	[18.00, 20.00]	[20.00, 22.00]	[17.85, 19.85]
WLAN 5G MIMO	[18.00, 20.00]	[20.00, 22.00]	[17.85, 19.85]

Note1: ERP= EIRP -2.15dB
Note2: 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	Distance (mm)	Calculation Frequency (GHz)	Tune-up limit power (dBm)	Tune-up limit power (mW)	Threshold Value (mW)	Power/Limit	Verdict
Bluetooth	213	2.402	10.85	12.16	3448.47	0.004	Pass
WLAN 2.4G Aux.	213	2.412	20.85	121.62	3448.67	0.035	Pass
WLAN 2.4G Main	213	2.412	20.85	121.62	3448.67	0.035	Pass
WLAN 2.4G MIMO	213	2.412	20.85	121.62	3448.67	0.035	Pass
WLAN 5G Aux.	213	5.750	20.00	100.00	3489.88	0.029	Pass
WLAN 5G Main	213	5.750	20.00	100.00	3489.88	0.029	Pass
WLAN 5G MIMO	213	5.750	20.00	100.00	3489.88	0.029	Pass

Collocated Power Density Calculation

Evolution mode	Frequency (GHz)	Power/Limit	Σ (Power/Limit) of WLAN 2.4G Aux. + WLAN 2.4G Main	Verdict
WLAN 2.4G Aux.	2.412	0.035	0.070	Pass
WLAN 2.4G Main	2.412	0.035		Pass
Evolution mode	Frequency (GHz)	Power/Limit	Σ (Power/Limit) of Bluetooth + WLAN 2.4G Main	Verdict
Bluetooth	2.402	0.004	0.039	Pass
WLAN 2.4G Main	2.412	0.035		Pass
Evolution mode	Frequency (GHz)	Power/Limit	Σ (Power/Limit) of Bluetooth + WLAN 5G Aux. + WLAN 5G Main	Verdict
Bluetooth	2.402	0.004	0.062	Pass
WLAN 5G Aux.	5.750	0.029		Pass
WLAN 5G Main	5.750	0.029		Pass

Note:

- Σ (Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for WLAN 2.4G Aux. + WLAN 2.4G Main, Bluetooth + WLAN 2.4G Main, Bluetooth + WLAN 5G Aux. + WLAN 5G Main.
- Transmit simultaneously the formula of calculated the Power is
 $CP1 / LP1 + CP2 / LP2 + \dots \text{etc.} < 1$
 CP = Calculation power
 LP = Limit of power
- Both of the WLAN 2.4G and WLAN 5G can't transmit simultaneously at same time.
- The worst-case situation is 0.070, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
- The DUT work frequency range used is 2400 MHz ~ 2483.5 MHz, 2412 MHz ~ 2472 MHz, 2422 MHz ~ 2462 MHz, 5150 MHz~ 5250 MHz, 5250 MHz ~ 5350 MHz, 5470 MHz ~ 5725 MHz and 5725 MHz ~ 5850 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
- More power list please refer to RF test report.

5.4 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--