# TEST REPORT

| | |
|---|---|
| **Applicant:** | E&S International Enterprises, Inc. |
| **Address:** | 7801 Hayvenhurst Avenue, Van Nuys, California 91406, United States |
| **Equipment Type:** | All-in-one PC |
| **Model Name:** | RWBN12444 (refer to section 2.3) |
| **Brand Name:** | RCA |
| **FCC ID:** | 2AYPE-RWBN12444 |
| **Test Standard:** | 47 CFR Part 2.1091<br>KDB 447498 D04 v01 |
| **Sample Arrival Date:** | Jun. 17, 2024 |
| **Test Date:** | Jun. 21, 2024 - Aug. 07, 2024 |
| **Date of Issue:** | Aug. 15, 2024 |

**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 |
|---|---|---|
| Rev. 01 | Aug. 15, 2024 | Initial Issue |

# TABLE OF CONTENTS

# 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 | ☐ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| | ☑ 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 | Shenzhen Yuko Technology Co., Ltd. |
| Address | 6th, A9 Bldg, Tianrui Industrial Park, Fuyuan 1st Rd, Fuyong, Boanan, Shenzhen |

## 2.3 General Description for Equipment under Test (EUT)

| | |
|---|---|
| EUT Name | All-in-one PC |
| Model Name Under Test | RWBN12444 |
| Series Model Name | RWBN12444-GRY, E238 |
| Description of Model name differentiation | All models are same with electrical parameters and internal circuit structure, but only differ in shell color. (this information provided by the applicant) |
| Hardware Version | N/A |
| Software Version | 23H2 |
| Dimensions (Approx.) | N/A |
| Weight (Approx.) | N/A |

## 2.4 Technical Information

| | |
|---|---|
| Network and Wireless connectivity | Bluetooth (BR+EDR+BLE)<br>WIFI 802.11a, 802.11b, 802.11g, 802.11n(HT20/40) and 802.11ac(VHT20/40/80) |

The requirement for the following technical information of the EUT was tested in this report:

| | | |
|---|---|---|
| Operating Mode | Bluetooth, 2.4G WLAN, 5G WLAN | |
| Frequency Range | Bluetooth | 2402 ~ 2480 MHz |
| | 802.11b/g/n(HT20/HT40) | 2412 ~ 2462 MHz |
| | 802.11a/ n(HT20/HT40) | 5150 ~ 5250 MHz |
| | | 5725 ~ 5850 MHz |
| | 802.11ac (VHT20/VHT40/VHT80) | 5150 ~ 5250 MHz |
| | | 5725 ~ 5850 MHz |
| Antenna Type | Bluetooth | PIFA Antenna |
| | WLAN | PIFA Antenna |
| Exposure Category | General Population/Uncontrolled Exposure | |
| Product Type | Mobile Device | |

# 3 SUMMARY OF TEST RESULT

## 3.1 Test Standards

| No. | Identity | Document Title |
|---|---|---|
| 1 | KDB 447498 D04 v01 | 447498 D04 Interim General RF Exposure Guidance v01 |

## 3.2 Limit Standards

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 2.1091 | Radiofrequency radiation exposure evaluation: mobile devices |

# 4 DEVICE CATEGORY AND LEVELS LIMITS

**Mobile Devices:**

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 ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

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 λ/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 Pth (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). Pth is given by Formula (B.2).

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

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 | Bluetooth |
|---|---|
| Conducted Power (dBm) | 8.44 |
| Antenna Gain (dBi) | 1.73 |
| EIRP (dBm) | 10.17 |
| Note: This report listed the maximal case power value, please refer to BL-SZ2460564-601&BL-SZ2460564-602 report for more details. | |

| Mode | 2.4G WIFI | |
|---|---|---|
| | Antenna 1 | Antenna 2 |
| Conducted Power (dBm) | 14.72 | 14.67 |
| Antenna Gain (dBi) | 1.73 | 1.58 |
| EIRP (dBm) | 16.45 | 16.25 |
| Note: This report listed the maximal case power value, please refer to BL-SZ2460564-602 report for more details. | | |

| Mode | 5.2G WIFI | | 5.8G WIFI | |
|---|---|---|---|---|
| | Antenna 1 | Antenna 2 | Antenna 1 | Antenna 2 |
| Conducted Power (dBm) | 14.85 | 14.70 | 14.68 | 14.84 |
| Antenna Gain (dBi) | 3.36 | 2.64 | 3.73 | 3.85 |
| EIRP (dBm) | 18.21 | 17.34 | 18.41 | 18.69 |
| Note: This report listed the maximal case power value, please refer to BL-SZ2460564-603 report for more details. | | | | |

## 5.2 Tune-up power

| Mode | Conducted Power Range (dBm) | EIRP Range (dBm) | ERP Range (dBm) |
|---|---|---|---|
| Bluetooth | [7.00, 9.00] | [9.00, 11.00] | [6.85, 8.85] |
| 2.4G WIFI Antenna 1 | [13.00, 15.00] | [15.00, 17.00] | [12.85, 14.85] |
| 2.4G WIFI Antenna 2 | [13.00, 15.00] | [15.00, 17.00] | [12.85, 14.85] |
| 5.2G WIFI Antenna 1 | [13.00, 15.00] | [17.00, 19.00] | [14.85, 16.85] |
| 5.2G WIFI Antenna 2 | [13.00, 15.00] | [16.00, 18.00] | [13.85, 15.85] |
| 5.8G WIFI Antenna 1 | [13.00, 15.00] | [17.00, 19.00] | [14.85, 16.85] |
| 5.8G WIFI Antenna 2 | [13.00, 15.00] | [17.00, 19.00] | [14.85, 16.85] |
| Note1: ERP= EIRP -2.15dB.<br>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

| Evolution mode | Maximum power (dBm) | Maximum power (mw) | Distance (mm) | Threshold Power (mW) | Power / Limit | Verdict |
|---|---|---|---|---|---|---|
| Bluetooth | 9.00 | 7.94 | 200 | 3060.00 | 0.003 | Pass |
| 2.4G WIFI Antenna 1 | 15.00 | 31.62 | 200 | 3060.00 | 0.010 | Pass |
| 2.4G WIFI Antenna 2 | 15.00 | 31.62 | 200 | 3060.00 | 0.010 | Pass |
| 5.2G WIFI Antenna 1 | 16.85 | 48.42 | 200 | 3060.00 | 0.016 | Pass |
| 5.2G WIFI Antenna 2 | 15.85 | 38.46 | 200 | 3060.00 | 0.013 | Pass |
| 5.8G WIFI Antenna 1 | 16.85 | 48.42 | 200 | 3060.00 | 0.016 | Pass |
| 5.8G WIFI Antenna 2 | 16.85 | 48.42 | 200 | 3060.00 | 0.016 | Pass |

## 5.4 Collocated Power Calculation

| Evolution mode | Frequency(MHz) | Power /Limit | Σ(Power / Limit) of Bluetooth + 5G WIFI | Verdict |
|---|---|---|---|---|
| Bluetooth | 2480 | 0.003 | **0.019** | Pass |
| Max. 5G WIFI | 5250 | 0.016 | | |

Note:

1. Σ(Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for Bluetooth + 5G WIFI.
2. Both of the Bluetooth/5G WIFI can transmit simultaneously, the formula of calculated the Power is CP1 / LP1 + CP2 / LP2 + ……etc. < 1
   CP = Calculation power
   LP = Limit of power
3. Both of the 2.4G WIFI and 5GHz WIFI can't transmit simultaneously at same time.
4. The worst-case situation is 0.019, which is less than "1". This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
5. The DUT work frequency range used is 2402 ~ 2480 MHz, 5150 MHz~ 5250 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.

## 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

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the “inspection and testing dedicated stamp” or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--