# Test Report

**Verified code:** 113759

**Report No.:** E20221228512201-3

| | |
|---|---|
| Customer: | Shenzhen Bipu Technology Co., Ltd. |
| Address: | Building 2, Floor 2, Wenkeng Industrial Area, Dafa Road No.24, Bantian, Long Gang District, Shenzhen, China |
| Sample Name: | Mechanical Keyboard |
| Sample Model: | PKKE221 |
| Receive Sample Date: | Dec.30,2022 |
| Test Date: | Jan.05,2023 ~ Jan.05,2023 |
| Reference Document: | CFR 47, FCC Part 2.1093 Radiofrequency radiation exposure evaluation: portable devices. |
| Test Result: | Pass |

Prepared by: Huang Lifang Reviewed by: Wu Haoming Approved by: Zhao Zehan

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2023-05-12

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# Statement

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2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.

3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.

4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.

5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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**REPORT ISSUED HISTORY**

| Report Version | Report No. | Description | Compile Date |
|---|---|---|---|
| 1.0 | E20221228512201-3 | Original Issue | 2023-01-13 |

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# 1. GENERAL DESCRIPTION OF EUT

## 1.1. APPLICANT

| | |
|---|---|
| Name: | Shenzhen Bipu Technology Co., Ltd. |
| Address: | Building 2, Floor 2, Wenkeng Industrial Area, Dafa Road No.24, Bantian, Long Gang District, Shenzhen, China |

## 1.2. MANUFACTURER

| | |
|---|---|
| Name: | Shenzhen Bipu Technology Co., Ltd. |
| Address: | Building 2, Floor 2, Wenkeng Industrial Area, Dafa Road No.24, Bantian, Long Gang District, Shenzhen, China |

## 1.3. FACTORY

| | |
|---|---|
| Name: | Dongguan Jieguan Industrial Technology Co., Ltd. |
| Address: | Room 301,No.1 Building,No.5, xifa Road,Lin Village,Tangxia Town, Dongguan City,Guangdong Province. |

## 1.4. BASIC DESCRIPTIONOF EQUIPMENTUNDER TEST

| | |
|---|---|
| Equipment: | Mechanical Keyboard |
| Model No.: | PKKE221 |
| Adding Model: | / |
| Trade Name: | Keychron |
| FCC ID: | 2ASF4-PKKE221 |
| Power supply: | DC 3.87V power supplied by battery<br>DC 5V power supplied by notebook |
| Battery Specification: | Name:Rechargeable Li-ion Polymer Battery<br>Model:BLP959<br>Nominal Voltage:3.87Vdc<br>Rated Capacity:4880mAh/18.88Wh<br>Typical Capacity:5000mAh/19.35Wh |
| Frequency Band: | 2402MHz -2480MHz |
| Transmit Power: | GFSK:-3.04dBm |
| Modulation type: | GFSK |
| Channel space: | 1MHz |
| Antenna Specification: | FPC antenna with 1.53dBi gain (Max.) |
| Temperature Range: | -10℃~+50℃ |
| Hardware Version: | V2.6 |
| Software Version: | V1.02 |
| Sample No: | E20221228512201-0004 |
| Note: | / |

## 2. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.


| | |
|---|---|
| Add.: | No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China. |
| P.C.: | 518110 |
| Tel : | 0755-61180008 |
| Fax: | 0755-61180008 |


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## 3. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

Exposure category: General population/uncontrolled environment
EUT Type: Production Unit
Device Type: Portable Device
According to the KDB 447498 D04 Interim General RF Exposure Guidance v01:
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 λ/4. As for devices with antennas of length greater than λ/4 where the gain is not well defined, but always less than that of a half-wave dipole (length λ/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 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 as below:

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

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 ERP20cm is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

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

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 |

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## 4. ESTIMATION RESULT

### 4.1 MEASUREMENT RESULTS

Table 1 Antenna Specification

| Mode | Antenna type | Internal Identification | Maximum antenna gain |
|---|---|---|---|
| DH5 | FPC antenna | Antenna 1 | 1.53dBi |

Table 2 Transmit Power

| Mode | Maximum Output Power (dBm) | Antenna Gain (dBi) | E.i.r.p. (dBm) | Target power (dBm) | Tolerance (dB) | Maximum Tune-up Output power (dBm) |
|---|---|---|---|---|---|---|
| DH5 | -3.04 | 1.53 | -1.51 | -1.0 | ±1.0 | 0 |

**STANDALONE MPE**

| Mode | Frequency (MHz) | Maximum Tune-up Output power (dBm) | Maximum Tune-up Output power (mW) | Exemption Limit (mW) | Verdict |
|---|---|---|---|---|---|
| DH5 | 2480 | 0 | 1 | 2.72 | PASS |

Remark:

1. Threshold ERP(mW)=$(0.5/20)^{-\log(60/3060/\sqrt{f})}$= $(0.5/20)^{-\log(60/3060/\sqrt{2.48})}$=2.72mW.

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## 5. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure of portable device.

**---------- End of Report ----------**