



REPORT No. : SZ18010201S01

# RF EXPOSURE EVALUATION REPORT

**APPLICANT** : Shenzhen Grandsun Electronic Co., Ltd.

**PRODUCT NAME** : active wireless earphones

**MODEL NAME** : air

**BRAND NAME** : Blackbox

**FCC ID** : 2AN4C-1267

**STANDARD(S)** : 47CFR 2.1093  
KDB 447498

**ISSUE DATE** : 2018-02-01

Tested by:

Gan Yueming (Test engineer)

Approved by:

Peng Huarui (Supervisor)

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**MORLAB**

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# DIRECTORY

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| Change History |            |                   |
|----------------|------------|-------------------|
| Issue          | Date       | Reason for change |
| 1.0            | 2018-02-01 | First edition     |
|                |            |                   |



# 1. Technical Information

**Note:** Provide by manufacturer.

## 1.1 Applicant and Manufacturer Information

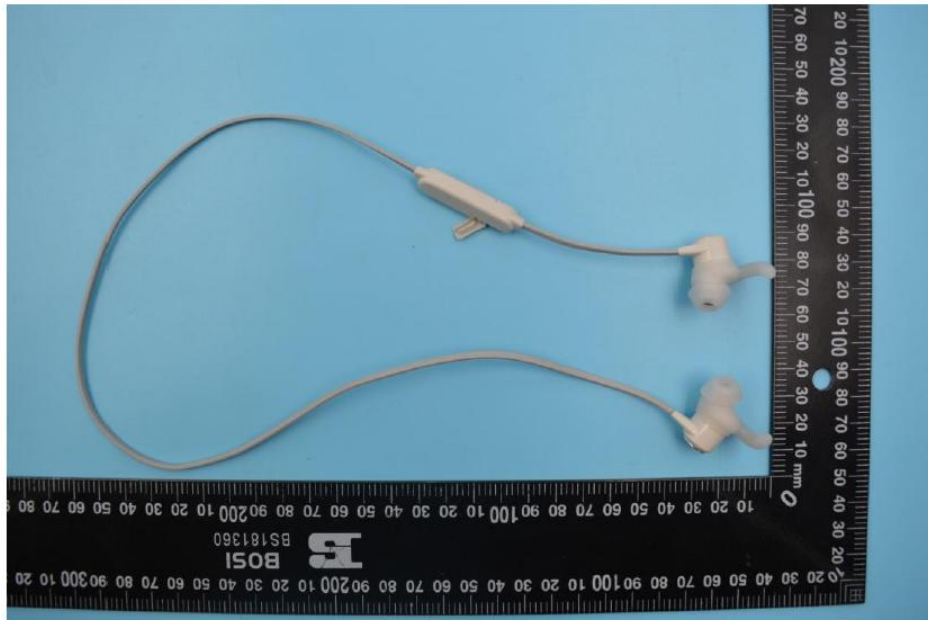
|                              |                                                                    |
|------------------------------|--------------------------------------------------------------------|
| <b>Applicant:</b>            | Shenzhen Grandsun Electronic Co., Ltd.                             |
| <b>Applicant Address:</b>    | Pingdi Gaoqiao Industry Zone , Longgang District , Shenzhen, China |
| <b>Manufacturer:</b>         | Shenzhen Grandsun Electronic Co., Ltd.                             |
| <b>Manufacturer Address:</b> | Pingdi Gaoqiao Industry Zone , Longgang District , Shenzhen, China |

## 1.2 Equipment Under Test (EUT) Description

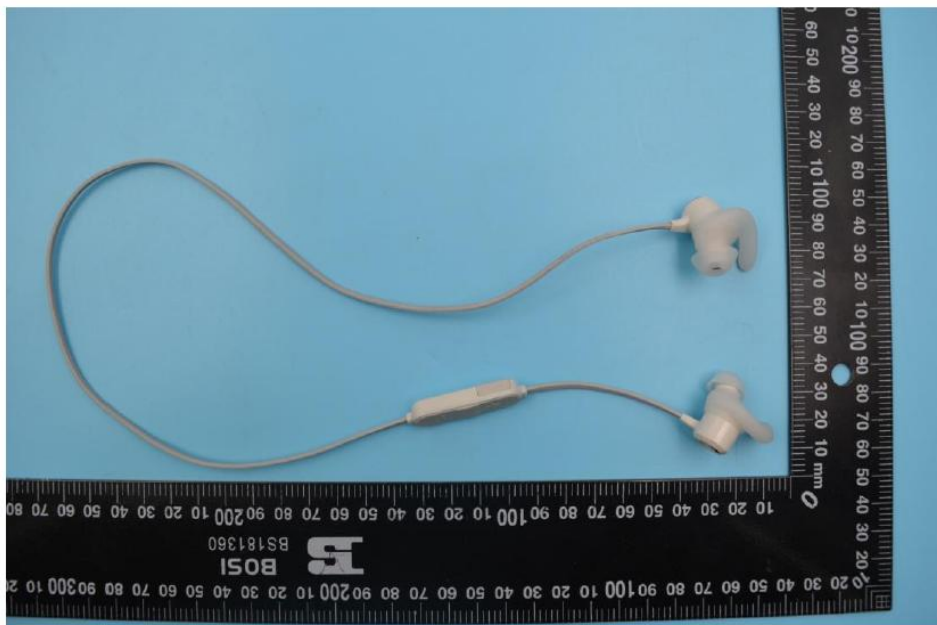
|                          |                                          |
|--------------------------|------------------------------------------|
| <b>EUT Type:</b>         | active wireless earphones                |
| <b>Hardware Version:</b> | V0P3                                     |
| <b>Software Version:</b> | V04                                      |
| <b>Frequency Bands:</b>  | Bluetooth 4.0(BR+EDR): 2402MHz-2480MHz   |
| <b>Modulation Mode:</b>  | Bluetooth : GFSK, $\pi/4$ -DQPSK, 8-DPSK |
| <b>Antenna Type:</b>     | Chip Antenna                             |
| <b>Antenna Gain:</b>     | 1dBi                                     |

## 1.3 Photographs of the EUT

### 1. EUT front view



### 2. EUT rear view





### 1.3.1 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

| EUT Identity | Hardware Version | Software Version |
|--------------|------------------|------------------|
| 1#           | V0P3             | V04              |

## 1.4 Applied Reference Documents

Leading reference documents for testing:

| No. | Identity          | Document Title                                                  |
|-----|-------------------|-----------------------------------------------------------------|
| 1   | 47 CFR§2.1093     | Radio frequency Radiation Exposure Evaluation: portable devices |
| 2   | KDB 447498 D01v06 | General RF Exposure Guidance                                    |



## 2. Device Category and RF Exposure Limit

Per user manual, this device is a 3-Axis Stabilizing Gimbal for Action Camera. Based on 47CFR 2.1093, this device belongs to portable device category with General Population/Uncontrolled exposure.

### **Portable Devices:**

47CFR 2.1093(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.

### **GENERAL POPULATION / UNCONTROLLED EXPOSURE**

47CFR 2.1093(d) (2)

Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.



### 3. Measurement of RF Output Power

#### 1. Bluetooth output power

| Mode          | Channel | Frequency<br>(MHz) | Average power (dBm) |       |       |
|---------------|---------|--------------------|---------------------|-------|-------|
|               |         |                    | 1Mbps               | 2Mbps | 3Mbps |
| BR / EDR      | CH 00   | 2402               | 1.21                | 0.77  | 1.32  |
|               | CH 39   | 2441               | 4.67                | 4.37  | 4.78  |
|               | CH 78   | 2480               | 4.77                | 4.41  | 4.56  |
| Tune-up Limit |         |                    | 5                   | 5     | 5     |

**Note:** According to KDB 447498, maximum source-based time-average power will be used for calculating MPE.



## 4. RF Exposure Evaluation

The device only incorporates a Bluetooth transmitter, so standalone SAR evaluation is required for Bluetooth and simultaneous SAR is not required.

Standalone transmission SAR evaluation

According to KDB 447498 section 4.3.1, the 1-g SAR test exclusion thresholds at test separation Distances  $\leq 50$  mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$

The maximum tune-up limit power is **3.16mW @ 2.441GHz**

When 3-Axis Stabilizing Gimbal for Action Camera is used on the hand/head, so use **5mm** as the most conservative minimum test separation distance,

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.99 \leq 3.0$$

So SAR evaluation is not required for this device.

Note: Declaration of the tune-up limit is 5.0dBm.



## Annex A General Information

### 1. Identification of the Responsible Testing Laboratory

|                               |                                                                                                                                  |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Company Name:                 | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| Department:                   | Morlab Laboratory                                                                                                                |
| Address:                      | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| Responsible Test Lab Manager: | Mr. Su Feng                                                                                                                      |
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### 2. Identification of the Responsible Testing Location

|          |                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| Name:    | Shenzhen Morlab Communications Technology Co., Ltd.<br>Morlab Laboratory                                                         |
| Address: | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |

————— END OF REPORT —————