

# RF Exposure Evaluation

## FCC ID: 2A4UM-SE02

### 1. Client Information

|                     |   |                                                                                                                   |
|---------------------|---|-------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>    | : | Shenzhen Apwill Electronic CO.,Ltd                                                                                |
| <b>Address</b>      | : | Room 13A, A Zuo, Zhenye Apartment, No.2014, Bao An Nan Road, Luo Hu District, Shen Zhen, Guang Dong, China 518000 |
| <b>Manufacturer</b> | : | Shenzhen Apwill Electronic CO.,Ltd                                                                                |
| <b>Address</b>      | : | Room 13A, A Zuo, Zhenye Apartment, No.2014, Bao An Nan Road, Luo Hu District, Shen Zhen, Guang Dong, China 518000 |

### 2. General Description of EUT

|                                                                                                                                                       |                          |                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------|
| <b>EUT Name</b>                                                                                                                                       | :                        | wireless headphone                                                                   |
| <b>Model(s) No.</b>                                                                                                                                   | :                        | SE02, SE01, SE03, SE04, SE05, SE06, SE07, SE08                                       |
| <b>Model Difference</b>                                                                                                                               | :                        | All PCB boards and circuit diagrams are the same, the only difference is that names. |
| <b>Product Description</b>                                                                                                                            | Operation Frequency:     | Bluetooth V5.0: 2402MHz~2480MHz                                                      |
|                                                                                                                                                       | Number of Channel:       | Bluetooth 5.0(BDR+EDR): 79 channels                                                  |
|                                                                                                                                                       | RF Output Power:         | 2dBm (Max)                                                                           |
|                                                                                                                                                       | Antenna Gain:            | 1.24 dBi ceramic Antenna                                                             |
|                                                                                                                                                       | Modulation Type:         | GFSK, $\pi$ /4-DQPSK, 8-DPSK                                                         |
|                                                                                                                                                       | Bit Rate of Transmitter: | 1/2/3Mbps                                                                            |
| <b>Power Supply</b>                                                                                                                                   | :                        | Input: DC 5V<br>DC 3.7V by 180mAh Li-ion battery                                     |
| <b>Software Version</b>                                                                                                                               | :                        | V1.0                                                                                 |
| <b>Hardware Version</b>                                                                                                                               | :                        | V1.0                                                                                 |
| <b>Remark:</b> The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab. |                          |                                                                                      |

**Note:** More test information about the EUT please refer the RF Test Report.

## SAR Test Exclusion Calculations

1. FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

(1) Clause 4.3: General SAR test reduction and exclusion guidance

Sub clause 4.31: Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance  $\leq 5$  mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{\text{GHz}}}] \leq 3.0 \text{ for 1-g SAR}$$

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{\text{GHz}}}] \leq 7.5.0 \text{ for 10-g SAR}$$

## 2. Calculation:

| Test separation: 5mm             |                       |                              |                                      |                                     |                   |                 |
|----------------------------------|-----------------------|------------------------------|--------------------------------------|-------------------------------------|-------------------|-----------------|
| Bluetooth Mode (GFSK)            |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)                  | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dBm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                            | -0.55                 | $0 \pm 1$                    | 1                                    | 1.259                               | 0.391             | 3.0             |
| 2.441                            | -1.33                 | $-1 \pm 1$                   | 0                                    | 1.000                               | 0.312             | 3.0             |
| 2.480                            | -1.61                 | $-1 \pm 1$                   | 0                                    | 1.000                               | 0.315             | 3.0             |
| Bluetooth Mode ( $\pi/4$ -DQPSK) |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)                  | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dBm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                            | 1.46                  | $1 \pm 1$                    | 2                                    | 1.585                               | 0.492             | 3.0             |
| 2.441                            | 0.73                  | $0 \pm 1$                    | 1                                    | 1.259                               | 0.393             | 3.0             |
| 2.480                            | 0.47                  | $-1 \pm 1$                   | 0                                    | 1.000                               | 0.315             | 3.0             |
| Bluetooth Mode (8-DPSK)          |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)                  | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dBm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                            | 2                     | $2 \pm 1$                    | 3                                    | 1.995                               | 0.620             | 3.0             |
| 2.441                            | 1.2                   | $1 \pm 1$                    | 2                                    | 1.585                               | 0.495             | 3.0             |
| 2.480                            | 0.99                  | $1 \pm 1$                    | 2                                    | 1.585                               | 0.499             | 3.0             |

### Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

-----END OF REPORT-----