

## FCC 47 CFR MPE REPORT

AUDIO PRO AB

WIRELESS MULTIROOM LOUDSPEAKER

Model Number: A36, A26

FCC ID: 2AGNC-A36

|                          |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| Prepared for:            | AUDIO PRO AB                                                        |
|                          | Garnisonsgatan 52, 25466, Helsingborg, Sweden                       |
|                          |                                                                     |
| Prepared By:             | EST Technology Co., Ltd.                                            |
|                          | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| Tel: 86-769-83081888-808 |                                                                     |

|                 |                      |
|-----------------|----------------------|
| Report Number:  | ESTE-R1908104        |
| Date of Test:   | Jul. 29~Aug. 30 2016 |
| Date of Report: | Sep. 02, 2019        |

## Maximum Permissible Exposure

### 1、Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

#### (a)、Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Times   E   2 ,   H   2 or S (minutes) |
|-----------------------|----------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------|
| 0.3-3.0               | 614                              | 1.63                              | (100)*                                  | 6                                                |
| 3.0-30                | 1842/f                           | 4.89/f                            | (900/f)*                                | 6                                                |
| 30-300                | 61.4                             | 0.163                             | 1.0                                     | 6                                                |
| 300-1500              |                                  |                                   | F/300                                   | 6                                                |
| 1500-10000            |                                  |                                   | 5                                       | 6                                                |

#### (b)、Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Times   E   2 ,   H   2 or S (minutes) |
|-----------------------|----------------------------------|-----------------------------------|-----------------------------------------|--------------------------------------------------|
| 0.3-1.34              | 614                              | 1.63                              | (100)*                                  | 30                                               |
| 1.34-30               | 824/f                            | 2.19/f                            | (180/f)*                                | 30                                               |
| 30-300                | 27.5                             | 0.073                             | 0.2                                     | 30                                               |
| 300-1500              |                                  |                                   | F/1500                                  | 30                                               |
| 1500-10000            |                                  |                                   | 1.0                                     | 30                                               |

Note: f=frequency in MHz; \*Plane-wave equivalent power density

### 2、MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = E^2 / 377$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

**3、Conducted Power Result**

| Mode                         | Frequency<br>(MHz) | Peak output<br>power (dBm) | Peak output<br>power (mW) | Target power<br>( dBm ) | Antenna gain |          |
|------------------------------|--------------------|----------------------------|---------------------------|-------------------------|--------------|----------|
|                              |                    |                            |                           |                         | (dBi)        | (Linear) |
| GFSK                         | 2402               | 2.31                       | 1.702                     | $2 \pm 1$               | 0            | 1        |
|                              | 2441               | 4.71                       | 2.958                     | $4 \pm 1$               | 0            | 1        |
|                              | 2480               | 6.12                       | 4.093                     | $6 \pm 1$               | 0            | 1        |
| 8-DPSK                       | 2402               | 0.49                       | 1.119                     | $0 \pm 1$               | 0            | 1        |
|                              | 2441               | 3.56                       | 2.270                     | $3 \pm 1$               | 0            | 1        |
|                              | 2480               | 5.06                       | 3.206                     | $5 \pm 1$               | 0            | 1        |
| BLE                          | 2402               | 3.68                       | 2.333                     | $3 \pm 1$               | 0            | 1        |
|                              | 2440               | 5.19                       | 3.304                     | $5 \pm 1$               | 0            | 1        |
|                              | 2480               | 6.72                       | 4.699                     | $6 \pm 1$               | 0            | 1        |
| IEEE<br>802.11b_ANT1         | 2412               | 17.68                      | 58.614                    | $17 \pm 1$              | 0            | 1        |
|                              | 2437               | 17.93                      | 62.087                    | $17 \pm 1$              | 0            | 1        |
|                              | 2462               | 17.64                      | 58.076                    | $17 \pm 1$              | 0            | 1        |
| IEEE<br>802.11g_ANT1         | 2412               | 22.07                      | 161.065                   | $22 \pm 1$              | 0            | 1        |
|                              | 2437               | 21.73                      | 148.936                   | $21 \pm 1$              | 0            | 1        |
|                              | 2462               | 21.22                      | 132.434                   | $21 \pm 1$              | 0            | 1        |
| IEEE<br>802.11n<br>HT20_ANT1 | 2412               | 21.84                      | 152.757                   | $21 \pm 1$              | 0            | 1        |
|                              | 2437               | 21.46                      | 139.959                   | $21 \pm 1$              | 0            | 1        |
|                              | 2462               | 22.04                      | 159.956                   | $22 \pm 1$              | 0            | 1        |
| IEEE<br>802.11n<br>HT40_ANT1 | 2422               | 21.18                      | 131.220                   | $21 \pm 1$              | 0            | 1        |
|                              | 2437               | 20.78                      | 119.674                   | $20 \pm 1$              | 0            | 1        |
|                              | 2452               | 20.59                      | 114.551                   | $20 \pm 1$              | 0            | 1        |
| IEEE<br>802.11b_ANT2         | 2412               | 17.72                      | 59.156                    | $17 \pm 1$              | 0            | 1        |
|                              | 2437               | 17.94                      | 62.230                    | $17 \pm 1$              | 0            | 1        |
|                              | 2462               | 17.47                      | 55.847                    | $17 \pm 1$              | 0            | 1        |
| IEEE<br>802.11g_ANT2         | 2412               | 21.89                      | 154.525                   | $21 \pm 1$              | 0            | 1        |
|                              | 2437               | 22.01                      | 158.855                   | $22 \pm 1$              | 0            | 1        |
|                              | 2462               | 21.71                      | 148.252                   | $21 \pm 1$              | 0            | 1        |
| IEEE<br>802.11n<br>HT20_ANT2 | 2412               | 22.07                      | 161.065                   | $22 \pm 1$              | 0            | 1        |
|                              | 2437               | 22.28                      | 169.044                   | $22 \pm 1$              | 0            | 1        |
|                              | 2462               | 22.04                      | 159.956                   | $22 \pm 1$              | 0            | 1        |
| IEEE<br>802.11n<br>HT40_ANT2 | 2422               | 21.39                      | 137.721                   | $21 \pm 1$              | 0            | 1        |
|                              | 2437               | 21.43                      | 138.995                   | $21 \pm 1$              | 0            | 1        |
|                              | 2452               | 21.30                      | 134.896                   | $21 \pm 1$              | 0            | 1        |

**4、Calculated Result and Limit**

| Mode                   | Target power<br>( dBm ) | Antenna gain |          | Power Density<br>(S)<br>(mW /cm2) | Limited of Power Density<br>(S)<br>(mW /cm2) | Test Result |
|------------------------|-------------------------|--------------|----------|-----------------------------------|----------------------------------------------|-------------|
|                        |                         | (dBi)        | (Linear) |                                   |                                              |             |
| 2.4G Band              |                         |              |          |                                   |                                              |             |
| GFSK                   | 7                       | 0            | 1        | 0.00139                           | 1                                            | Compiles    |
| 8-DPSK                 | 6                       | 0            | 1        | 0.00119                           | 1                                            | Compiles    |
| BLE                    | 7                       | 0            | 1        | 0.00139                           | 1                                            | Compiles    |
| IEEE 802.11b_ANT1      | 18                      | 0            | 1        | 0.00358                           | 1                                            | Compiles    |
| IEEE 802.11g_ANT1      | 23                      | 0            | 1        | 0.00458                           | 1                                            | Compiles    |
| IEEE 802.11n HT20_ANT1 | 23                      | 0            | 1        | 0.00458                           | 1                                            | Compiles    |
| IEEE 802.11n HT40_ANT1 | 22                      | 0            | 1        | 0.00438                           | 1                                            | Compiles    |
| IEEE 802.11b_ANT2      | 18                      | 0            | 1        | 0.00358                           | 1                                            | Compiles    |
| IEEE 802.11g_ANT2      | 23                      | 0            | 1        | 0.00458                           | 1                                            | Compiles    |
| IEEE 802.11n HT20_ANT2 | 23                      | 0            | 1        | 0.00458                           | 1                                            | Compiles    |
| IEEE 802.11n HT40_ANT2 | 22                      | 0            | 1        | 0.00438                           | 1                                            | Compiles    |

**4.1 Antenna 1+2**

| Mode              | Power Density (S) (mW/cm <sup>2</sup> )<br>Antenna 1 | Power Density (S) (mW/cm <sup>2</sup> )<br>Antenna 2 | Power Density (S) (mW/cm <sup>2</sup> )<br>Total | Limited of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|-------------------|------------------------------------------------------|------------------------------------------------------|--------------------------------------------------|----------------------------------------------------|-------------|
| 2.4G Band         |                                                      |                                                      |                                                  |                                                    |             |
| IEEE 802.11n HT20 | 0.00458                                              | 0.00458                                              | 0.00916                                          | 1                                                  | Compiles    |
| IEEE 802.11n HT40 | 0.00438                                              | 0.00438                                              | 0.00876                                          | 1                                                  | Compiles    |