

## FCC RF Exposure

EUT Description: Karaoke machine

Model No.: S-2802

FCC ID: 2A7U7-S-2802

Equipment type: fixed equipment

### 1. Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz)                                   | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                               |                               |                                     |                          |
| 0.3–3.0   | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0–30  | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30–300  | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300–1500  |                               |                               | f/300                               | 6                        |
| 1500–100,000  |                               |                               | 5                                   | 6                        |
| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
| 0.3–1.34  | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30   | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30–300  | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300–1500  |                               |                               | f/1500                              | 30                       |
| 1500–100,000  |                               |                               | 1.0                                 | 30                       |

F = frequency in MHz

Formula:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where :

Pd = power density in mW/cm<sup>2</sup>,

Pout = output power to antenna in mW;

G = gain of antenna in linear scale,

$\pi$  = 3.14;

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 3. Test Result of RF Exposure Evaluation

#### BLE

| GFSK | Output power<br>(dBm/ mW) | Antenna<br>Gain(dBi) | Power<br>Density<br>at R=20cm<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|------|---------------------------|----------------------|--|--------------------------------|--------|
| 2402 | -11.725/0.672             | 1.0                  | 0.00016  | 1.0                            | Pass   |
| 2440 | -10.544/0.882             | 1.0                  | 0.00022  | 1.0                            | Pass   |
| 2480 | -10.101/0.977             | 1.0                  | 0.00024  | 1.0                            | Pass   |

#### BT

| GFSK    | Output power<br>(dBm/ mW) | Antenna<br>Gain(dBi) | Power Density<br>at R=20cm<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Result |
|---------|---------------------------|----------------------|---|--------------------------------|--------|
| 2402MHz | -9.58/1.101               | 1.0                  | 0.00027   | 1.0                            | Pass   |
| 2441MHz | -10.212/0.952             | 1.0                  | 0.00024   | 1.0                            | Pass   |
| 2480MHz | -11.344/0.733             | 1.0                  | 0.00018   | 1.0                            | Pass   |