

## FCC 47 CFR MPE REPORT

Zhongshan City Richsound Electronic Industrial Ltd.

2.1CH Soundbar with Wired Subwoofer

Model Number: CINEMA SB130

FCC ID: Z8M-SB130

|                          |   |
|--------------------------|---|
| Prepared for:            | Zhongshan City Richsound Electronic Industrial Ltd.                 |
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|                          |   |
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|                 |                       |
|-----------------|-----------------------|
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## Maximum Permissible Exposure

### 1. Applicable Standards

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.

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

##### (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   <sup>2</sup> ,   H   <sup>2</sup> 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   <sup>2</sup> ,   H   <sup>2</sup> 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

## 1.2. MPE Calculation Method

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

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

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

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

## 2. Conducted Power Result

| Mode   | Frequency (MHz) | Peak output power (dBm) | Peak output power (mW) | Target power (dBm) | Antenna gain |          |
|--------|-----------------|-------------------------|------------------------|--------------------|--------------|----------|
|        |                 |                         |                        |                    | (dBi)        | (Linear) |
| GFSK   | 2402            | 0.52                    | 1.127                  | 0±1                | -0.68        | 0.855    |
|        | 2441            | 0.62                    | 1.153                  | 0±1                | -0.68        | 0.855    |
|        | 2480            | 0.04                    | 1.009                  | 0±1                | -0.68        | 0.855    |
| 8-DPSK | 2402            | 1.87                    | 1.538                  | 1±1                | -0.68        | 0.855    |
|        | 2441            | 2.13                    | 1.633                  | 2±1                | -0.68        | 0.855    |
|        | 2480            | 1.58                    | 1.439                  | 1±1                | -0.68        | 0.855    |

## 3. Calculated Result and Limit

| Mode   | Target power (dBm) | Antenna gain |          | Power Density (S) (mW /cm <sup>2</sup> ) | Limited of Power Density (S) (mW /cm <sup>2</sup> ) | Test Result |
|--------|--------------------|--------------|----------|--|---|-------------|
|        |                    | (dBi)        | (Linear) |  |   |             |
| GFSK   | 1                  | -0.68        | 0.855    | 0.00021                                  | 1   | Compiles    |
| 8-DPSK | 3                  | -0.68        | 0.855    | 0.00034                                  | 1   | Compiles    |

**End of Test Report**