



FCC 47 CFR MPE REPORT

Guoguang Electric Co.,Ltd

Guitar Speaker

Model Number: Spark 40

FCC ID: 2AAP8SPARK40ADI

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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 ²) | 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 ²) | 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

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 | 0.23 | 1.054 | 0±1 | 1.02 | 1.265 |
| | 2441 | 1.59 | 1.442 | 1±1 | 1.02 | 1.265 |
| | 2480 | 1.28 | 1.343 | 1±1 | 1.02 | 1.265 |
| 8-DPSK | 2402 | 1.79 | 1.510 | 1±1 | 1.02 | 1.265 |
| | 2441 | 3.15 | 2.065 | 3±1 | 1.02 | 1.265 |
| | 2480 | 2.76 | 1.888 | 2±1 | 1.02 | 1.265 |
| BLE | 2402 | -0.33 | 0.927 | 0±1 | 1.02 | 1.265 |
| | 2440 | 0.99 | 1.256 | 0±1 | 1.02 | 1.265 |
| | 2480 | 0.62 | 1.153 | 0±1 | 1.02 | 1.265 |

3. Calculated Result and Limit

| Mode | Target power (dBm) | Antenna gain | | Power Density (S) (mW/cm ²) | Limited of Power Density (S) (mW/cm ²) | Test Result |
|-----------|--------------------|--------------|----------|---|--|-------------|
| | | (dBi) | (Linear) | | | |
| 2.4G Band | | | | | | |
| GFSK | 2 | 1.02 | 1.265 | 0.00040 | 1 | Complies |
| 8-DPSK | 4 | 1.02 | 1.265 | 0.00063 | 1 | Complies |
| BLE | 1 | 1.02 | 1.265 | 0.00032 | 1 | Complies |

End of Test Report