

MPE Analysis Report

The Equipment Under Test (EUT) is a Portable Bluetooth Speaker with multi-mode lighting. It can accept audio signal from analog input sources (3.5mm phone jack Aux-in) and wireless Bluetooth device. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). The audio signal is amplified and fed to the built-in passive loudspeaker. The EUT is powered by an AC/DC adaptor. (Input: 100-240VAC 50/60Hz 0.45A; Output: 14VDC 1.0A).

The EUT may come in color variations but are electrically and mechanically the same. The only difference is the color.

For Bluetooth module:

For Bluetooth 2.1 mode, it occupies a frequency range from 2402MHz to 2480MHz (79 channels with channel spacing of 1MHz). It transmits via GFSK modulation.

Antenna Type: Internal, Integral

Antenna Gain: 0dBi

Operating mode	Nominal Radiated Field Strength	Production Tolerance	Modulation Type
Bluetooth 2.1	91.8 dBμV/m at 3m	+/- 3dB	GFSK

For Maximum Permissible Exposure (MPE) evaluation of the EUT, the maximum power density at 20 cm from this mobile transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65.

For the Bluetooth 2.1, maximum field strength measured within its production tolerance (FS) was 94.8 dBμV/m (maximum). The distance (D) between the antenna and the equipment under test (EUT) was 3 meters. And the maximum source-based time-averaging duty factor is 100%. From these data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

$$\text{The radiated power} = (FS \cdot D)^2 / 30 = 0.906 \text{ mW}$$

$$\begin{aligned} \text{The radiated (EIRP) source-based time-averaging output power} \\ &= (0.906 \cdot 1) \text{ mW} \\ &= 0.906 \text{ mW} \end{aligned}$$

$$\begin{aligned} \text{The power density at 20 cm from the antenna} \\ &= \text{EIRP} / 4\pi R^2 \\ &= 0.00018 \text{ mW cm}^{-2} \end{aligned}$$

In the frequency range of 1,500 - 100,000MHz, the MPE limit is 1.0 mWcm⁻² for general population and uncontrolled exposure. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structures and body of the user or nearby persons. The following RF exposure statement is proposed to be included in the user manual:

“ FCC RF Radiation Exposure Statement

Caution: To maintain compliance with the FCC's RF exposure guidelines, place the product at least 20cm from nearby persons.”