

Maximum Permissible Exposure

Applicable Standard

According to §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Remark: 1) For BT: The maximum output power for antenna is 7.13dBm (5.16mW) at 2441MHz, 0.5dBi antenna gain(with 1.12 numeric antenna gain.)

For BLE(1M): The maximum output power for antenna is 3.77dBm (2.38mW) at 2440MHz, 0.5dBi antenna gain(with 1.12 numeric antenna gain.)

For BLE(2M): The maximum output power for antenna is 3.89dBm (2.45mW) at 2480MHz, 0.5dBi antenna gain(with 1.12 numeric antenna gain.)

2) For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20cm, even if the calculation indicate that the MPE distance would be lesser.

Calculation

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts / square centimeter

For BT:

Maximum Permissible Exposure

output power= 5.16mW

Numeric Antenna gain= 1.12

Substituting the MPE safe distance using $d=20\text{cm}$ into above equation.

Yields:

$$S = 0.000199 * P * G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW/cm^2

$$\text{Power density} = 0.001150 \text{mW}/\text{cm}^2$$

For BLE(1M):

Maximum Permissible Exposure

output power= 2.38mW

Numeric Antenna gain= 1.12

Substituting the MPE safe distance using $d=20\text{cm}$ into above equation.

Yields:

$$S = 0.000199 * P * G$$

Where P = Power in mW

$G = \text{Numeric antenna gain}$

$S = \text{Power density in mW/cm}^2$

Power density = 0.000530 mW/cm²

For BLE(2M):

Maximum Permissible Exposure

output power = 2.45 mW

Numeric Antenna gain = 1.12

Substituting the MPE safe distance using $d = 20\text{cm}$ into above equation.

Yields:

$S = 0.000199 * P * G$

Where $P = \text{Power in mW}$

$G = \text{Numeric antenna gain}$

$S = \text{Power density in mW/cm}^2$

Power density = 0.000546 mW/cm²

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)