

## 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 BLE: The maximum output power for antenna is -1.279dBm (0.74mW) at 2440MHz, 2.5dBi antenna gain(with 1.78numeric antenna gain.)

For WIFI: The maximum output power for antenna is 15.71dBm (37.24mW) at 2462MHz, 2.5dBi antenna gain(with 1.78numeric 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 BLE: Maximum Permissible Exposure

output power= 0.74mW

Numeric Antenna gain= 1.78

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  $\text{mW}/\text{cm}^2$

$$\text{Power density} = 0.000262 \text{mW}/\text{cm}^2$$

For WIFI: Maximum Permissible Exposure

output power= 37.24mW

Numeric Antenna gain= 1.78

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  $\text{mW}/\text{cm}^2$

$$\text{Power density} = 0.013191 \text{mW}/\text{cm}^2$$

*(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.)*