Maximum Permissible Exposure

Applicable Standard

According to §1.1310, the limits for maximum permissible exposure (MPE) may be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b).

Remark: 1) For Bluetooth: The target output power is 0.83dBm (1.21mW) at 2402MHz, 0dBi antenna gain(with 1 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

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

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 Bluetooth:

Maximum Permissible Exposure

output power=1.21mW

Numeric Antenna gain=1

Substituting the MPE safe distance using d=20cm 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

Power density=0.00024mW/cm^2

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