MPE evaluation

Calculation

Given $E = \frac{\sqrt{30xPxG}}{d}$ & $S = \frac{E^2}{3770}$

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

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30xPxG}{3770d^2}$$

Changing to units of mW and cm, using:

P (mW) = P(W) / 1000 and

d (cm) =d(m) / 100

Yields

$$S = \frac{30x(P/1000)xG}{3770x(d/100)^2} = 0.0796x\frac{PxG}{d^2}$$ **Equation 1**

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm^2

Maximum Permissible Exposure

EUT output power =77.8mW

Antenna Gain = 7.943 (Numeric gain) (9dBi)

Antenna Gain = 63.096 (Numeric gain) (18dBi)

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

S=0.000199 x P x G

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm^2

→ Power density = 0.123mW/cm^2 (9dBi)

→ Power density = 0.977mW/cm^2 (18dBi)

(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.)