MPE evaluation

Calculation

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

    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

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

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

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

    d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \qquad \textbf{\textit{Equation 1}}$$

    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 = 0.07834mW

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

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

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

Yields

    $S = 0.000199 \times P \times G$

Where   *P = Power in mW*

            G = Numeric antenna gain

            S = Power density in mW / cm^2

→ *Power density = 0.000124 mW / cm2 (9 dBi)*

→ *Power density = 0.000984 mW / cm2 (18 dBi)*

(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.