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**MAXIMUM PERMISSIBLE EXPOSURE FOR SUBPART C 2.4 GHz BAND**

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**Calculations**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

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 rearranging the terms to express the distance as a function of the remaining variables yields

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

yields

$$d = 100 \sqrt{((30 * (P/1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric Antenna Gain

S = Power Density in mW / cm<sup>2</sup>P (mW) = 10<sup>^(P(dBm)/10)</sup> andG (numeric) = 10<sup>^(G(dBi)/10)</sup>

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**MAXIMUM PERMISSIBLE EXPOSURE FOR SUBPART C 2.4 GHz BAND (continued)**

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yields

$$d = 0.282 \cdot 10^{((P+G)/20)} \sqrt{S} \quad \text{Equation (1)}$$

where

d = MPE safe distance in cm  
P = Power in dBm  
G = Antenna Gain in dBi  
S = Power Density Limit in mW / cm<sup>2</sup>

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields

$$d = \sqrt{((30 \cdot P \cdot G) / (3770 \cdot S))}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and} \\ d \text{ (cm)} = 100 \cdot d \text{ (m)}$$

yields

$$d = 100 \sqrt{((30 \cdot (P/1000) \cdot G) / (3770 \cdot S))} \\ d = 0.282 \cdot \sqrt{(P \cdot G / S)}$$

where

d = distance in cm  
P = Power in mW  
G = Numeric Antenna Gain  
S = Power Density in mW / cm<sup>2</sup>

**Results**

EUT output power = 22.81 dBm

Antenna Gain = 0.0 dBi

S = 1.0 mW / cm<sup>2</sup> from 1.1310 Table 1

Substituting these parameters into equation (1) above:

**MPE Safe Distance = 3.9 centimeters**

Note: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.