

CALCULATION OF POWER DENSITY

FIND DISTANCE FOR POWER DENSITY OF 7.76 W/m^2

$$\text{RADIATION DENSITY } (W/m^2) = 7.76 = S$$

$$\text{Peak Power (W)} = P$$

$$\text{DISTANCE (M)} = D$$

$$\text{ANTENNA GAIN (dBi)} = G$$

$$\text{ANTENNA GAIN RATIO} = \text{Log}^{-1}\left(\frac{G}{10}\right) = 31.62 = G_{\text{RATIO}}$$

$$\text{FOR: POWER OUTPUT MAXIMUM } P_{\text{Peak}} = 24 \text{ dBm} = 0.25 \text{ W}$$

$$\text{ANTENNA GAIN MAXIMUM } 15 \text{ dBi}$$

$$S = \frac{P \times G_{\text{RATIO}}}{4\pi \times D^2}$$

$$7.76 = \frac{(0.25)(31.62)}{4 \times 3.14 \times D^2}$$

$$D^2 = \frac{(0.25)(31.62)}{4 \times 3.14 \times 7.76}$$

$$D^2 = \frac{7.936}{97.465}$$

$$D^2 = 0.0814$$

$$D = 0.285 \text{ METER or } 28.5 \text{ cm}$$