

**9.9** An antenna with a pattern solid angle of 1.5 (sr) radiates 90 W of power. At a range of 1 km, what is the maximum power density radiated by the antenna?

**Solution:** From Eq. (9.23),  $D = 4\pi/\Omega_p$ , and from Eq. (9.24),  $D = 4\pi R^2 S_{\max}/P_{\text{rad}}$ . Combining these two equations gives

$$S_{\max} = \frac{P_{\text{rad}}}{\Omega_p R^2} = \frac{90}{1.5 \times (10^3)^2} = 6 \times 10^{-5} \quad (\text{W/m}^2).$$

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