

$$3. \quad a) \quad I = \frac{P}{4\pi R^2} \Rightarrow R = \sqrt{\frac{P}{4\pi I}} = \sqrt{\frac{800}{4\pi(2.5)}} = \boxed{5.05 \text{ m}}$$

$$b) \quad I = \frac{E_{\max}^2}{2\mu_0 c} \Rightarrow E_{\max} = \sqrt{2\mu_0 c I} = \sqrt{2 \times 4\pi \times 10^{-7} \times 3 \times 10^8 (2.5)}$$

$$\boxed{E_{\max} = 43.4 \text{ V/m}}$$

$$B_{\max} = \frac{E_{\max}}{c} = \frac{43.4}{3 \times 10^8} = \boxed{1.45 \times 10^{-7} \text{ Tesla}}$$

$$c) \quad P = \frac{I}{c} = \frac{2.5}{3 \times 10^8} = \boxed{8.33 \times 10^{-9} \frac{\text{W}}{\text{m}^2}}$$

$$d) \quad I \uparrow \quad I_1 \quad I_2 \quad I_{\text{trans}}$$

$$I_{\text{trans}} = I_2 \cos^2 45^\circ = I_1 \cos^4 45^\circ = \frac{I}{2} \cos^4(45^\circ)$$

$$I_{\text{trans}} = \frac{I}{8} = \frac{2.5}{8} = \boxed{0.313 \frac{\text{W}}{\text{m}^2}}$$