19. (a) The average rate of energy flow per unit area, or intensity, is related to the electric field amplitude E_m by $I = E_m^2/2\mu_0 c$, so

$$\begin{aligned} E_m &= \sqrt{2\mu_0 cI} = \sqrt{2(4\pi \times 10^{-7}\,\text{H/m})(2.998 \times 10^8\,\text{m/s})(10 \times 10^{-6}\,\text{W/m}^2)} \\ &= 8.7 \times 10^{-2}\ \text{V/m} \ . \end{aligned}$$

(b) The amplitude of the magnetic field is given by

$$B_m = \frac{E_m}{c} = \frac{8.7 \times 10^{-2}\,\text{V/m}}{2.998 \times 10^8\,\text{m/s}} = 2.9 \times 10^{-10}\ \text{T} \ .$$

(c) At a distance r from the transmitter, the intensity is $I = P/4\pi r^2$, where P is the power of the transmitter. Thus

$$P = 4\pi r^2 I = 4\pi(10 \times 10^3\,\text{m})^2(10 \times 10^{-6}\,\text{W/m}^2) = 1.3 \times 10^4\ \text{W} \ .$$