Level 2 EM question 10 2002/3

The standard expression for the electric field at a large distance r and at an angle θ from the axis of a half-wave dipole carrying a peak current I_o is

$$\underline{E}(\underline{r},t) = \frac{jc\mu_o I_o}{2\pi r}\left[\frac{\cos\left(\frac{\pi}{2}\cos\theta\right)}{\sin\theta}\right] e^{j\omega(t-r/c)}\hat{\underline{\theta}}\,.$$

At a distance of 15 km and at an angle $\pi/6$ above the equatorial plane the amplitude of the electric field is found to be 1.5×10^{-2} Vm^{-1}. What is the value of the peak current in the dipole? Estimate the total time averaged power radiated by this half-wave dipole.