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$$v = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$$

$$P = \frac{1}{2}\frac{E_0^2}{377} = \frac{1}{2}\frac{377^2}{377} = 188,5$$

$$v_2 = \frac{1}{2}\frac{1}{\sqrt{\mu_0 \varepsilon_0}} \rightarrow \begin{matrix}\mu = 4\mu_0 \\ \varepsilon = 4\varepsilon_0\end{matrix}$$

$$\omega = 12,56 \times 10^9 = 2\pi f$$

$$f = \frac{12,6 \times 10^9}{2 \cdot 3,14} = 2\,GHz$$

$$|\eta| = 377\sqrt{\frac{\mu_r}{\varepsilon_r}} = 377\sqrt{\frac{1}{4}} = \frac{377}{2} = 188,5\ \Omega$$

$$\gamma = j\omega\sqrt{\mu\varepsilon} = j \cdot 2\pi \cdot 10^9 \sqrt{2 \cdot \mu_0 \cdot 8 \cdot \varepsilon_0} = j2\pi \cdot 10^9 \sqrt{1,78 \times 10^{-16}}$$

$$= j\,83,8$$

$$E = E_0 e^{-\alpha}$$

$$\frac{1}{2}E_0 = E_0 e^{-\alpha}$$

$$e^{-\alpha} = \frac{1}{2}$$

$$-\alpha = -\ln(2)$$

$$\alpha = \ln(2) \rightarrow \delta = \frac{1}{\alpha} = \frac{1}{\ln(2)}$$

$$\omega = 2\pi f = 6,28 \times 10^9$$

$$\delta = 10^9$$

$$v = 25$$

$$\lambda = \frac{v}{f} = \frac{3 \times 10^8}{10^9} = 0,3\ m = 30\ cm$$

$$\beta = \frac{2\pi}{0,25} = 25,12\ rad/m$$

$$f = \frac{v}{\lambda} = \frac{3 \times 10^8}{0,25} = 1,2\ GHz$$

$$T = \frac{1}{f} = \frac{1}{1,2\,GHz} = 83,33\ ns$$

$$H_0 = \frac{E_0}{377} \rightarrow E_0 = H_0 \cdot 377$$

$$E_0 = 0,25 \cdot 377$$

$$E_0 = 94,25\ V/m$$