A lossless speaker cable 200 m long, $\varepsilon_r = 10$, $Z_0 = 16 \Omega$, is connected to a 16 $\Omega$ speaker. At a frequency of 32 kHz, are transmission line issues absolutely not a problem, possibly a problem, or absolutely a problem?

$$\omega = 32 \text{ kHz}, \quad \frac{1}{T} = \frac{\omega}{c} = 31.25 \mu s \quad [1]$$

$$\sqrt{T} = \frac{2}{\sqrt{\varepsilon_r}} = \frac{3 \times 10^8 \text{m/s}}{\sqrt{10}} = 9.487 \times 10^7 \text{m/s} \quad [2]$$

$$\frac{T}{L} = \frac{200 \text{m}}{9.487 \times 10^7 \text{m/s}} = 2.108 \mu s \quad [3]$$

$$\frac{T}{\lambda} = \frac{2.108}{31.25} = 0.066 \quad [4]$$

Distributed if: $\frac{T}{\lambda} > 0.1$

Lumped if: $\frac{T}{\lambda} < 0.01$

0.1 < 0.06 < 0.1

Possibly a problem