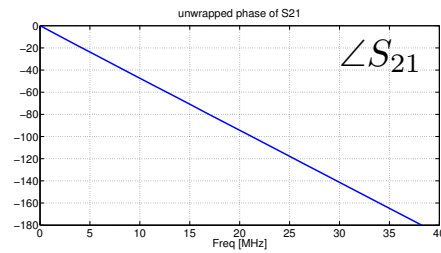
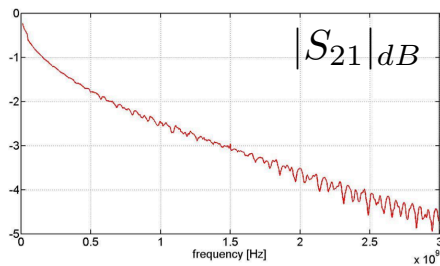


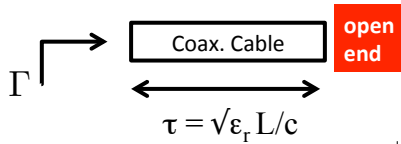
Coaxial Cable

$$S_{21}(\omega) = \exp(-\gamma L) = \exp(-\alpha L - j\beta L) = \exp(-\alpha' \sqrt{\omega} L - j \omega \tau)$$

$$\beta L = (\omega/c) \sqrt{\epsilon_r} L = \omega \tau \quad \tau = \sqrt{\epsilon_r} L/c = \text{electrical delay}$$

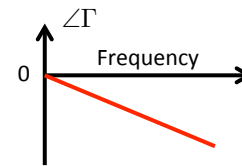
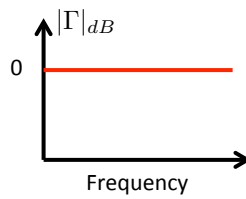


Open Coaxial Cable



Ideal Case

$$\Gamma = \frac{b_1}{a_1} = e^{-j2\pi f 2\tau}$$



Radiation + Losses

$$\Gamma \approx e^{-\alpha' \sqrt{\omega} 2L} e^{-j2\pi f 2\tau}$$

