# ECE320: Fields and Waves
## Lab 2 Report: Standing Waves and Waveguides
### PRA106

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# 1   Introduction

This laboratory focused on investigating the (voltage) wave propagation in a microstrip transmission lines, as well as its depedance on the nature of load impedance.

# 2   Measurement of Microstrip Line Characteristics

We varied the load on the switch box until we saw little or no traces of reflected waves. This was at $Z_L = 50\Omega$ which is also equal to the charactertic impedance since we know that the reflections nullify when $Z_L = Z_0$. The corresponding waveforms captured at the generator input (channel 1, top) and the transmission line input (channel 2, bottom) are shown in Figure 1.
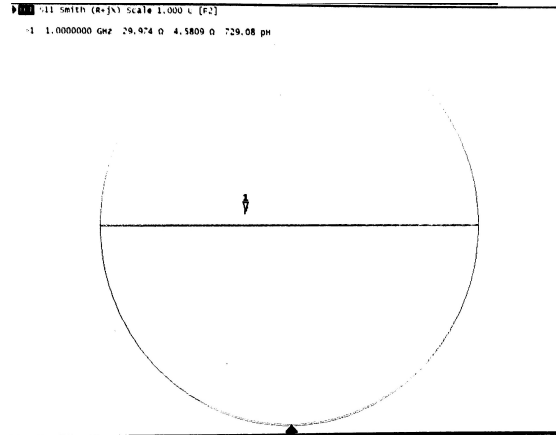


Figure 1: Transmission line terminated with load $Z_L = Z_0$

# 3   Using Standing Wave Patterns for Load Calculations

Observed waveforms at different points on the transmission line can be found in Figure 5.
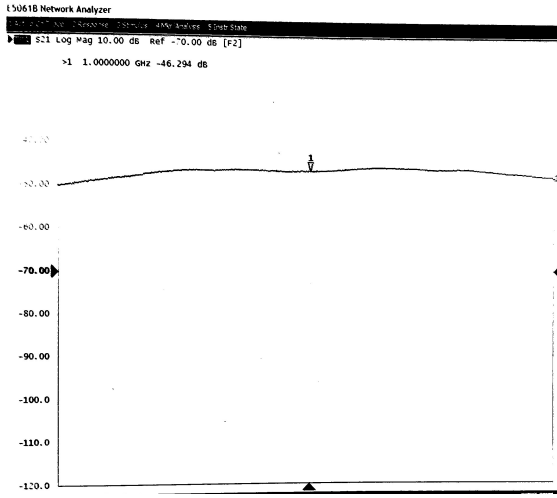
# 4   Notes

All images taken during the lab were post-processed in a batch using a custom script that bit-wise inverts the pixels and binarizes the resulting image based on a custom threshold. No adjustments or modifications were
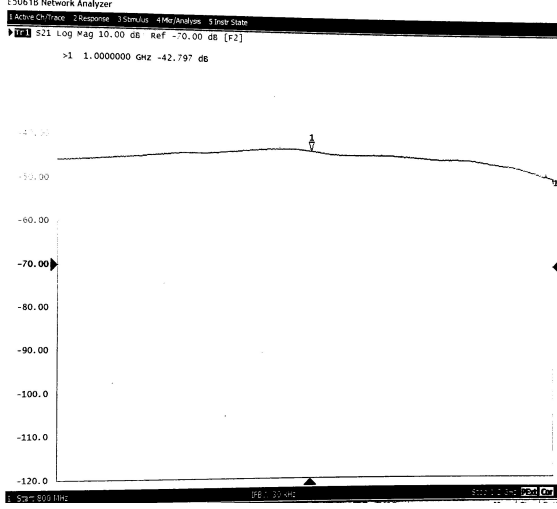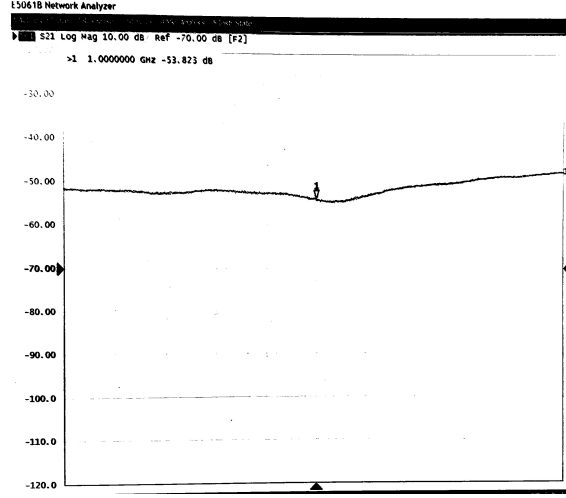
(a) Port C (0m)
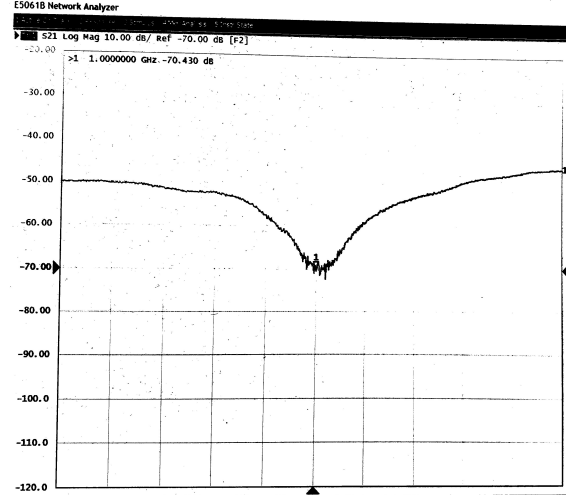
(b) Port D (30m)

(c) Port E (60m)

(d) Port F (90m)

Figure 2: Measured $V(t)$ at different loactions along the transmission line with $Z_L = Z_0$

made to the readings, for which the oscilloscope's measurements are also shown alongside the waveforms. All scripts and related work can be found at `github.com/pranshumalik14/ece320-labs`.