

ECE320: Fields and Waves

Lab 2 Report: Standing Waves and Waveguides

PRA106

Alp Tarım, Pranshu Malik
1003860128, 1004138916

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 characterctic 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.

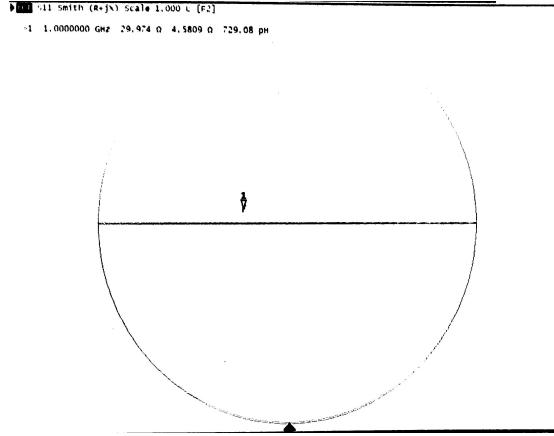


Figure 1: Transmission line terminated with load $Z_L = Z_0$

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

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.

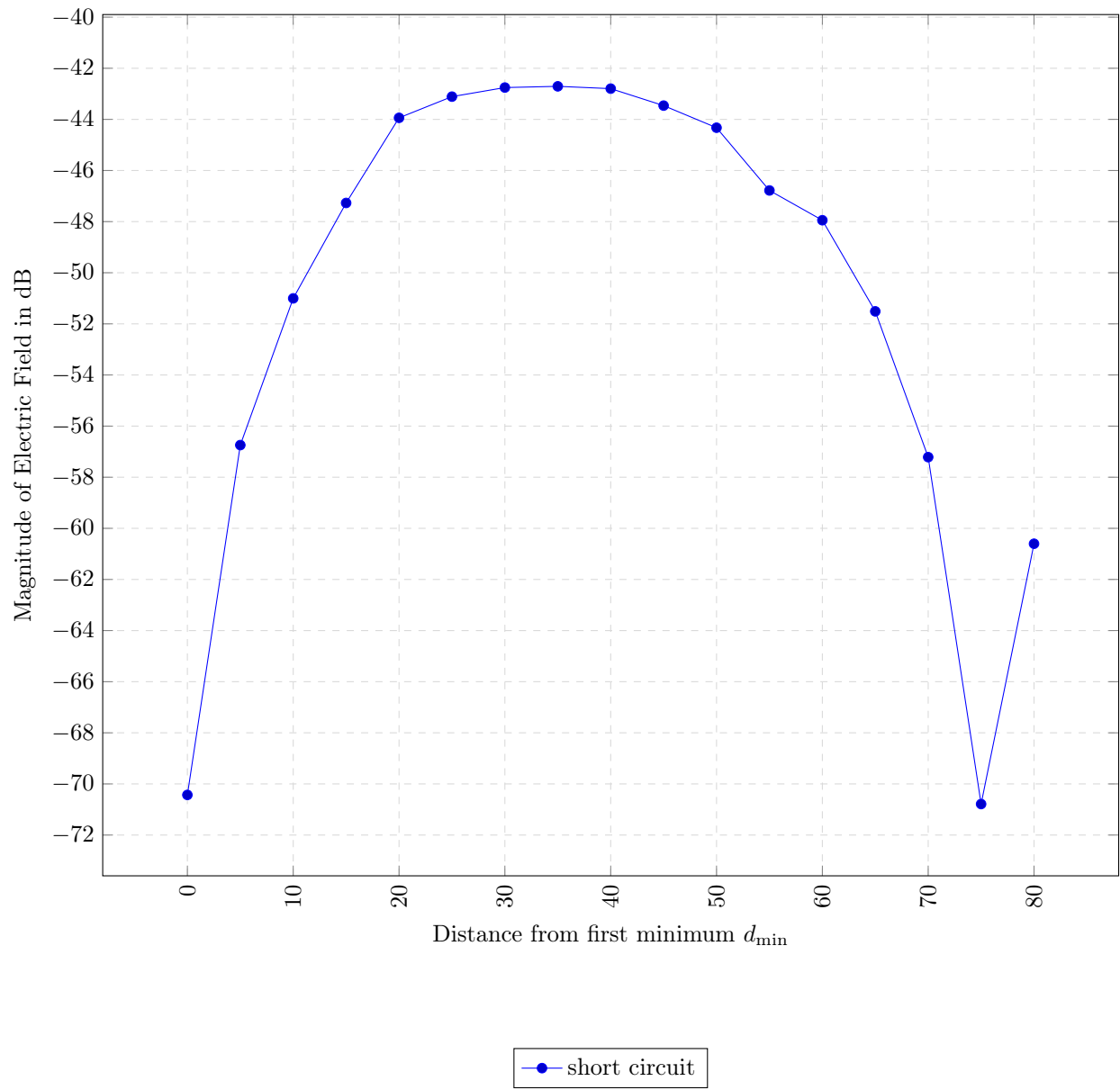


Figure 2: volt plot

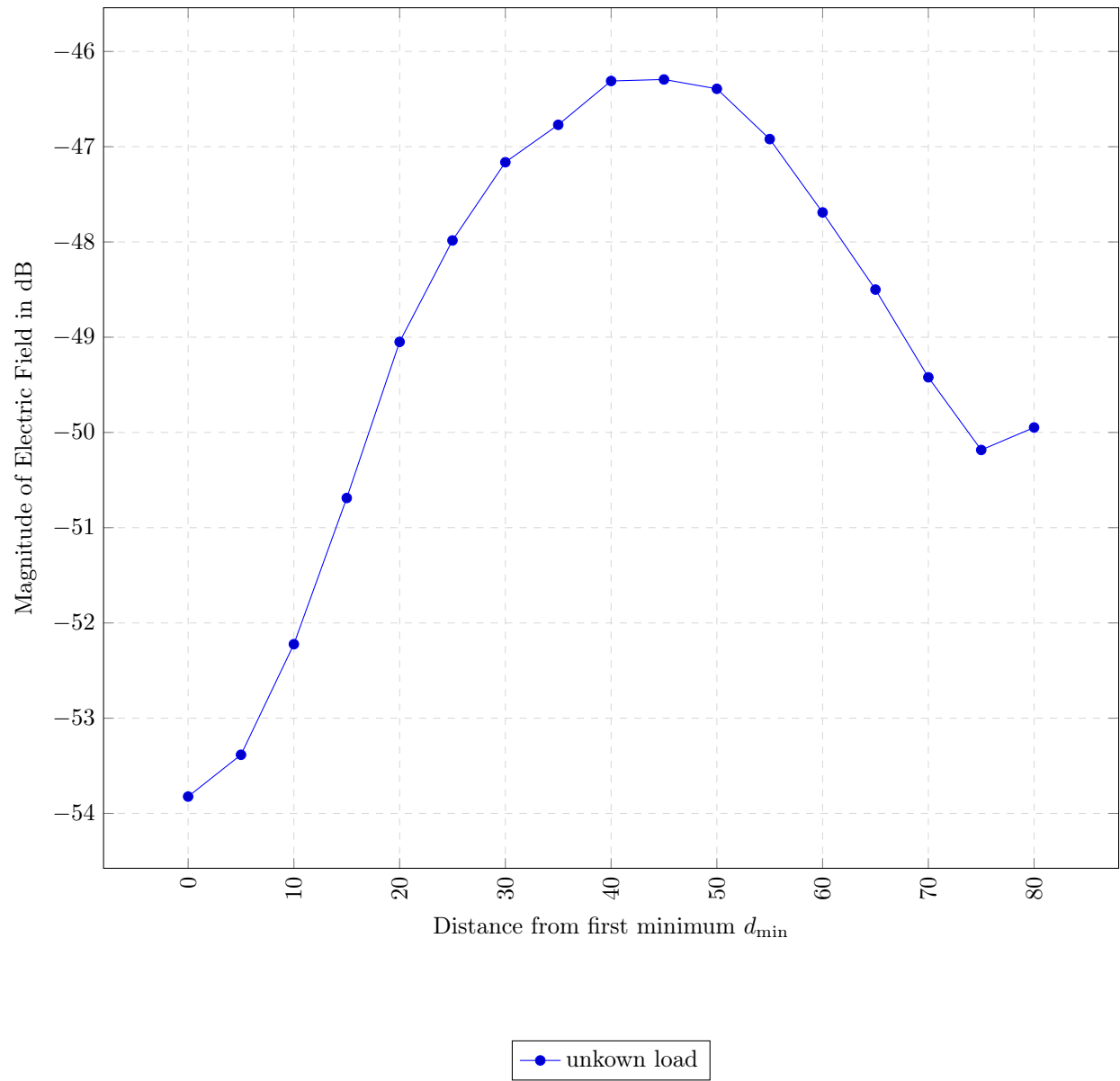
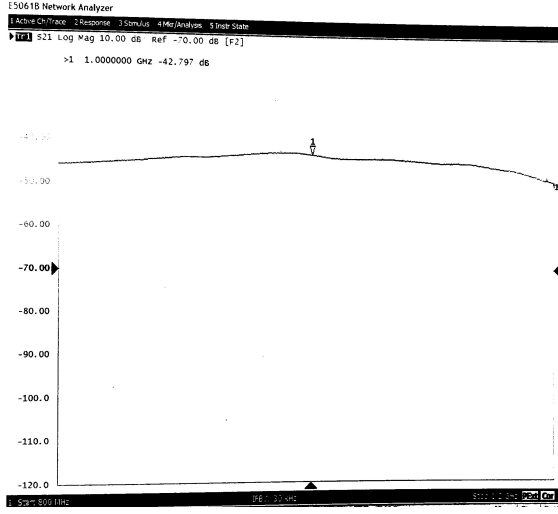
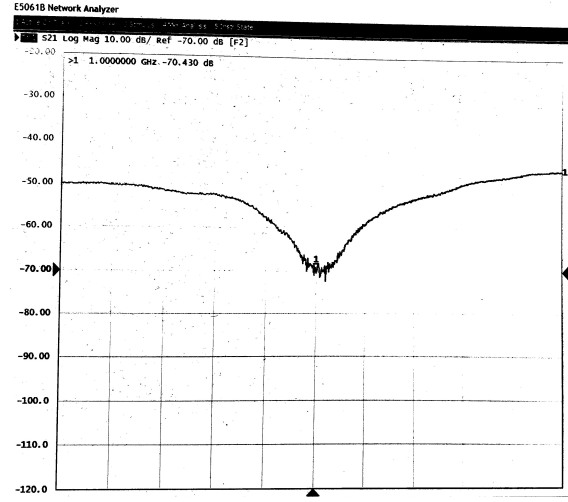


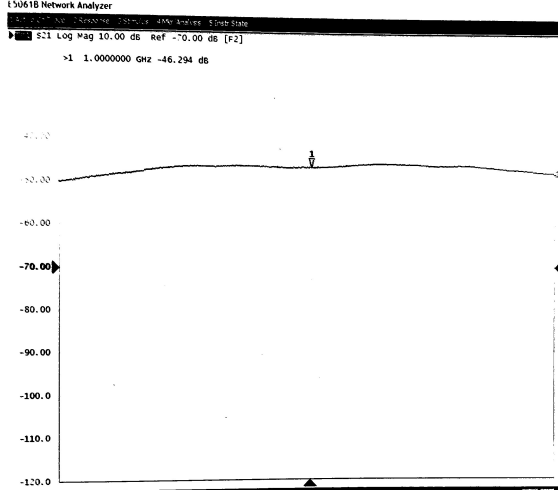
Figure 3: volt plot 2



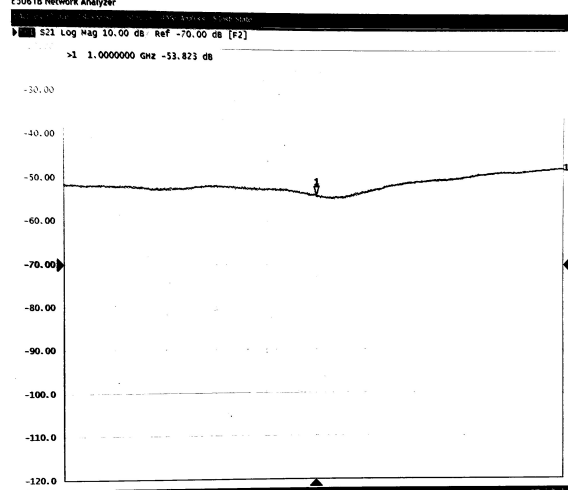
(a) Port C (0m)



(b) Port D (30m)



(c) Port E (60m)



(d) Port F (90m)

Figure 4: Measured $V(t)$ at different loactions along the transmission line with $Z_L = Z_0$