EC452 Ultra High Frequency Techniques

Title: Prelab 2

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1. Quarter-Wave Transformer
Microstrip width of the 50Ω transmission = 4.92mm
Microstrip width of the 200Ω transmission = 0.17mm
For the λ/4 matching T-Line, Z_{OT}=100Ω, so the width of the transmission line =1.41mm and the length = 23.04mm

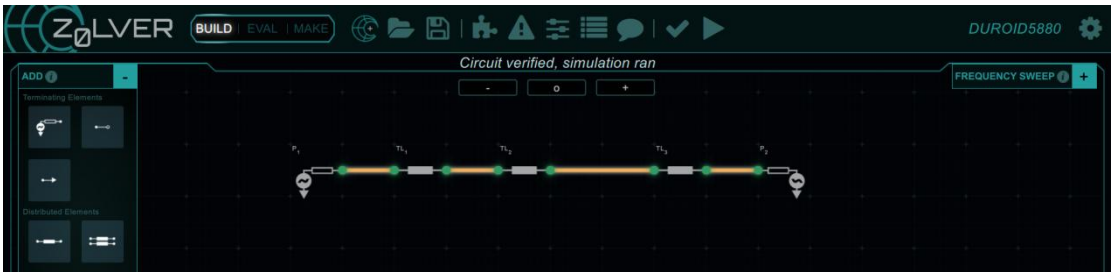

Figure 1 - A Quarter-Wave Transformer Design Layout in Z0lver

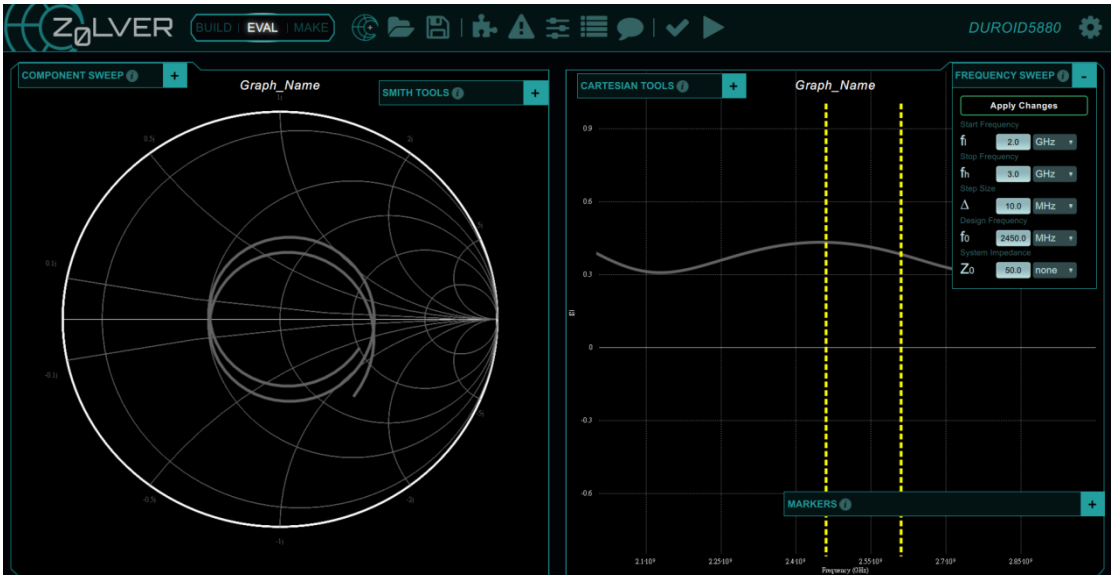

Figure 2 - S11 Simulation Results in Z0lver

Figure 3 - Circuit Layout on Duroid 5880 Substrate in Z0lver

2. Double-Stub matching network
Z_L=100-50j, z_L=2-j, y_L=0.4+0.2j

Set d_1=0.5λ, d_2=λ/8
y_1=0.4+0.2j, y_1'=0.4+1.8j
jb_1=0j, jb_1'=1.6j
Rotate d_2=0.125λ==>jb_2=-1.05j, jb_2'=2.8j

1st solution: d_1=0.5λ, l_1=0λ, d_2=0.125λ, l_2=0.372λ

2nd solution: d_1'=0.5λ, l_1'=0.16λ, d_2'=0.125λ, l_2'=0.195λ

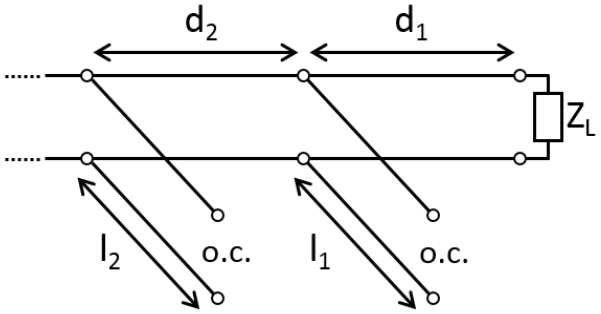

Figure 4 - A Double-Stub Matching Design Layout

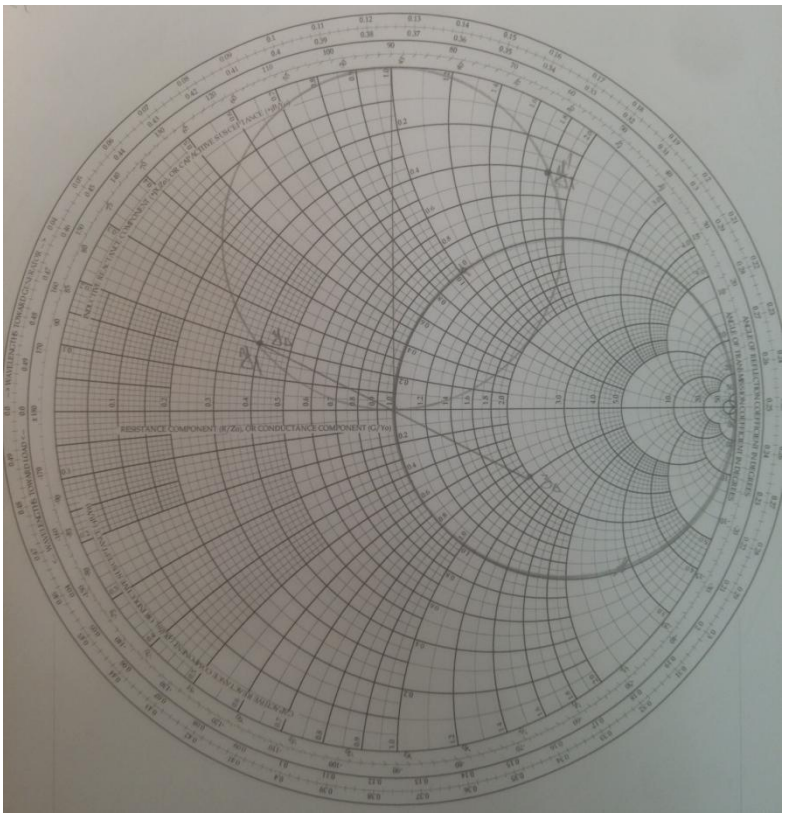
Figure 5 - Smith Chart Degian - 1

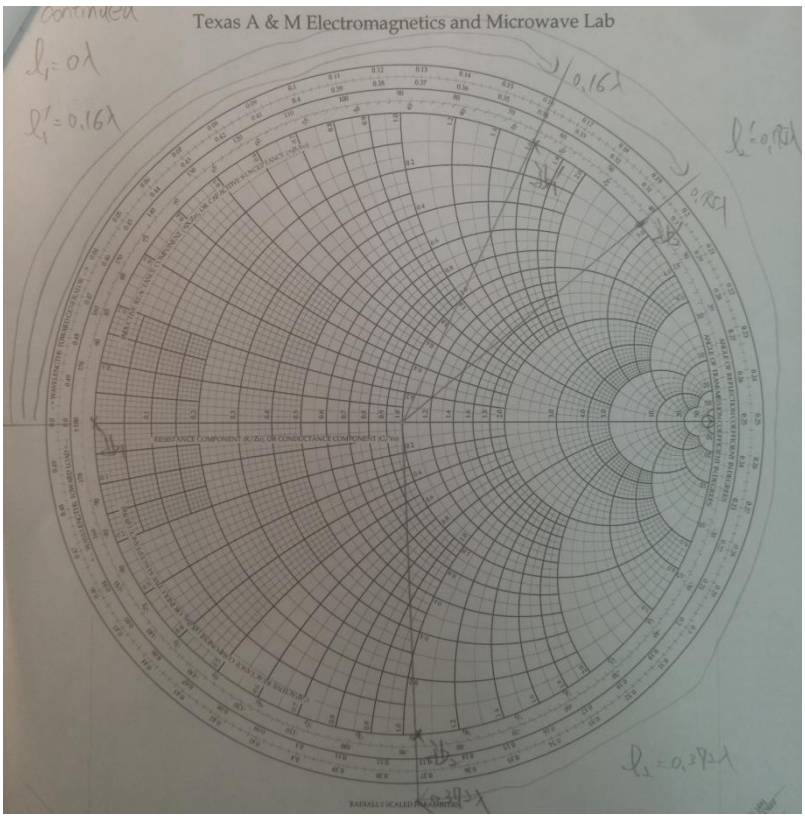

Figure 6 - Smith Chart Degian - 2

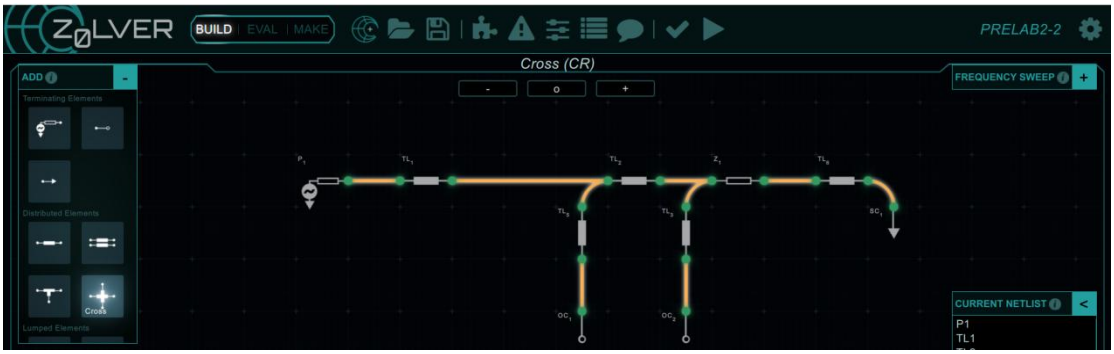

Figure 7 - A Double-Stub Circuit Implemented in Z0lver

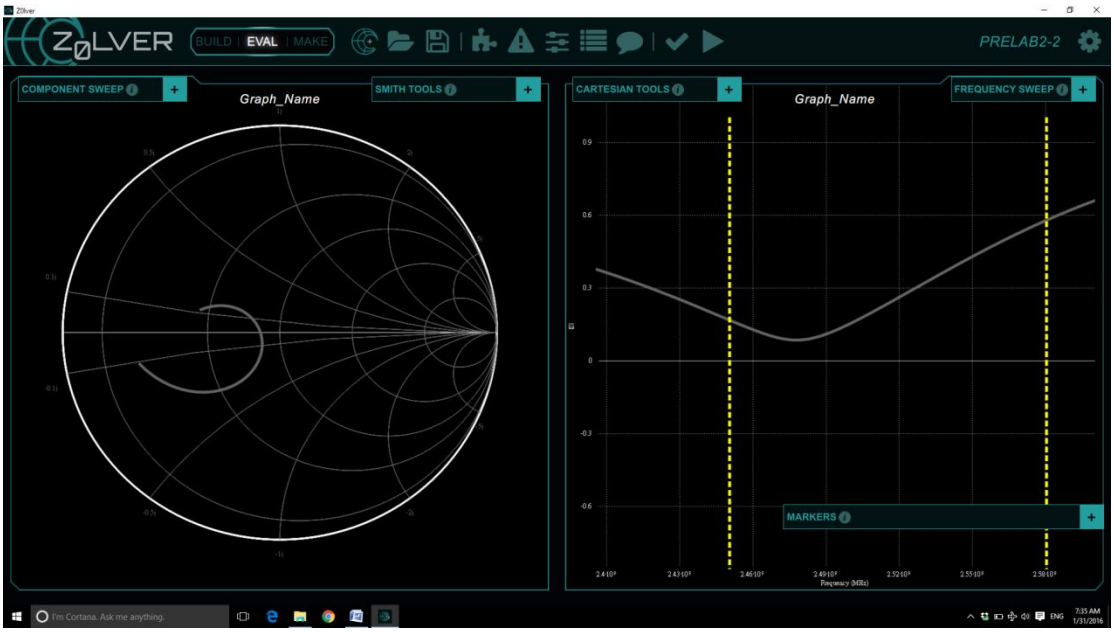

Figure 8 - S_{11} Simulation Results in Z0lver

Figure 9 - Circuit Layout on FR4 Substrate in Z0lver