

電工實驗 5

第三次實驗

預報

Date: 2024/10/15

Class: 電機四全英班

Group: Group 9

Name: B103105006 胡庭翊

B103015018 劉珮妤

I. TXLINE 參數設定

A. $\lambda/2$

The screenshot shows the TXLINE 2003 - Microstrip software window. The 'Material Parameters' section is set to Dielectric: GaAs, Dielectric Constant: 4.7, Loss Tangent: 0.02, Conductor: Copper, and Conductivity: 5.88E+07 S/m. The 'Electrical Characteristics' section shows Impedance: 27 Ohms, Frequency: 1.8 GHz, Electrical Length: 180 deg, Phase Constant: 4232.05 deg/m, Effective Diel. Const.: 3.83348, and Loss: 6.6824 dB/m. The 'Physical Characteristic' section shows Physical Length (L): 42.5326 mm, Width (W): 3.59703 mm, Height (H): 0.8 mm, and Thickness (T): 0.035 mm. A diagram on the right shows a cross-section of a microstrip line with width W, height H, and thickness T.

Material Parameters	Electrical Characteristics	Physical Characteristic
Dielectric: GaAs	Impedance: 27 Ohms	Physical Length (L): 42.5326 mm
Dielectric Constant: 4.7	Frequency: 1.8 GHz	Width (W): 3.59703 mm
Loss Tangent: 0.02	Electrical Length: 180 deg	Height (H): 0.8 mm
Conductor: Copper	Phase Constant: 4232.05 deg/m	Thickness (T): 0.035 mm
Conductivity: 5.88E+07 S/m	Effective Diel. Const.: 3.83348	
	Loss: 6.6824 dB/m	

特性阻抗設為 27Ω , 得到線長為 42.5326mm, 線寬為 3.59703mm。

B. $\lambda/4$

The screenshot shows the TXLINE 2003 - Microstrip software window. The 'Material Parameters' section is set to Dielectric: GaAs, Dielectric Constant: 4.7, Loss Tangent: 0.02, Conductor: Copper, and Conductivity: 5.88E+07 S/m. The 'Electrical Characteristics' section shows Impedance: 36.74 Ohms, Frequency: 1.8 GHz, Electrical Length: 90.0001 deg, Phase Constant: 4137.46 deg/m, Effective Diel. Const.: 3.66403, and Loss: 6.4806 dB/m. The 'Physical Characteristic' section shows Physical Length (L): 21.7525 mm, Width (W): 2.32574 mm, Height (H): 0.8 mm, and Thickness (T): 0.035 mm. A diagram on the right shows a cross-section of a microstrip line with width W, height H, and thickness T.

Material Parameters	Electrical Characteristics	Physical Characteristic
Dielectric: GaAs	Impedance: 36.74 Ohms	Physical Length (L): 21.7525 mm
Dielectric Constant: 4.7	Frequency: 1.8 GHz	Width (W): 2.32574 mm
Loss Tangent: 0.02	Electrical Length: 90.0001 deg	Height (H): 0.8 mm
Conductor: Copper	Phase Constant: 4137.46 deg/m	Thickness (T): 0.035 mm
Conductivity: 5.88E+07 S/m	Effective Diel. Const.: 3.66403	
	Loss: 6.4806 dB/m	

特性阻抗為 $\sqrt{27 \times 50} = 36.7423\Omega$, 得到線長為 21.7525mm, 線寬為 2.32574mm。

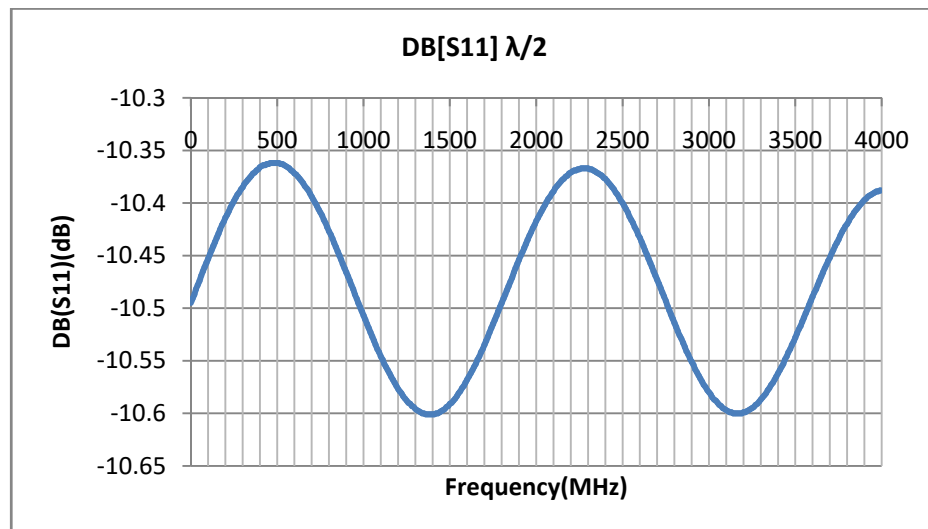
II. Libra 的 code

$\lambda/2$	$\lambda/4$
<pre>DIM FREQ MHZ RES OH LNG MM ANG DEG IND NH CAP PF CKT MSUB ER=4.7 H=0.8 T=0.035 RHO=0 RGH=0 TAND TAND=0.02 MLIN 1 2 W=3.59703 L=42.5326 RES 2 0 R=27 DEF1P 1 EXP1 FREQ SWEEP 0.0000005 4000 10 OUT EXP1 DB[S11] GR1 EXP1 MAG[z1] GR2 GRID RANGE 0.0000005 4000 10 GR1 -20 0 1 GR2 0 50 10</pre>	<pre>DIM FREQ MHZ RES OH LNG MM ANG DEG IND NH CAP PF CKT MSUB ER=4.7 H=0.8 T=0.035 RHO=0 RGH=0 TAND TAND=0.02 MLIN 1 2 W=2.32574 L=21.7525 RES 2 0 R=27 DEF1P 1 EXP1 FREQ SWEEP 0.0000005 4000 10 OUT EXP1 DB[S11] GR1 EXP1 MAG[z1] GR2 GRID RANGE 0.0000005 4000 10 GR1 -20 0 1 GR2 0 50 10</pre>

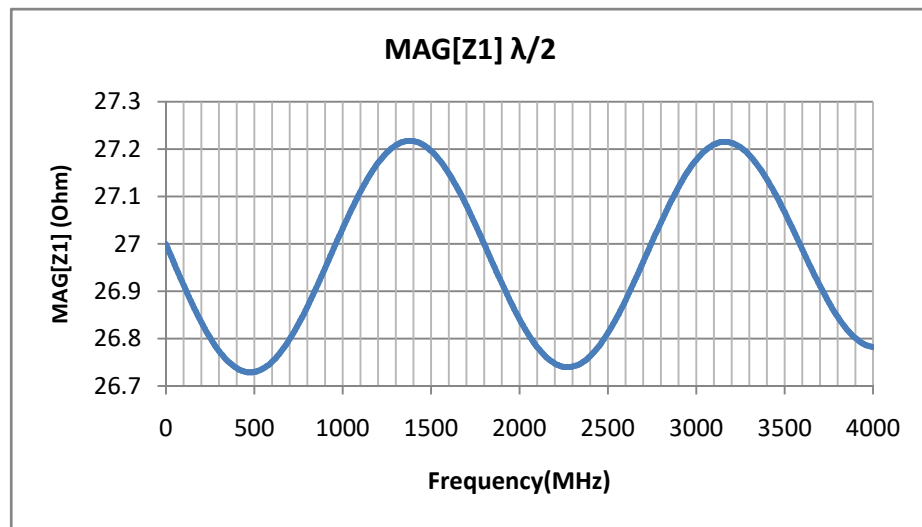
III. 模擬結果

A. $\lambda/2$

1. S11

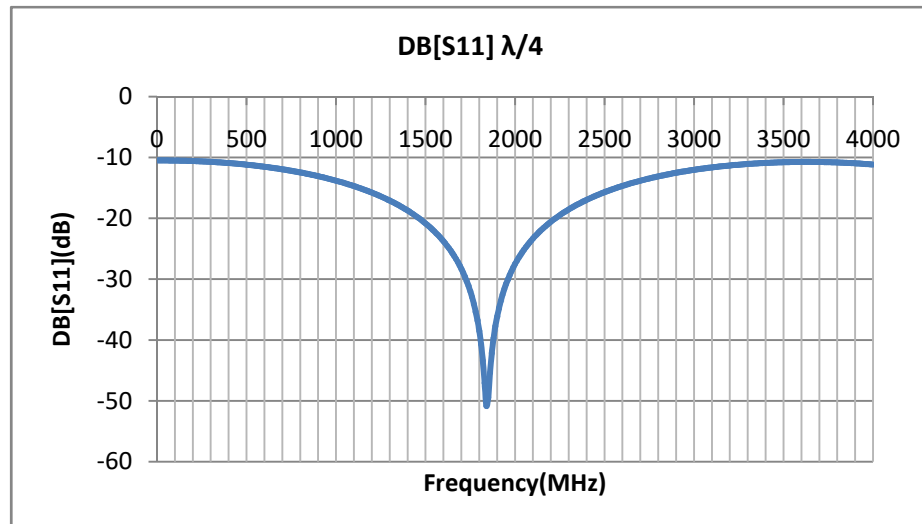


2. Z1



B. $\lambda/4$

1. S11



2. Z1

