ECE 546 HOMEWORK No 6

1. Go through the HFSS tutorial (download from course web site).

<u>Modify the structure</u>: rotate the lower trace by 180 degrees with everything else remaining the same as in the HFSS tutorial; after the rotation, the structure should appear as shown in Figure 1 (side-view) and Figure 2 (3D-view); make sure the lumped port associated with the lower trace is also rotated with the trace; hand in your plots for S_{11} and S_{21} versus frequency.



Figure 1. Side view: trace and via



Figure 2. 3D view: trace and via

<u>Modify the material property for the board</u>: on the modified design (with the rotation), assign FR4_epoxy to the board in replace of the vacuum as shown in Figure 3; to view the material properties of FR4_epoxy, you can select View/Edit Material and the material properties are highlighted in the red box as shown in Figure 4; you can also assign frequency-dependent material properties as that in the green box in Figure 4; you are not required to use the frequency-dependent material properties in this homework.; hand in your plots for S_{11} and S_{21} versus frequency.



Figure 3. Assign FR4_epoxy to board

View / Edit Material				<u> </u>
faterial Name				
FR4_epoxy				
Properties of the Material				View/Edit Material for
Name	Тире	Value	Units	
Belative Permittivitu	Simple	4.4	Oniks	Active Design
Belative Permeability	Simple	1		C This Product
Bulk Conductivity	Simple	0	siemens/m	C All Products
Dielectric Loss Tangent	Simple	0.02		
Magnetic Loss Tangent	Simple	0		
Magnetic Saturation	Simple	0	tesla	
Lande G Factor	Simple	2		
Delta H	Simple	0	A_per_meter	
- Measured Frequency	Simple	9.4e+009	Hz	
Mass Density	Simple	1900	kg/m^3	
				Validate Material
				-
]
Set Frequency Dependency	Calculate Propert	ties for: 📃 💌		
Beset	OK Cano	cel 1		
11000				

Figure 4. Material properties of FR4_epoxy