

LAB #03: Transmission Line Modeling using Coplaner Waveguide.

Objective:

To familiarize the students with the designing of different transmission line modeling using design guide in ADS.

Pre Lab:

Transmission Line modeling in ADS?

A transmission line connects a generator to a load – a two port network. TEM (Transverse Electromagnetic): Electric and magnetic fields are orthogonal to one another, and both are orthogonal to direction of propagation. RF transmission lines carry an AC signal through a controlled-impedance transmission medium. This contains the EM field and minimizes loss and coupling to other nearby structures. A simple transmission line model allows the designer to estimate the electrical length of the structure, along with the path loss. There are many approaches to take when modeling a transmission line. It is important to choose the appropriate simulation model for the required outcome. For example, two-dimensional, schematic-level models are appropriate for determining phase delay through a line. This is also ideal for approximating the power loss as a function of frequency and length. For this application note, Agilent's ADS is used.

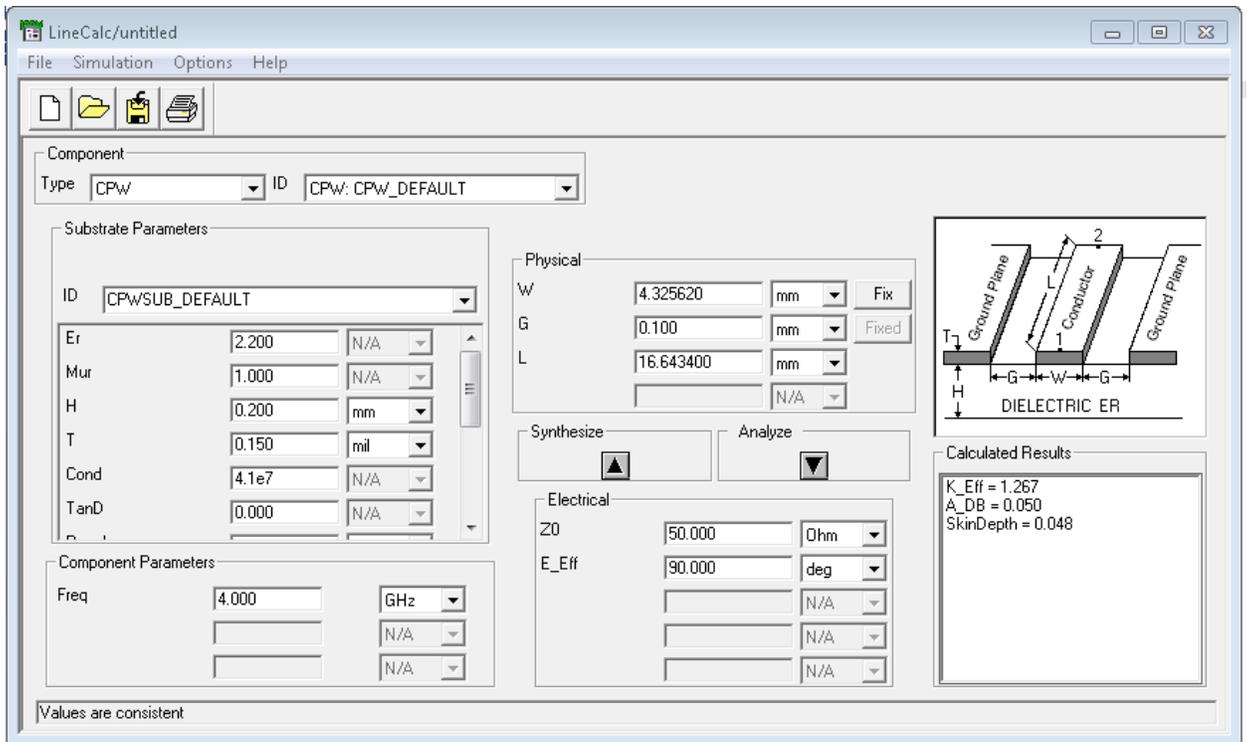
Lab Task 1.

To start the modeling of transmission line go to the **start window > programs > ADS > ADS Tools > linecalc.**

Following window will be appear

For CPW

- Select the component type **CPW**
- Change the parameter W, L and H units to mm
- The tan delta value should remain be zero
- Enter the values
Er=2.2
Tan delta=0
Frequency =4GHz
Z (IMPEDENACE) =50
E_EFF =90 DEGREE
G= 0.1 fix



Fill the following table

H-sub	W-TL
0.2 mm	4.32 mm
0.4 mm	
0.6 mm	
0.8 mm	
1 mm	
1.2 mm	
1.5 mm	
3 mm	

Now fix the value of height at 1.54mm and $\epsilon_r=2.2$ and $G=0.1$ MM fill the following table

E_EFF	L-T-L
45 DEGREE	7.78 mm
90 DEGREE	
180 DEGREE	
270 DEGREE	

2. Fill the Same Tables for CPWG.

Lab Task 2.

Fill the both tables for CPW and CPWG with

- $\epsilon_r=3$
- $G=0.1$

Lab Task 3.

Calculate and simulate the CPW and CPWG transmission line for FR-4 substrate of permittivity 4.4 and height of 1.6mm.