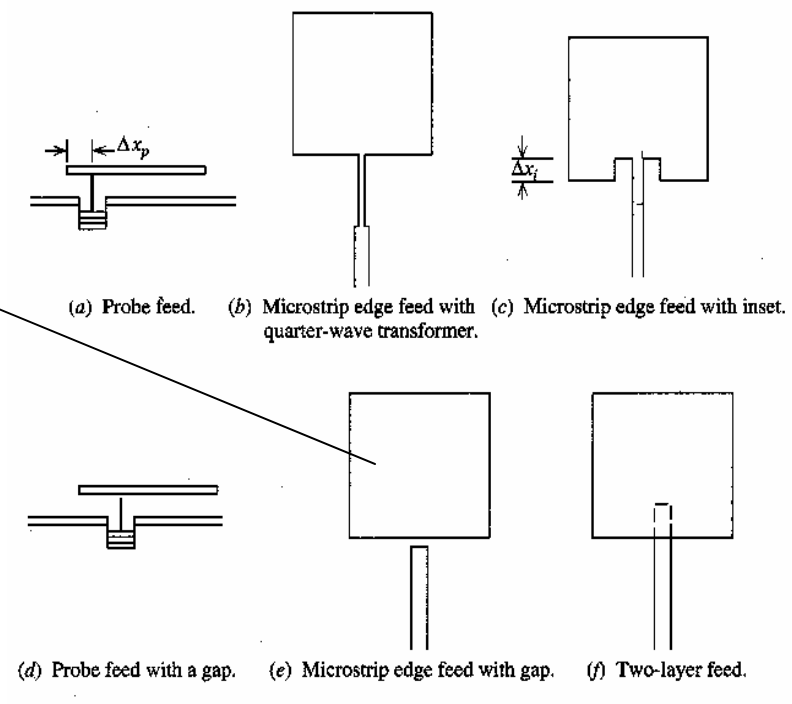
Example 1.

Microstrip edge feed with gap

Antenna Design

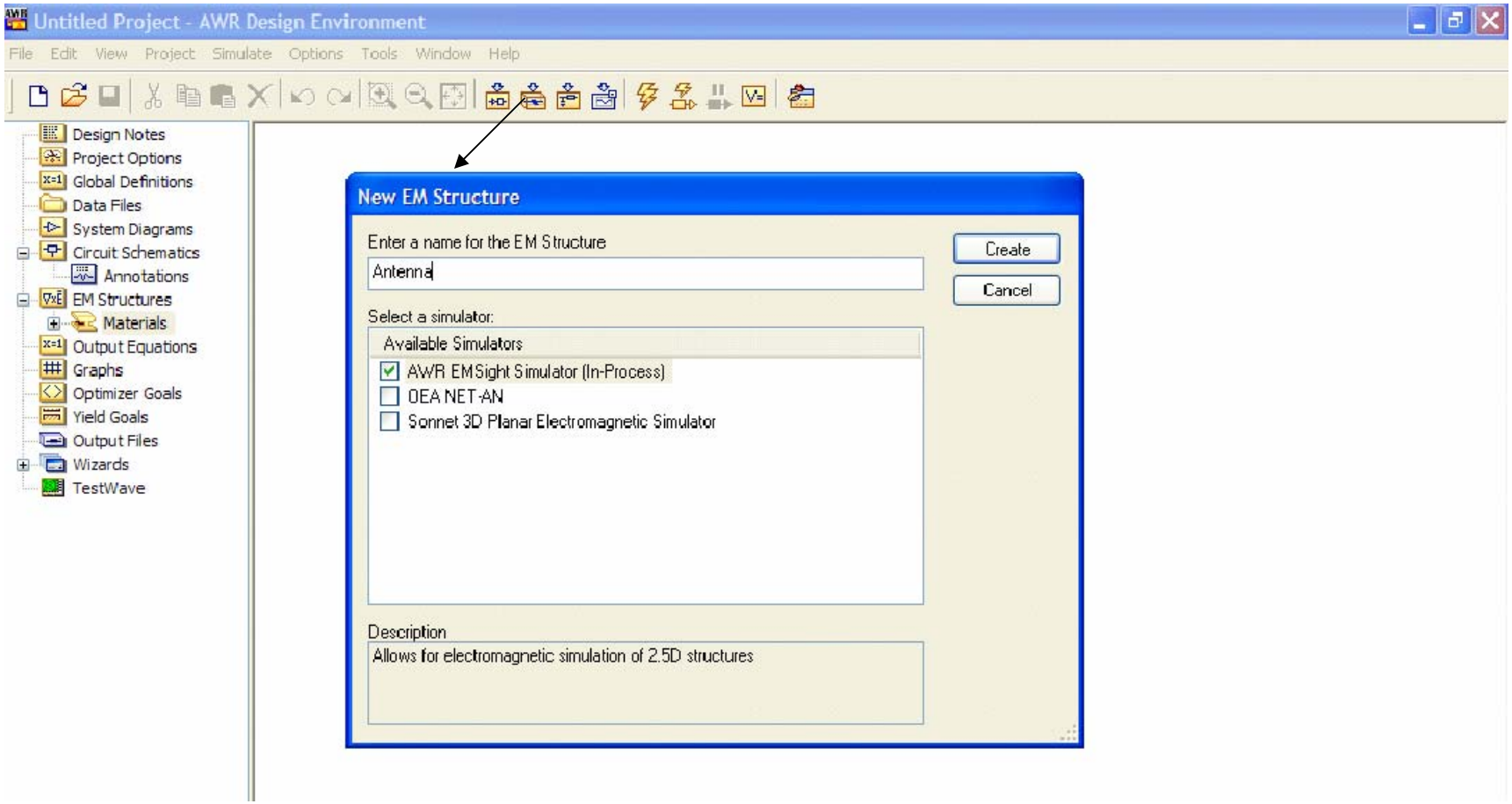
A Simple Example to Show the Basic Steps Using AWR Microwave Office



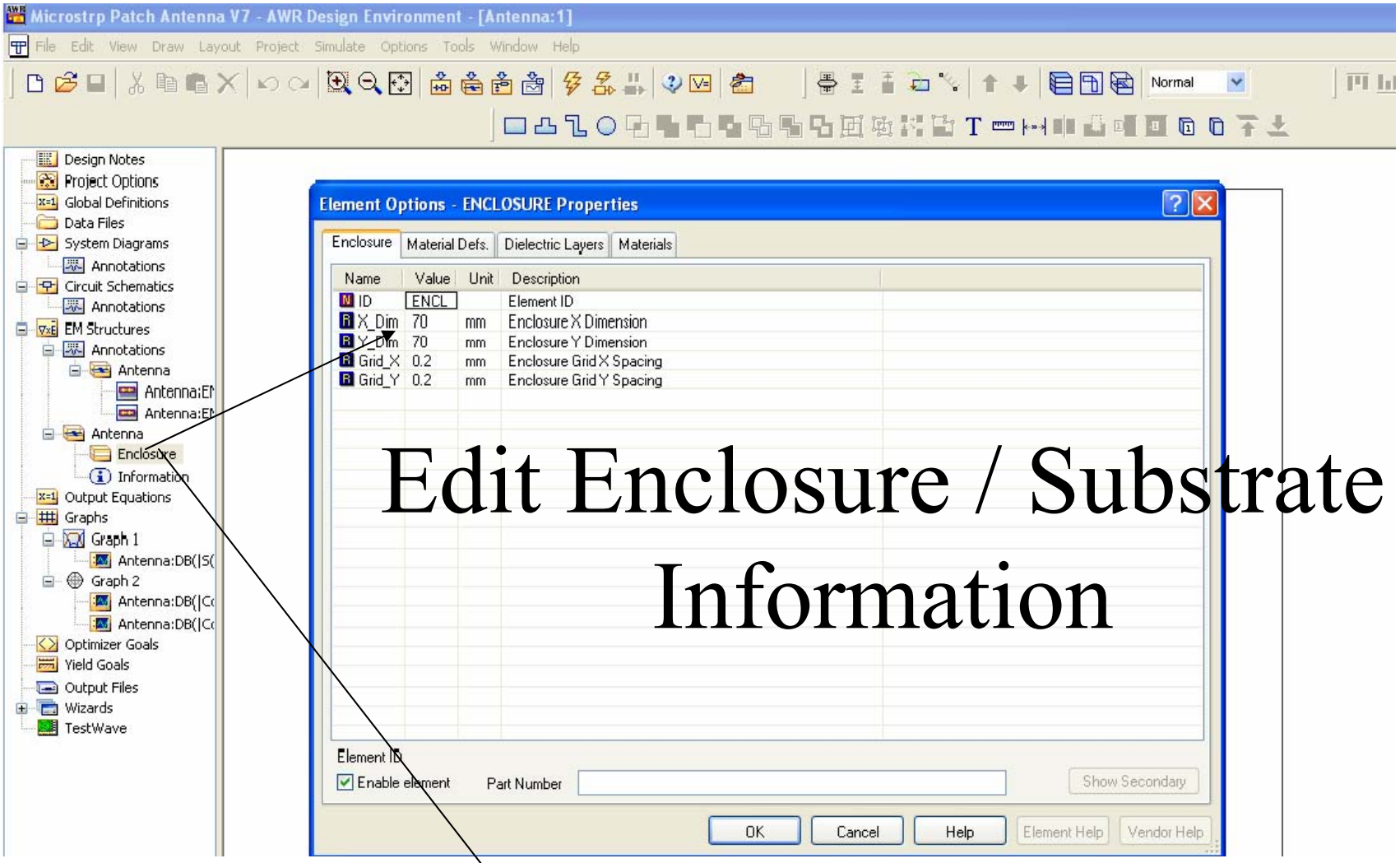
By:

Manjunatha Reddy.H.V

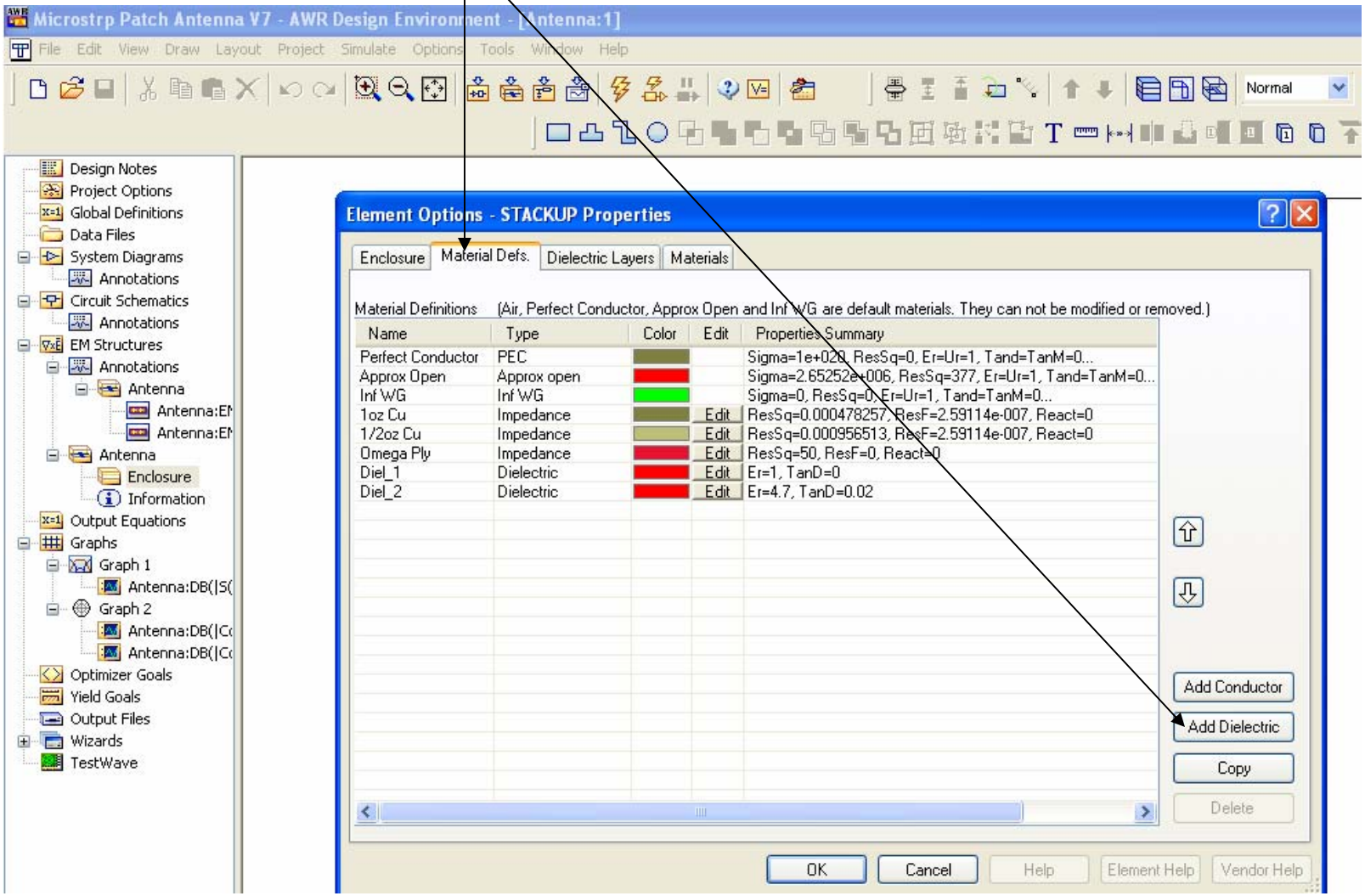
manjunatha_hv@rediffmail.com

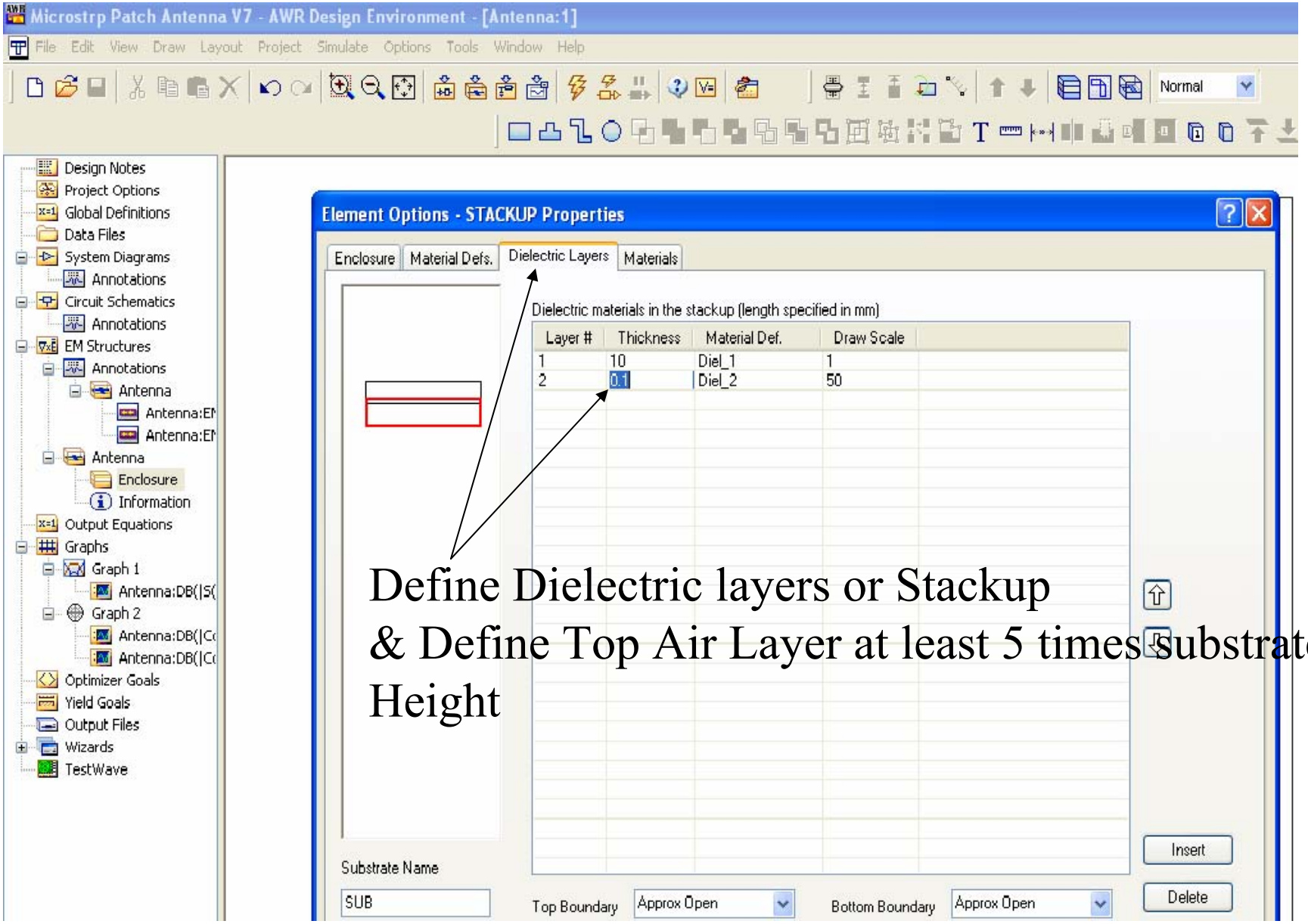


Create New EM Structure as shown above


Microstrp Patch Antenna V7 - AWR Design Environment - [Antenna:1]
File Edit View Draw Layout Project Simulate Options Tools Window Help
Normal
Design Notes
Project Options
Global Definitions
Data Files
System Diagrams
Annotations
Circuit Schematics
Annotations
EM Structures
Annotations
Antenna
Antenna:EM
Antenna:EM
Antenna
Enclosure
Information
Output Equations
Graphs
Graph 1
Antenna:DB(|S(
Graph 2
Antenna:DB(|C
Antenna:DB(|C
Optimizer Goals
Yield Goals
Output Files
Wizards
TestWave
Element Options - ENCLOSURE Properties
Enclosure
Material Defs.
Dielectric Layers
Materials
Name Value Unit Description
ID ENCL Element ID
X_Dim 70 mm Enclosure X Dimension
Y_Dim 70 mm Enclosure Y Dimension
Grid_X 0.2 mm Enclosure Grid X Spacing
Grid_Y 0.2 mm Enclosure Grid Y Spacing
Element ID
Enable element
Part Number
Show Secondary
OK
Cancel
Help
Element Help
Vendor Help
Edit Enclosure / Substrate Information
Double click toSet the enclosure options as above,
Simply by double clicking on Enclosure

Define the Dielectric Layers as shown below

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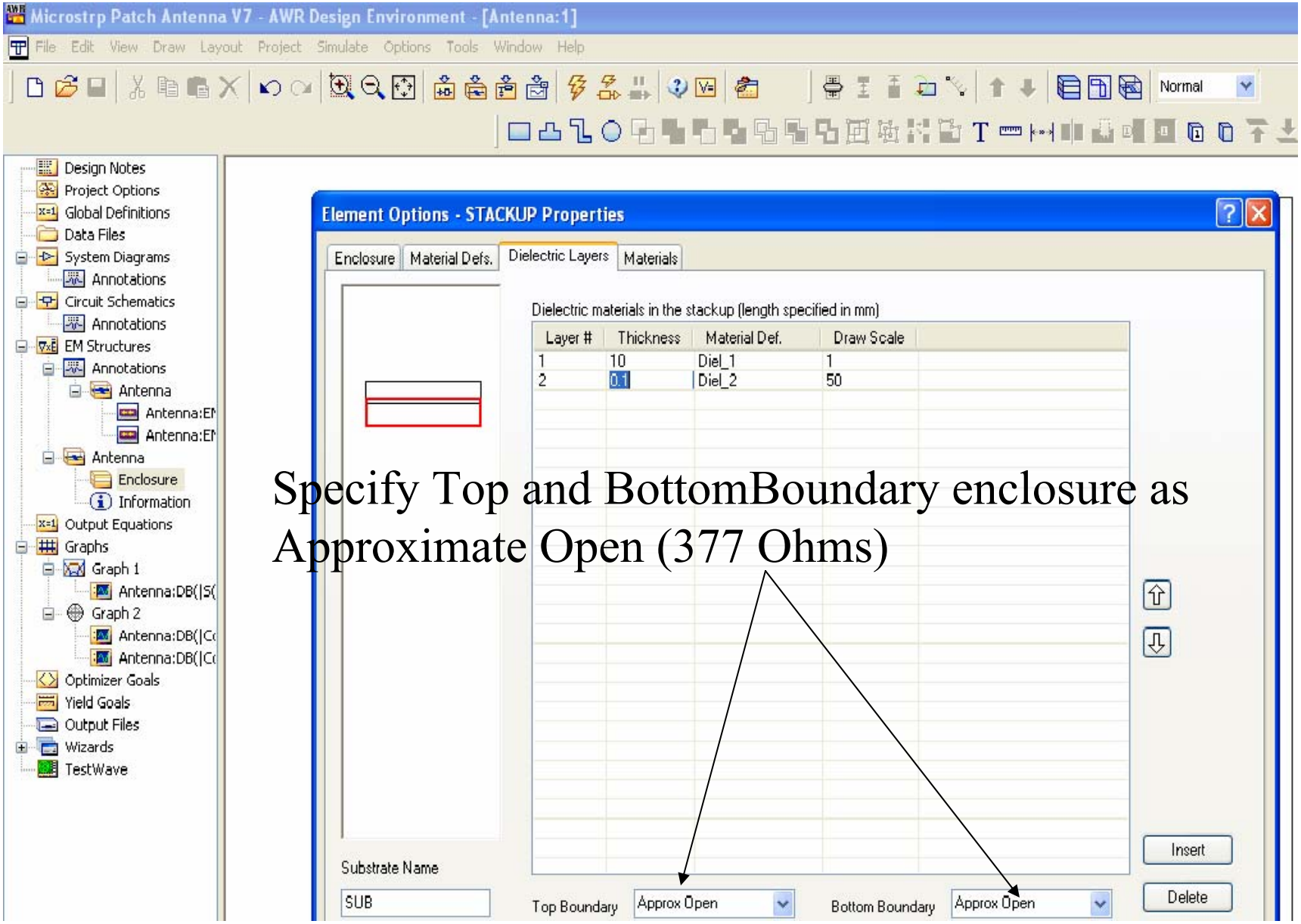
Graph 1
Antenna:DB(|S(
Graph 2
Antenna:DB(|C
Antenna:DB(|C
Optimizer Goals
Yield Goals
Output Files
Wizards
TestWave
Element Options - STACKUP Properties
Enclosure
Material Defs.
Dielectric Layers
Materials
Dielectric materials in the stackup (length specified in mm)
Layer # Thickness Material Def. Draw Scale
1 10 Diel_1 1
2 0.1 Diel_2 50
Define Dielectric layers or Stackup
& Define Top Air Layer at least 5 times substrate Height
Insert
Delete
Substrate Name
SUB
Top Boundary
Approx Open
Bottom Boundary
Approx Open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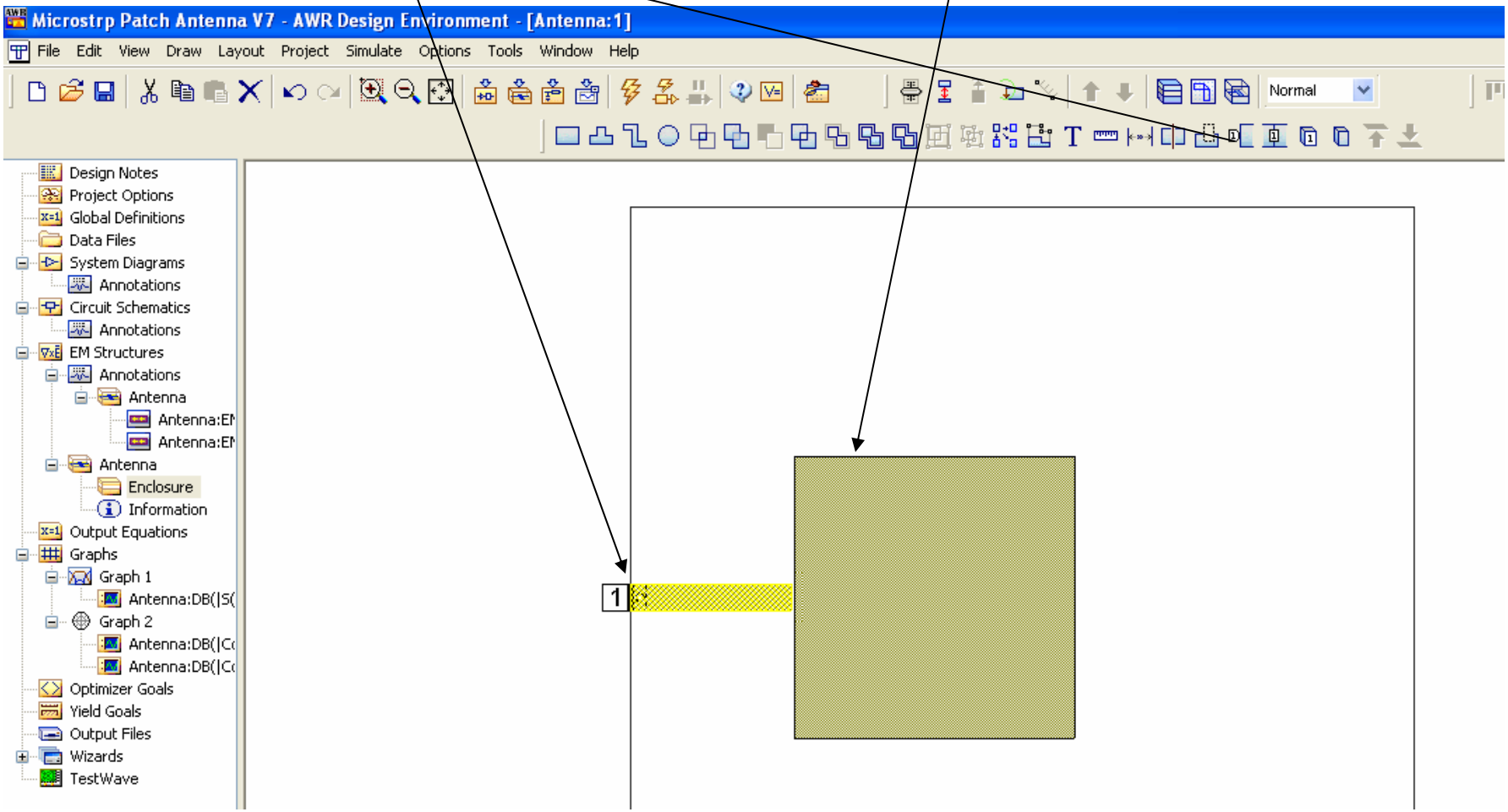
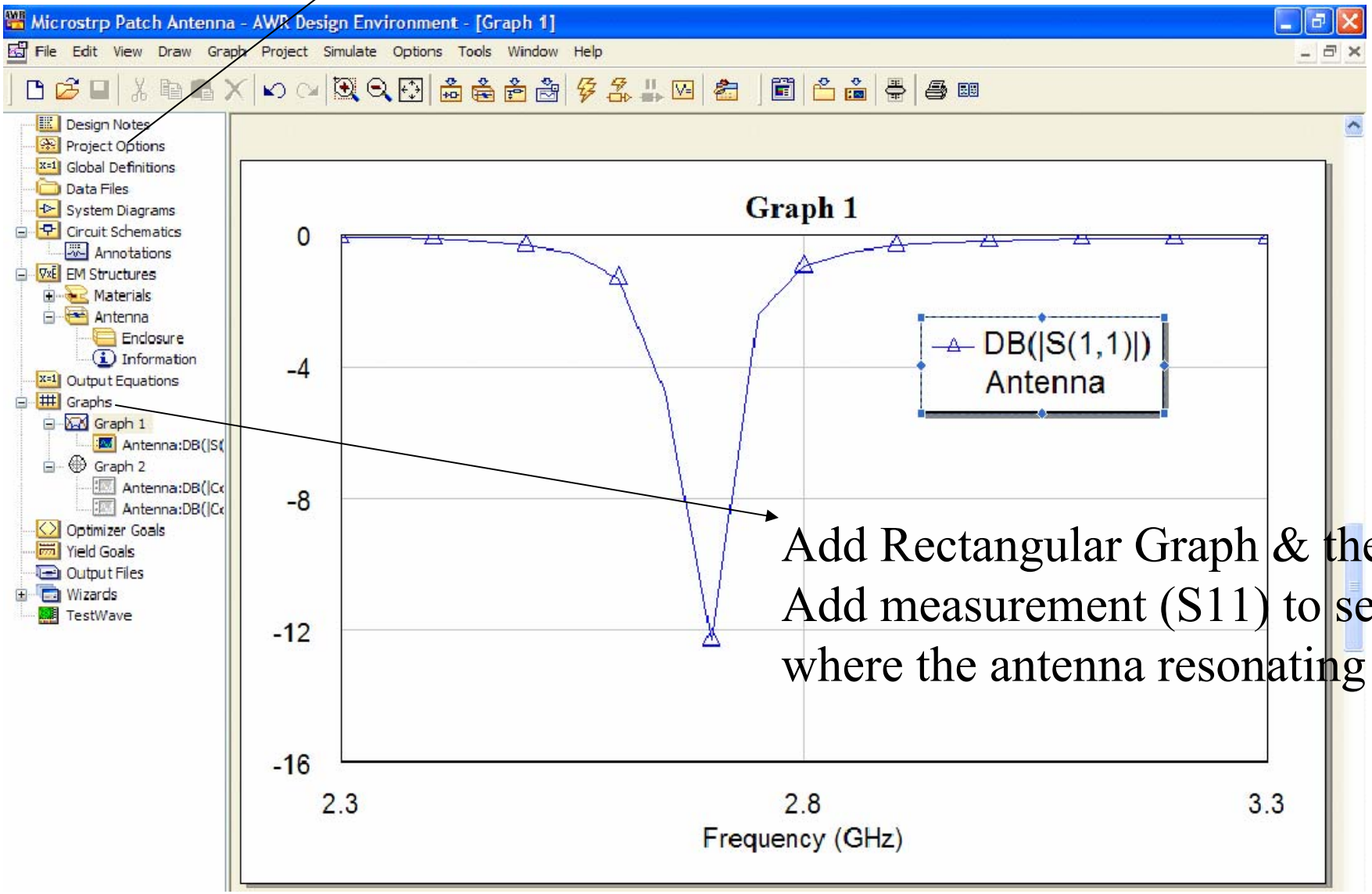
Element Options - STACKUP Properties
Enclosure
Material Defs.
Dielectric Layers
Materials
Dielectric materials in the stackup (length specified in mm)
Layer #
Thickness
Material Def.
Draw Scale
1
10
Diel_1
1
2
0.1
Diel_2
50
Specify Top and BottomBoundary enclosure as
Approximate Open (377 Ohms)
Substrate Name
SUB
Top Boundary
Approx Open
Bottom Boundary
Approx Open
Insert
Delete

Draw Antenna structure
Then select the feed line the it
Automatically highlights the Edge port

Draw antenna structure
Using the drawing tools available

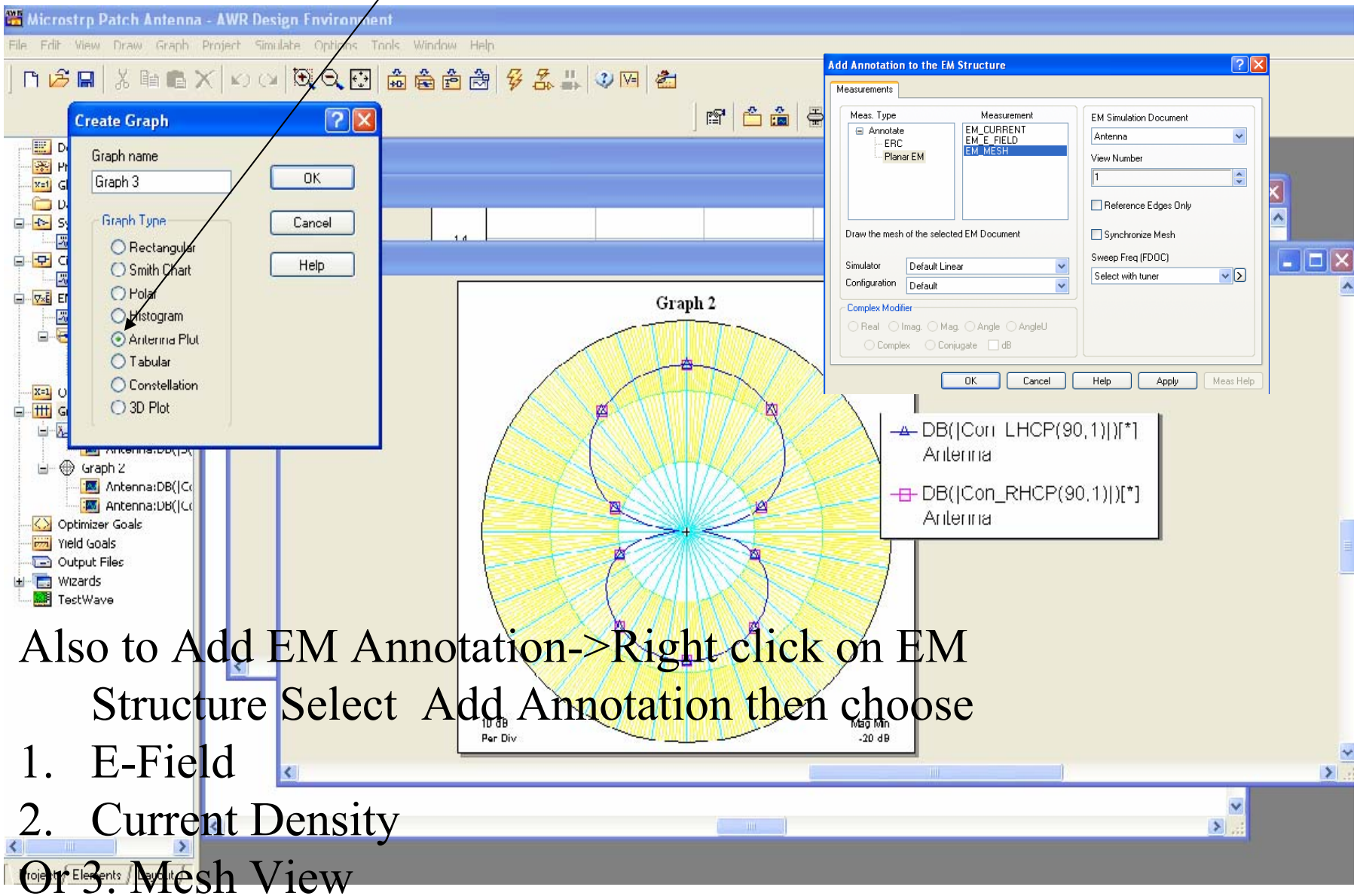


Set Project Frequency Sweep Example 2.3 to 3.3 in steps of 0.05



Add Rectangular Graph & then Add measurement (S11) to see where the antenna resonating

Add Antenna plot & add Radiation Pattern Measurement



Also to Add EM Annotation->Right click on EM Structure Select Add Annotation then choose

1. E-Field
2. Current Density

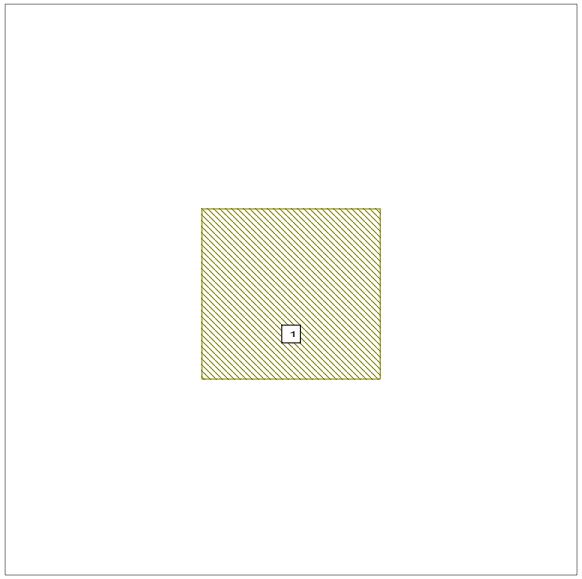
Or 3. Mesh View

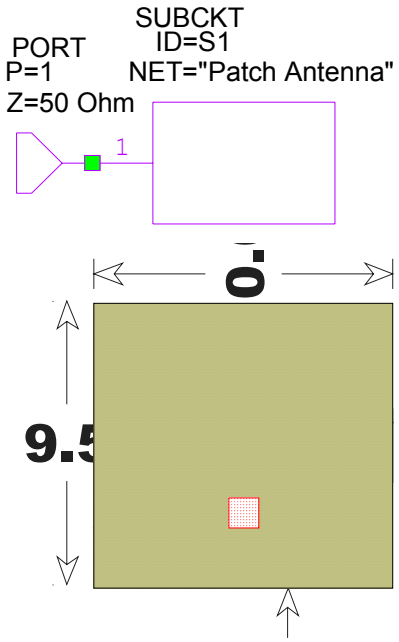
Example 2.
Microstrip Patch using Via Port excitation

Draw the patch using EMsigth

- Open MWOffice create new EM Structure
- Draw a rectangle
- Add a via-port

Use the layout view of a dummy schematic that includes the subcircuit the antenna to to draw dimension lines





Edit Enclosure / Substrate Information

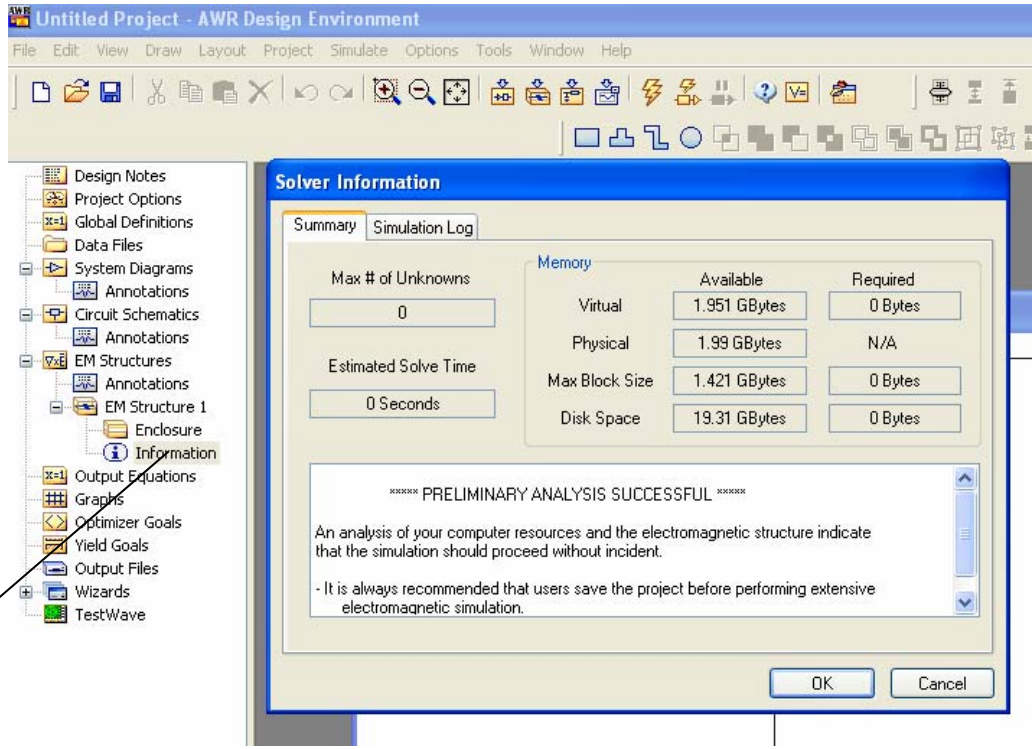
X-dimension=32mm Grid/Cell Size=0.5
Y-dimension=32mm Grid/Cell Size=0.5

Dielectric Layers
Air H=5, Er=1
Diel_1 H=0.4, Er=2.6, Tand=0.0001

Top & Bottom Enclosure Must be Open

Set Project Frequency Sweep

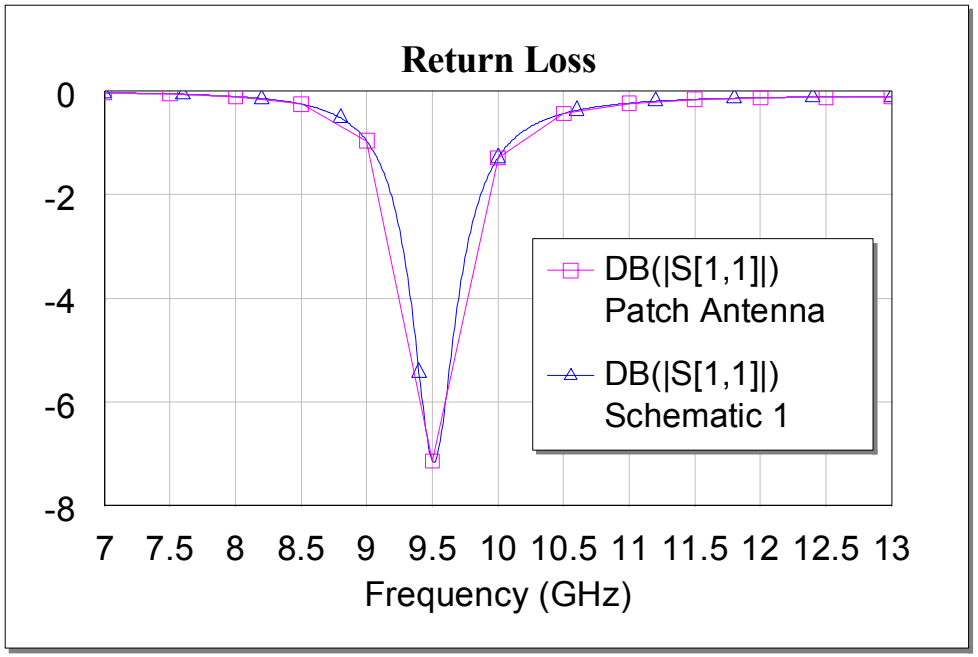
- Project : 7GHz to 13GHz by 10 MHz step
- Antenna: 7GHz to 13GHz by 500 MHz step
- Set Interpolation option as ‘Rational’
- Check ‘Information box’



Check memory requirement and recommended cache. They should be less than your physical memory and Max cache size, respectively.

Resonance Frequency

- Create new Rectangular Graph
- Add the S11 S-Parameter measurement
- Run the analysis for DB|S11|



Add a few more frequency point to EM Structure frequency range after you know the location of the resonant frequency.