Coplanar Interconnect

Design Goal: Create and simulate 2 coplanar waveguide transmission lines connected by via interconnecting structures.
1) Circuit Design Procedure:
   - Draw a dielectric block 2.12 mm long by 1.76 mm wide by 0.36 mm high, set Permittivity = 12.9.
   - Draw the bottom center conductor 1.12 mm long by 0.12 mm wide on center with the top face of the block. Use finite conductor = copper.
   - On each side of the center conductor spaced 0.12 mm away from it, draw a ground conductor 1.12 mm long by 0.6 mm wide. Use finite conductor = copper.
   - Draw quantity 3 0.12 mm^3 vias. Place the vias as show on the drawing to connect the bottom and top coplanar waveguide sections. Use finite conductor = copper.
   - Draw a dielectric block 2.12 mm long by 1.76 mm wide by 0.12 mm high. This block is an air space (Permittivity = 1), and resides between the substrate blocks.
   - Draw a dielectric block 2.12 mm long by 1.76 mm wide by 0.36 mm high, locate block on center with the top of the middle via, set Permittivity = 12.9.
   - Draw the top center conductor 1.12 mm long by 0.12 mm wide on center with the bottom face of the block; repeat the earlier ground topology construction. Use finite conductor = copper.
   - Construct air box’s 2.12 by 1.76 mm wide by 0.5 mm high and place above and below intrinsic coplanar circuit. Note: this can be somewhat higher if desired by user.
   - All outside faces are to be assigned a radiation boundary.
   - Draw Waveports = 1.3 mm^2. Waveports are to be on center with center conductor trace. Run an integration line between outside center conductor edge and 1 inside ground edge.

2) Solution Setup:
   - Add a solution setup, set the adaptive frequency to 6 GHz. Use 15 passes and a maximum delta S of 0.01.
   - Add a fast sweep from 0.5 to 8 GHz at 100 MHz linear step increments.

3) Analyze and verify results:
   - Input Impedance at Port 1 = X ohms at 6 GHz
   - Input Return Loss at Port = X ohms at 6 GHz
   - Insertion loss = X dB at 6 GHz
   - Is circuit reciprocal?
   - Select all metallization, select fields, H, Mag_H for 6 GHz and 0 degrees create plot. Describe the I field distribution shown on 3D creation.
3) **Analyze and verify results, Answers:**

- Input Impedance at Port 1 = 57.9 ohms at 6 GHz
- Input Return Loss at Port = -22.7 dB at 7 GHz
- Insertion loss = 0.12 dB at 7.5 GHz
- Is circuit reciprocal? Yes
- Select all metallization, select fields, H, Mag_H for 6 GHz and 0 degrees create plot. Describe the I field distribution shown on 3D creation. Fields are mainly confined to edges of coplanar structure, some discontinuity (blue is noticeable at the via interface.)