

# Evaluation of the Performance of a Single Via

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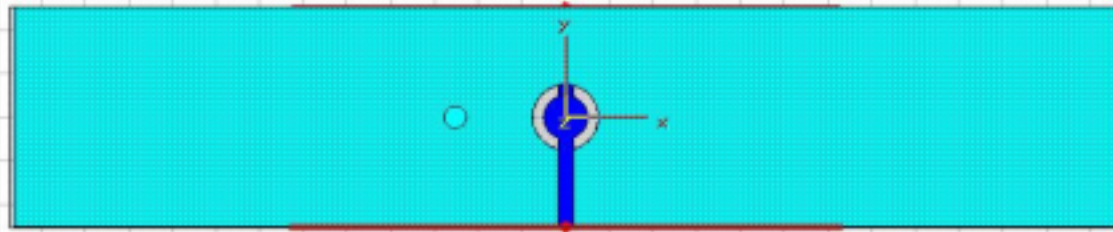


# Goal

- To provide a benchmark for the simulation performance of a single ended via penetrating board planes.



# Geometry Top View



Plane Width - 500 mils

Plane Height - 100 mils

Plane Thickness - 1.2 mils

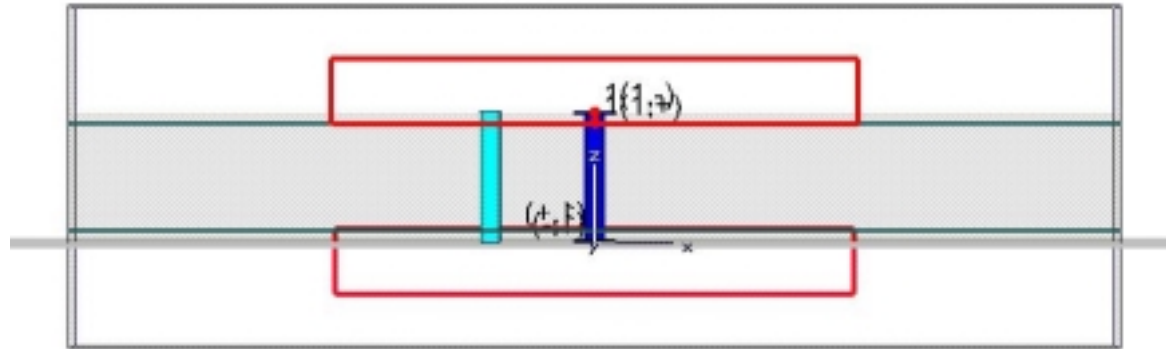
Trace Width = 0.0067 (Adjusted for 50 ohms)

Boundaries - (X,Y,Z) Open with PML



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# Geometry Edge View



Via Diameter – 10 mils

Via Pad Diameter – 20 mils (layers 1 and 4)

Via Antipad Diameter – 30 mils

Ground Via Spacing – Varied

Waveguide Launch into structure



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# Methodology

- CST Microwave was used for fullwave solutions.
- Microstrip trace width was adjust to a nominal impedance of 50 ohms +/- 1% from a waveguide launch.
- S-parameters were generated from a reference plane placed at the edge of the via antipad, in order to accurately characterize the via performance.
- S-parameters were normalized to 50 ohms impedance.

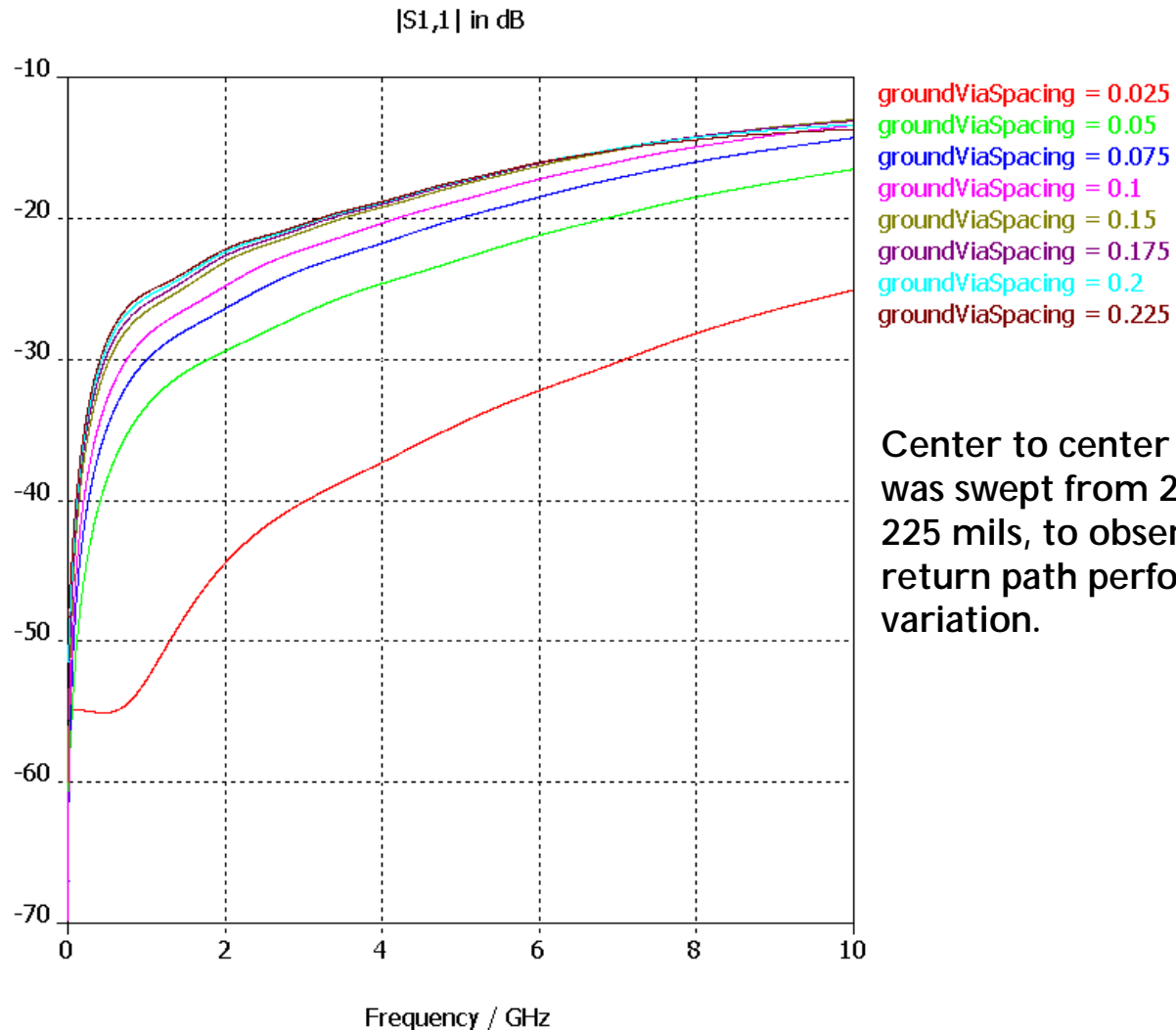


# Methodology

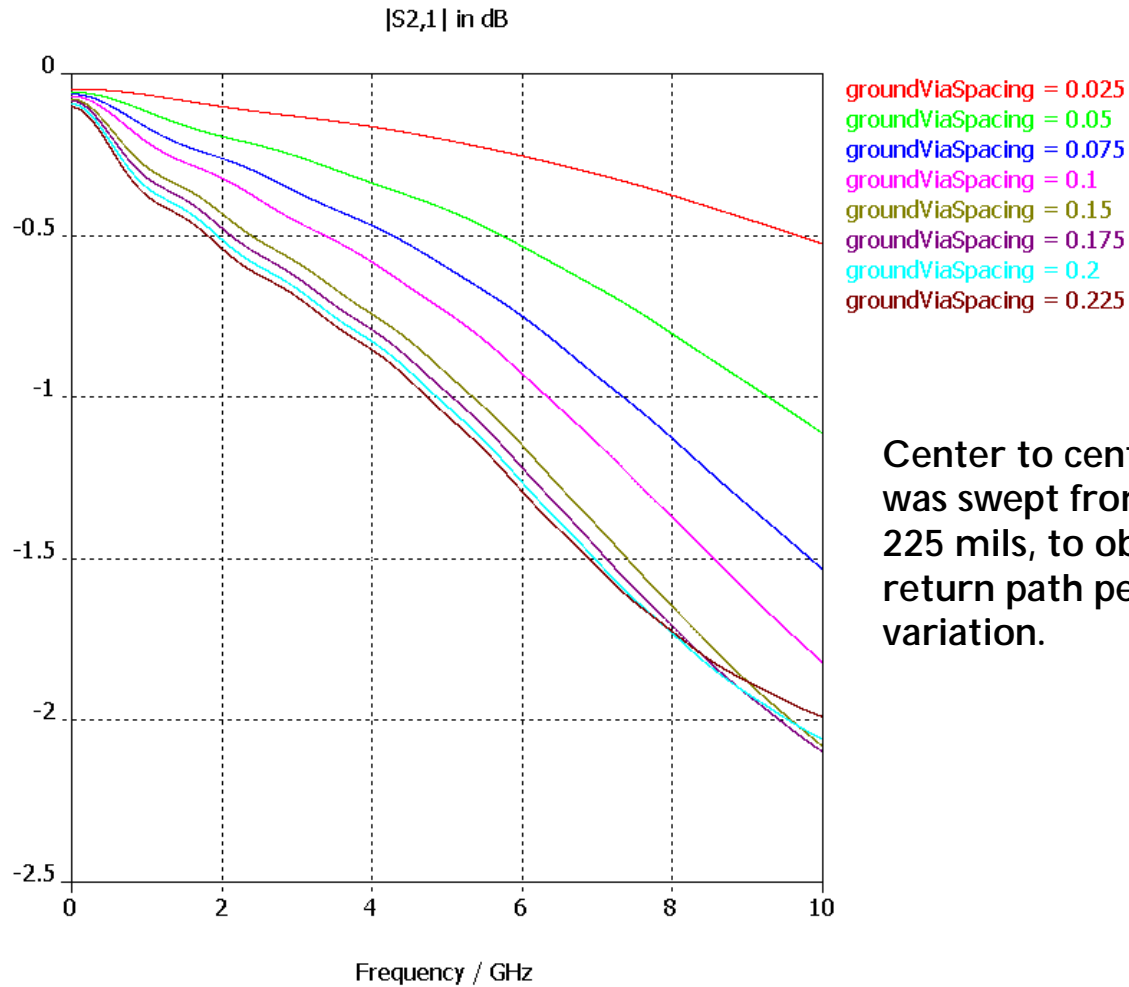
- Open boundary conditions were used to simulate a via penetrating infinite planes and dielectrics.
- One additional “ground stitch” via was provided that could be moved in the simulation, to close the DC ground path and to evaluate the affect of neighbor vias on AC performance.
- Simulations were performed from 0 Hz to 20 GHz.



# S11 Results



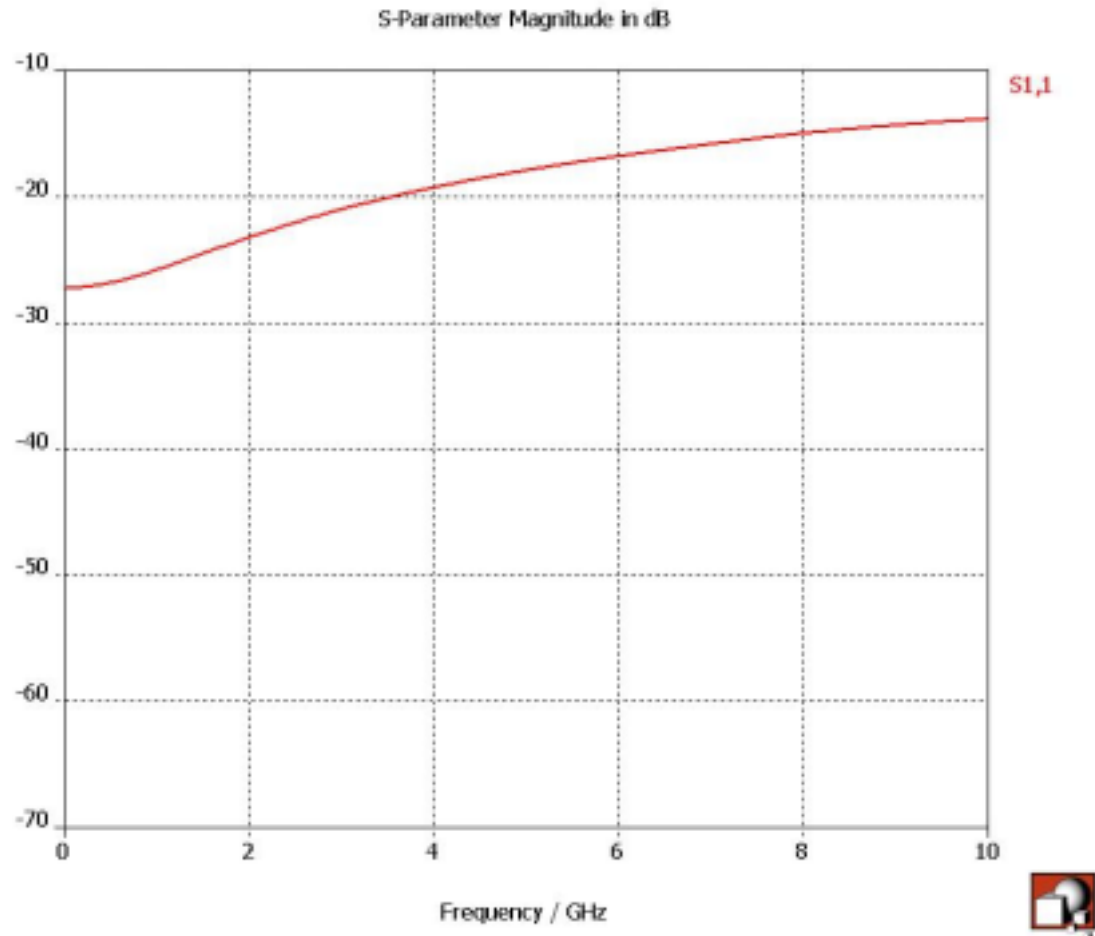
# S12 Results



Center to center via spacing was swept from 25 mils to 225 mils, to observe the return path performance variation.



# S11 Results With No Ground



# S12 Results With No Ground

