



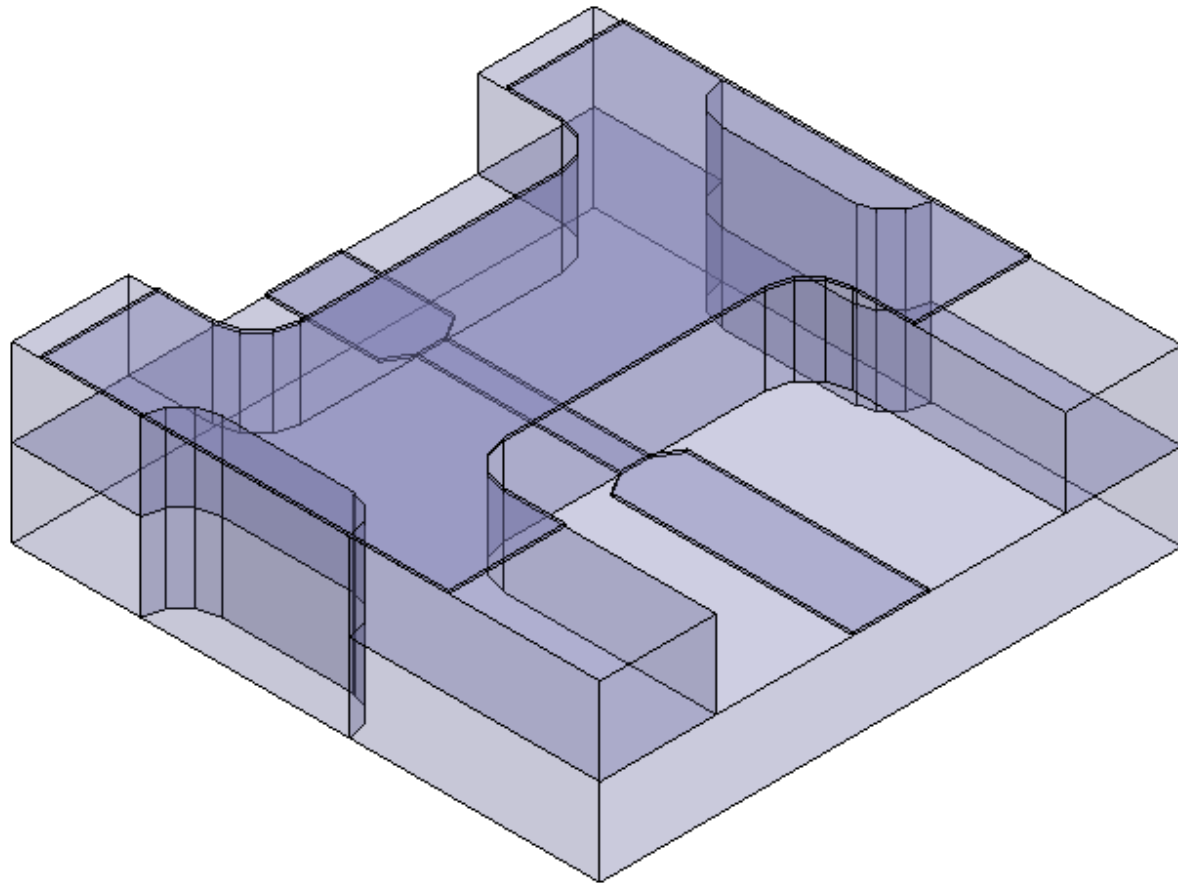
**microwave**  
PACKAGING TECHNOLOGY, INC.

***Microwave Feed Thrus  
In HTCC***

# *Overview Of Feed Thru Developments*

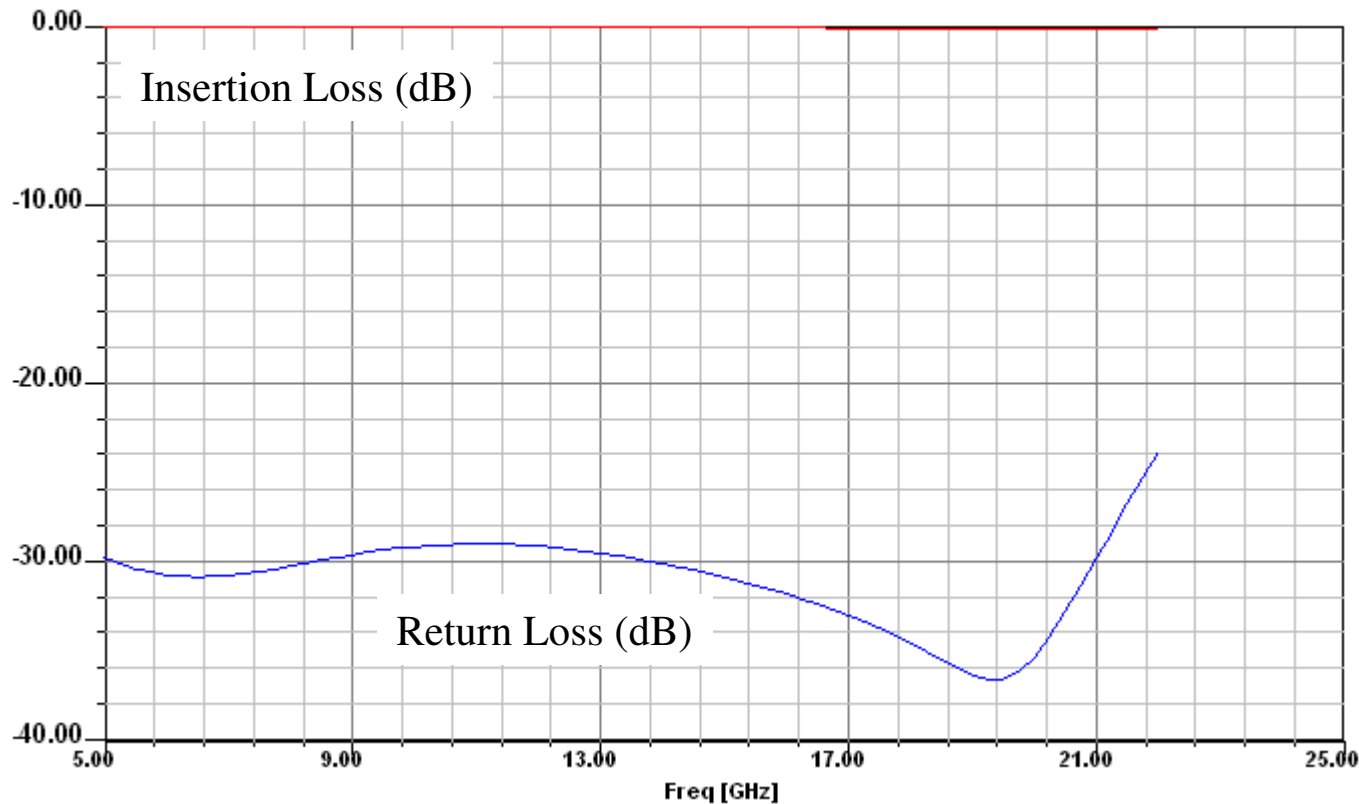
- **MPT has developed feed thrus in HTCC alumina which operate to 20GHz and higher.**
- **They are used in hermetic high speed and microwave modules.**
  - **Brazed into housing wall to for a high quality RF feed thru.**
  - **Use CPW and microstrip transitions**
- **This White Paper Reviews Three Designs**
  - **Feed thru A: Microstrip to microstrip**
  - **Feed thru B: Microstrip to CPW**
  - **Feed thru C: CPW to CPW**

# *Model Of Feed thru A Used In Electromagnetic Simulation*



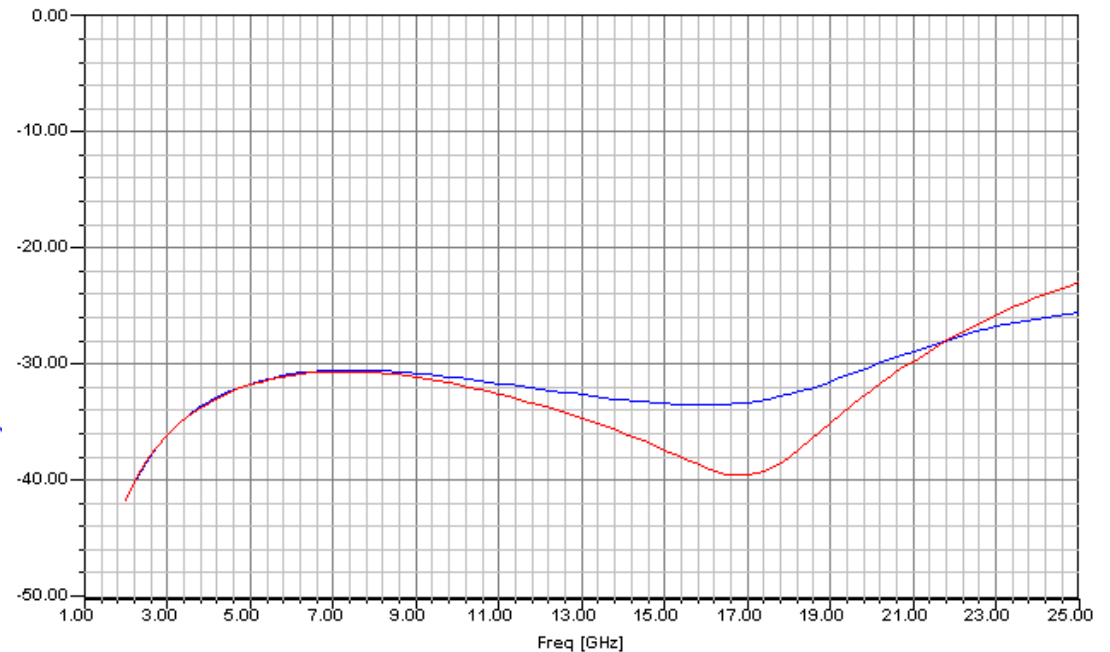
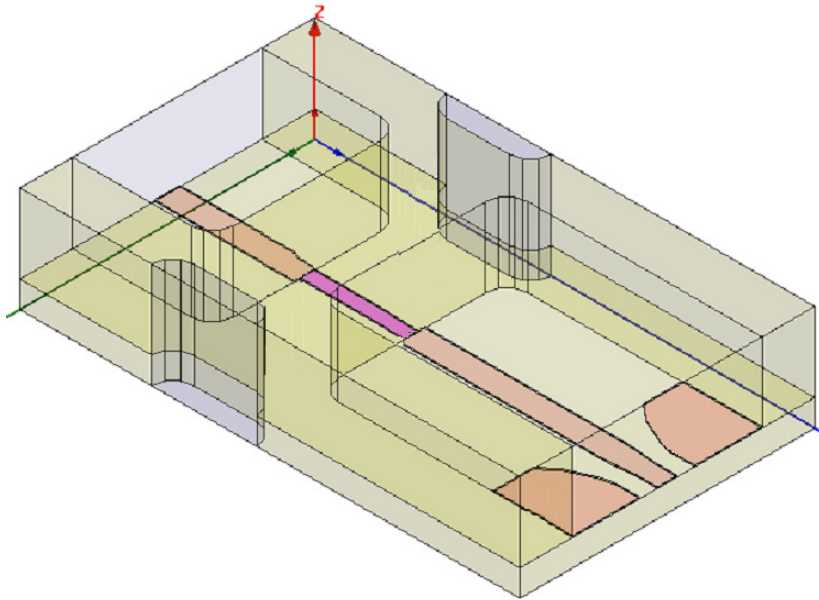
- **Microstrip input and output transition.**
- **Ground around the sides and over the top of the package.**

# *Simulated Performance Of Feed thru A*



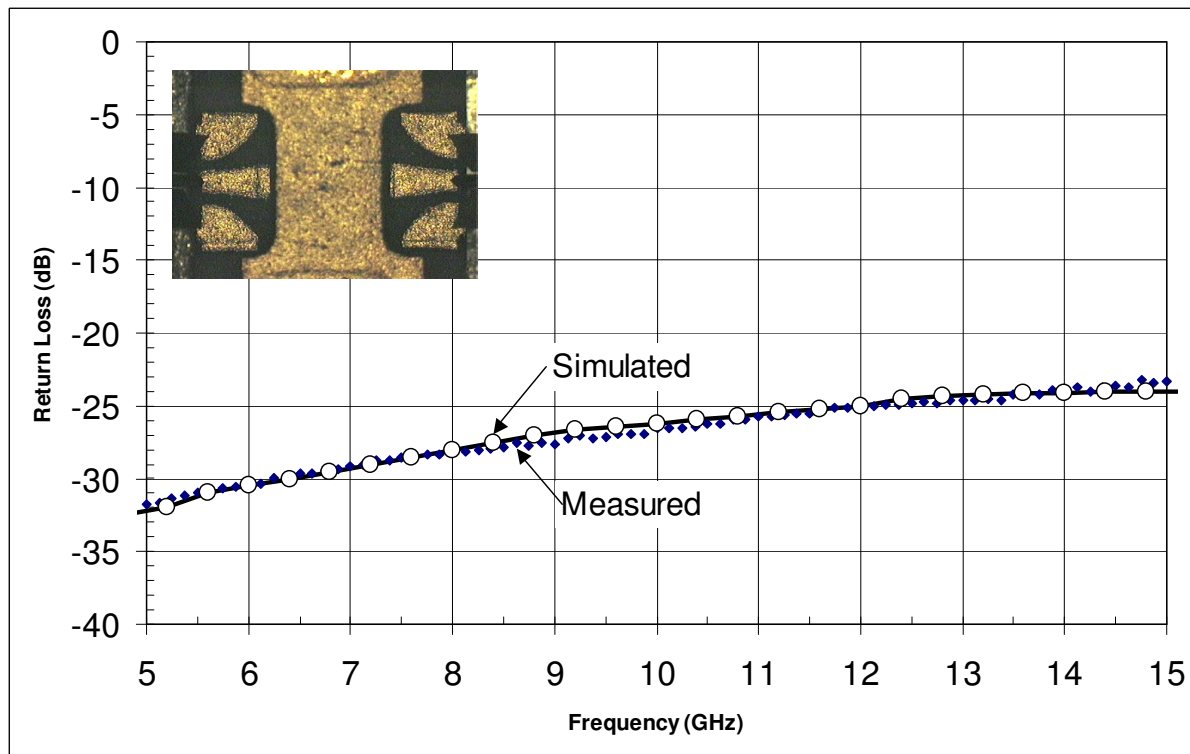
- **Simulations conducted with High Frequency Structure Simulator (HFSS).**
  - **Finite element method (FEM)**
  - **Includes all transmission line, radiation and coupling effects.**
  - **Generates scattering parameters.**

# *Millimeter-wave Bandwidth Feed Thru B Operates Beyond 30GHz*



- **Feed Thru Developed For High Speed Data Communications Module.**

# *Measured and Modeled Performance Of Feed thru C*



- **Modeling conducted using HFSS**
- **Measurements performed on a probe station using a vector network analyzer.**

- **MPT has successfully performed on several feed thru designs.**
- **The performance of the feed thru is excellent to 20GHz and beyond.**
- **Good agreement between modeled and measured performance has been achieved.**