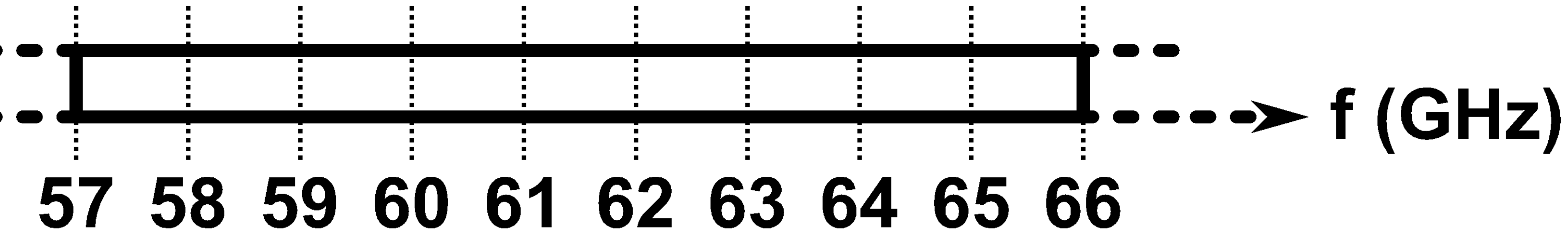


On the Variations of Shunt Characterization Technique of Decoupling Transmission Line for Millimeter-Wave CMOS Applications

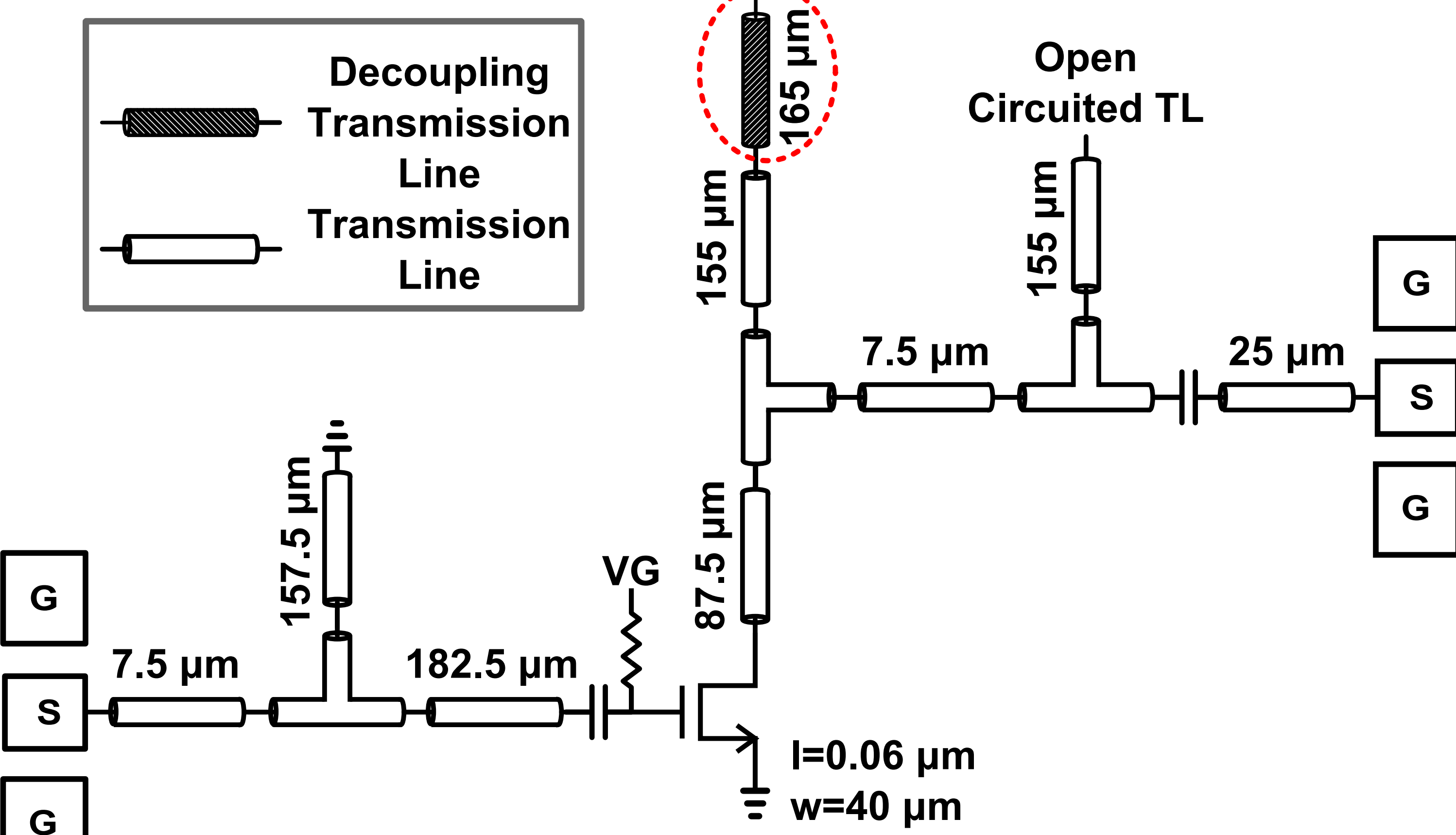
Korkut Kaan Tokgoz, Kimsrun Lim, Kenichi Okada, and Akira Matsuzawa
 Matsuzawa & Okada Lab, Tokyo Institute of Technology
 E-mail: korkut@ssc.pe.titech.ac.jp

1. Motivation



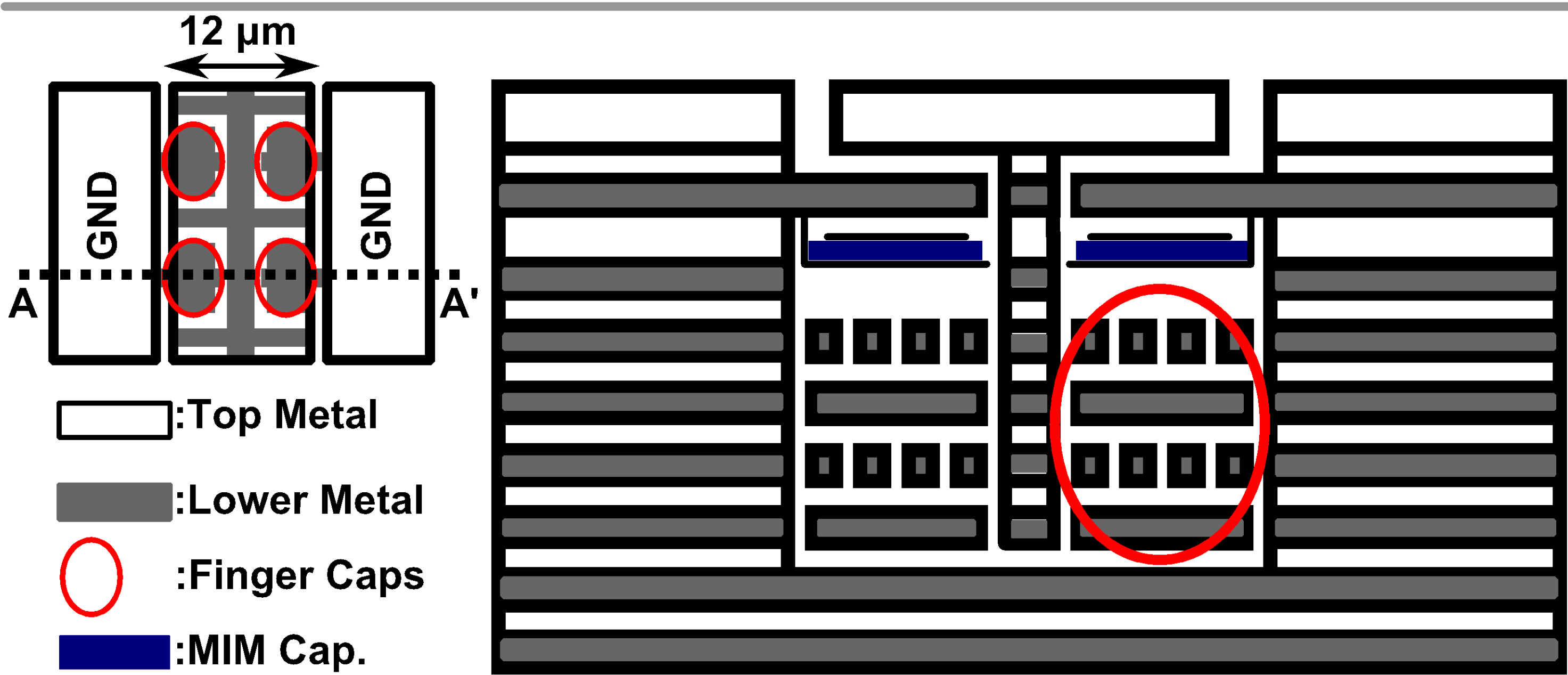
- 60-GHz wireless communication with 9 GHz unlicensed bandwidth
- Wide bandwidth
- Ultra high data rate:
 64QAM → 10.56Gbps/ch
 64QAM → 42.24Gbps (4-ch bonding)

Representation of a simple amplifier



- Decoupling of DC and RF:
 - Metal-Insulator-Metal TL
 - Lumped components lacks accuracy
 - More reliable in millimeter-wave

2. MIM Transmission Line



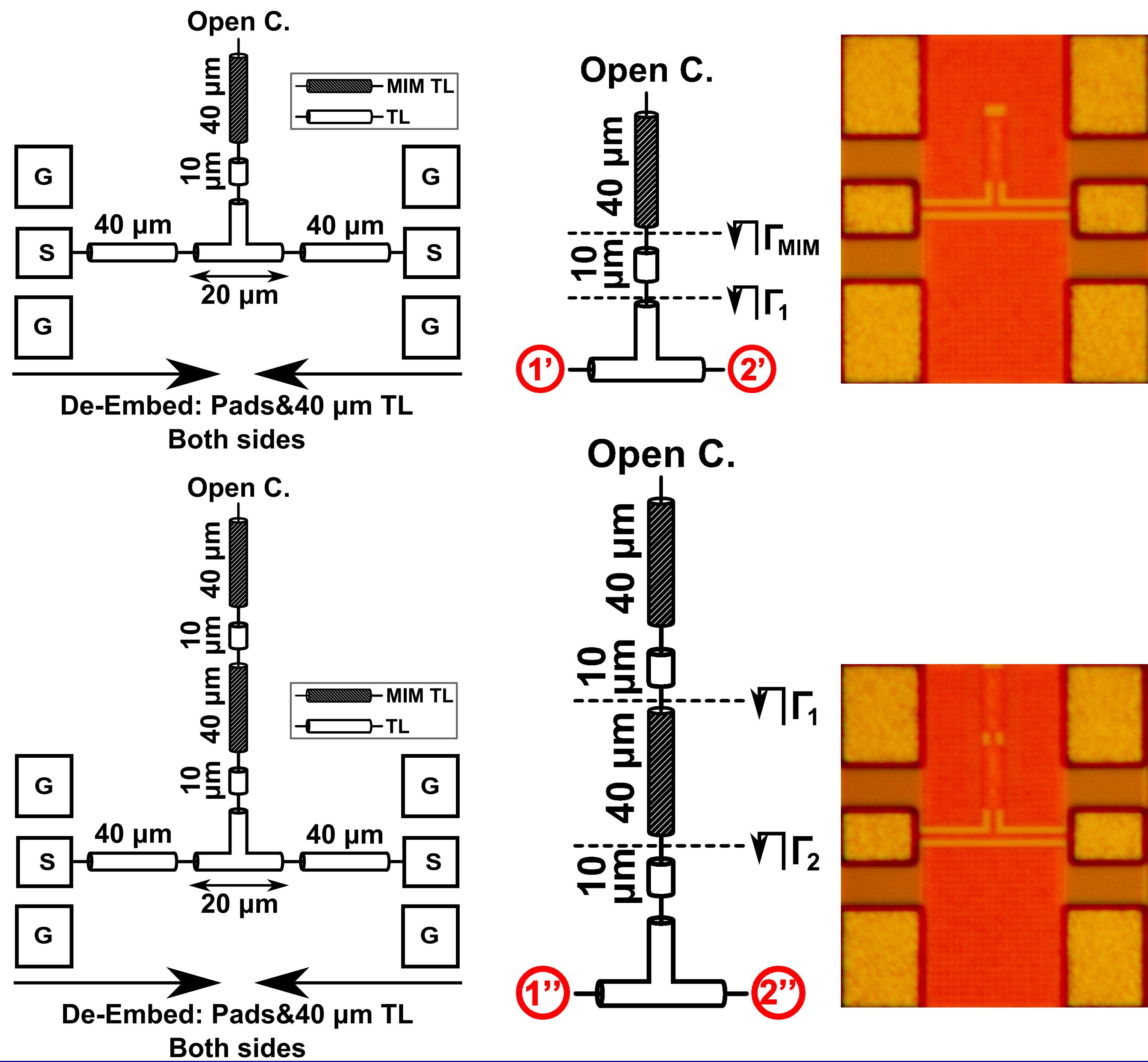
- Desired MIM TL characteristics:
 - Low characteristic impedance (1~3 Ω)
 - High RF loss

Issues:

- Direct measurement accuracy

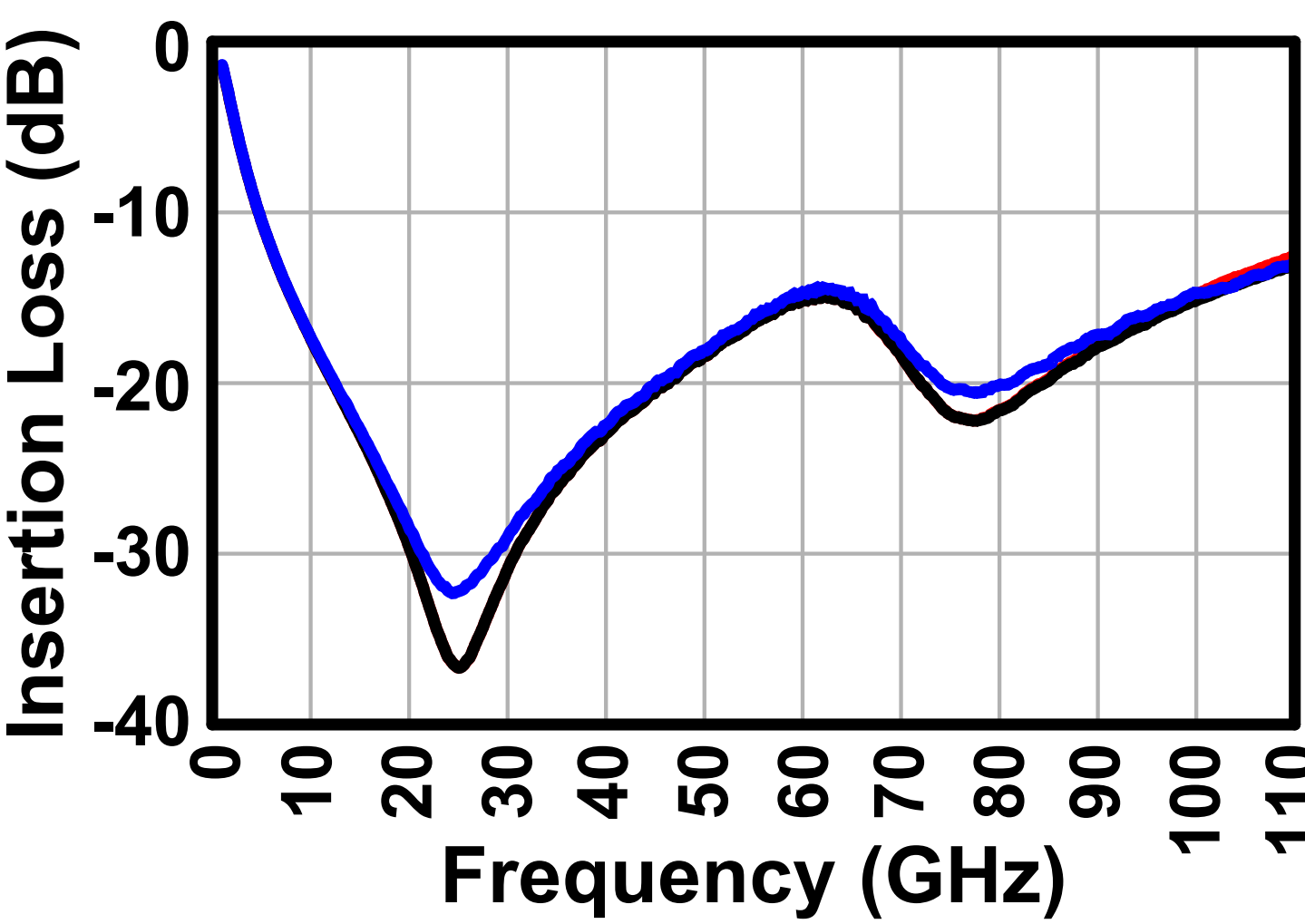
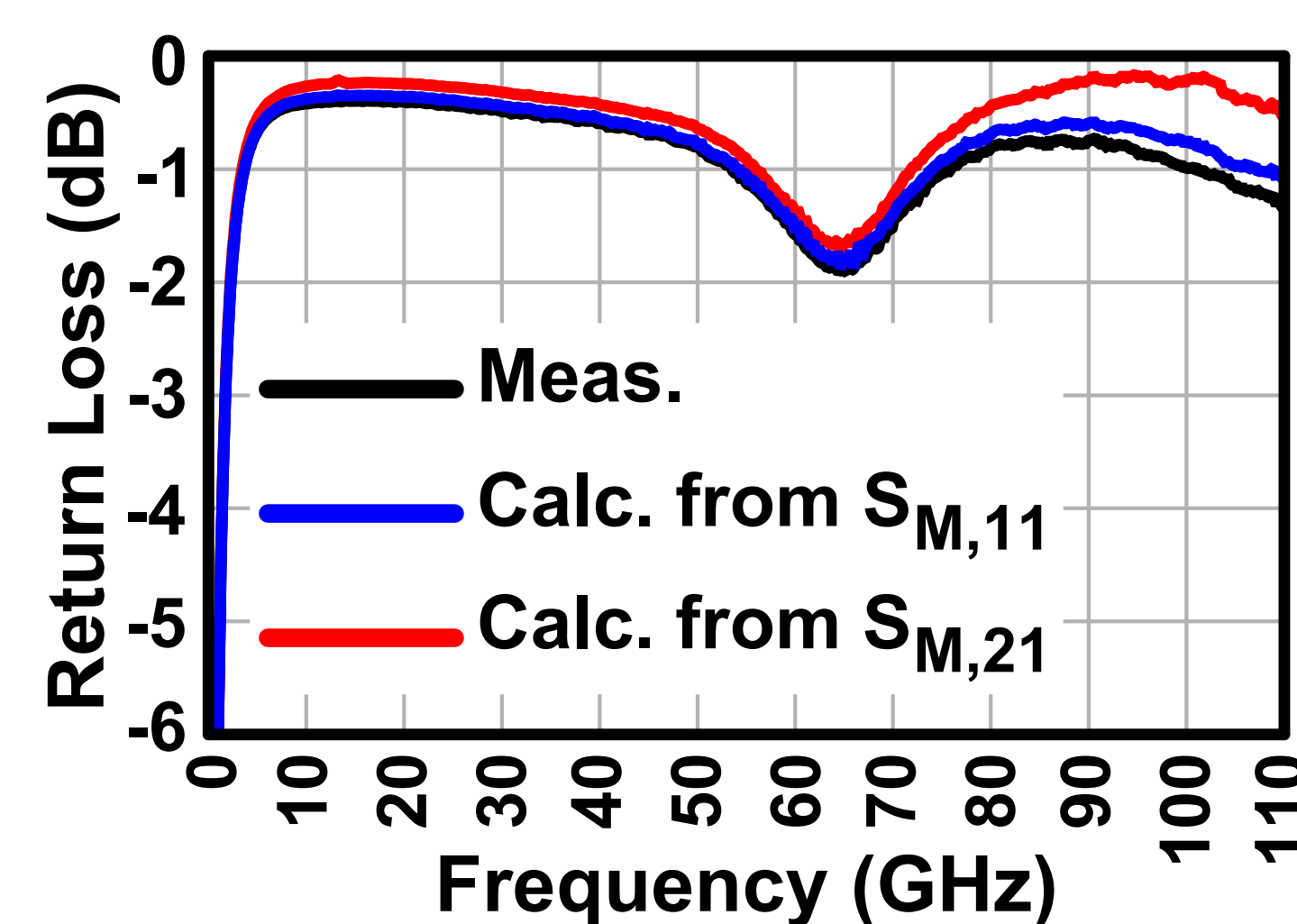
3. Shunt Characterization

Two characterization structures

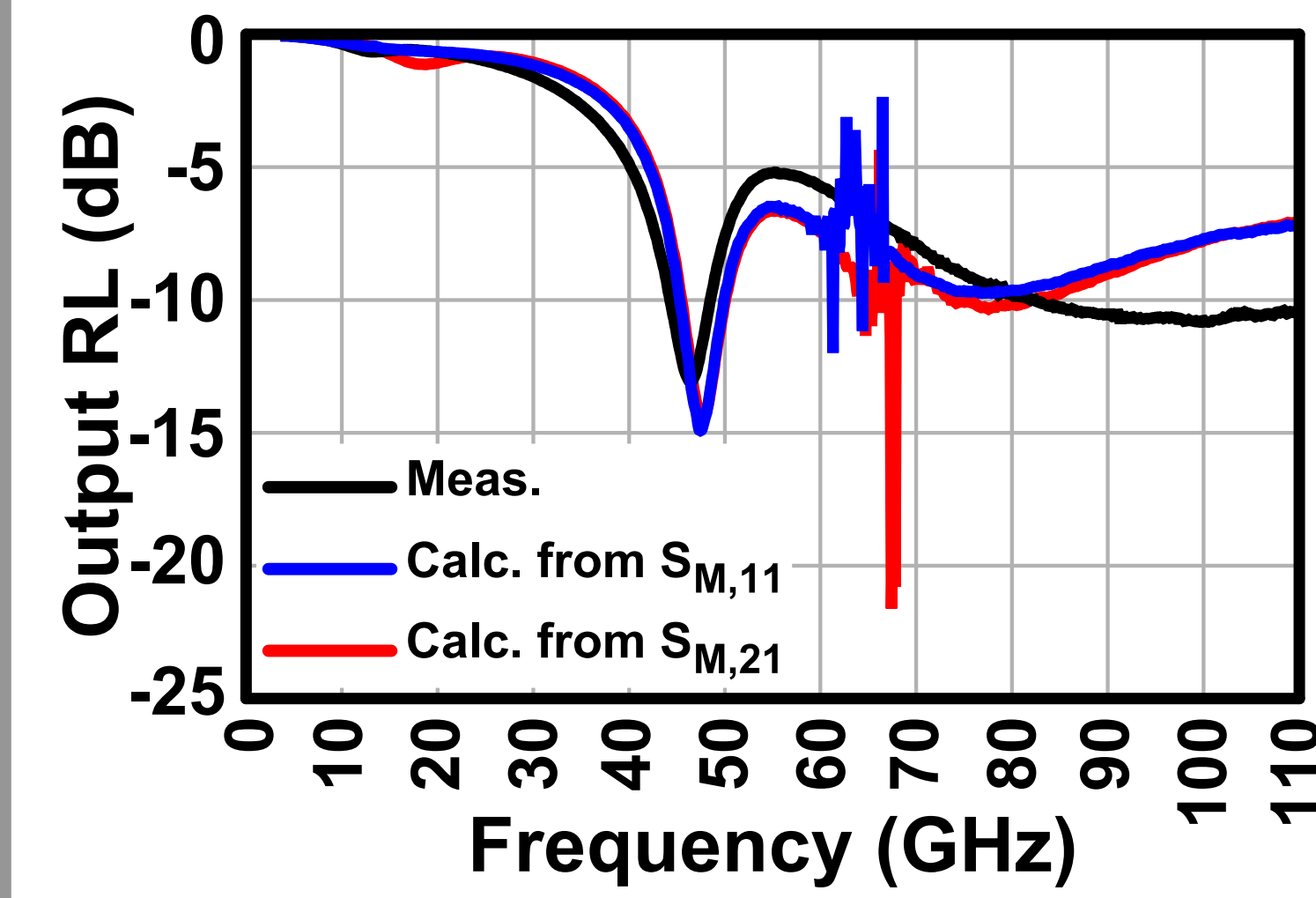
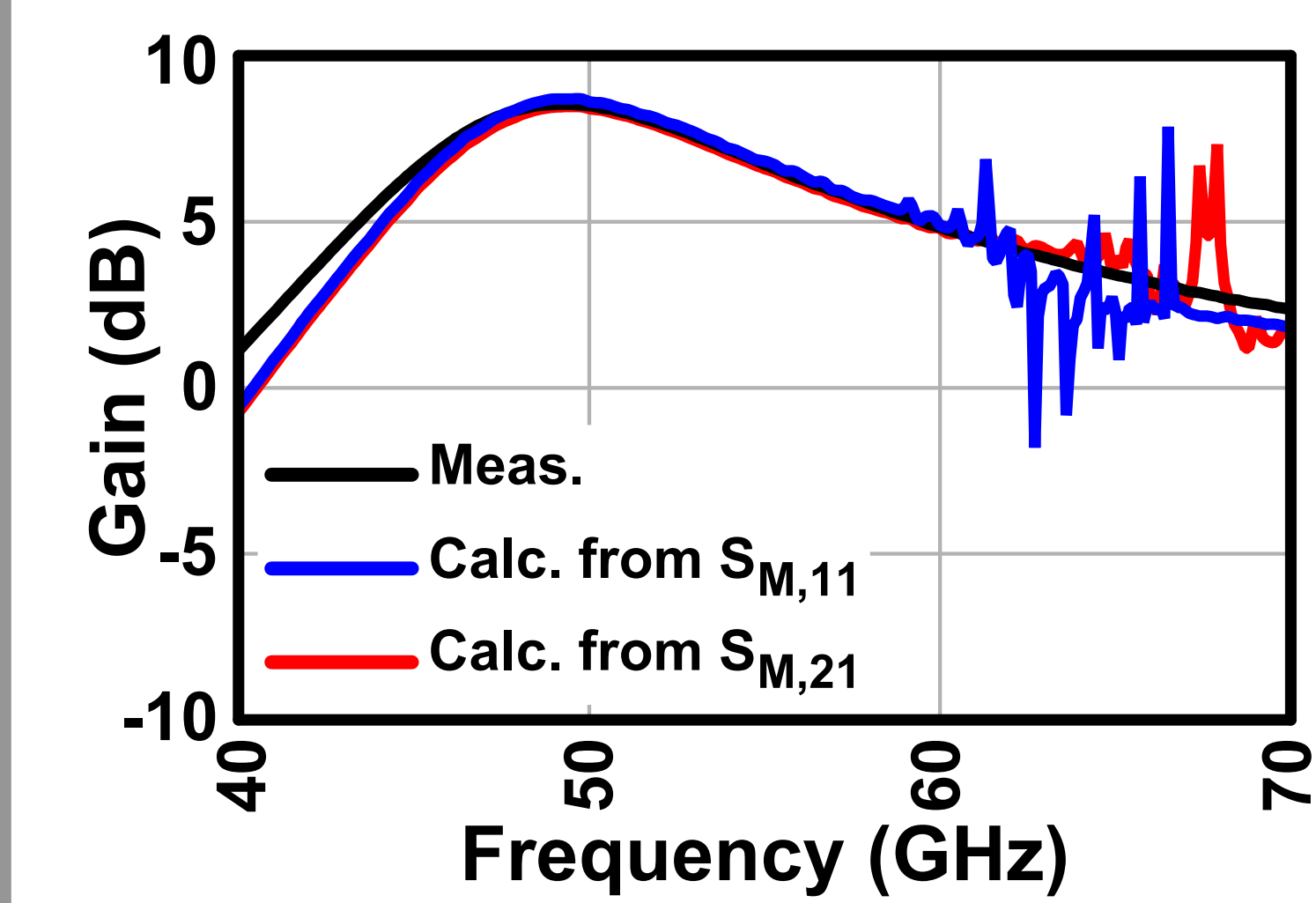


4. Variations & Results

Charac. structure



Amplifier results



4. Conclusion

- Inaccuracy in direct measurements
- A shunt characterization method for increased accuracy
- S-parameters of Metal-insulator-metal TL calculated from reflections
- Variations from calculation procedure
- Effects on amplifier simulation results