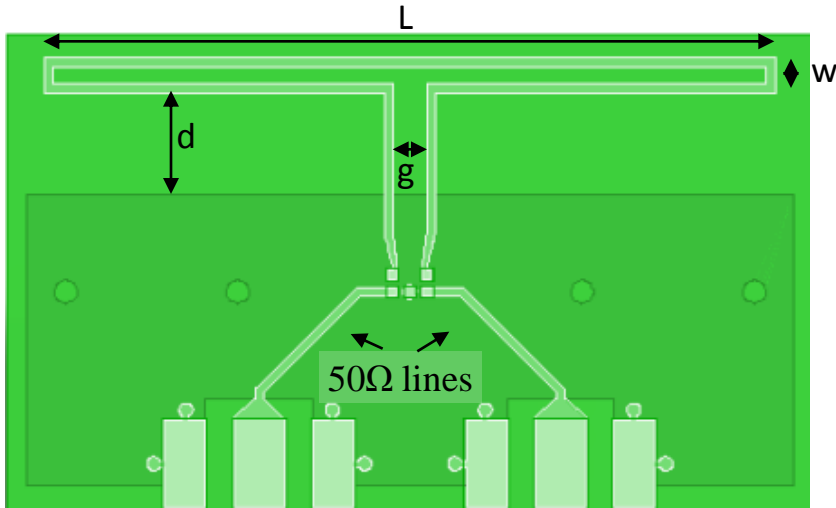


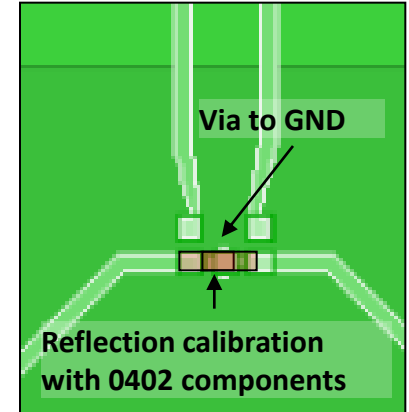
# Test board 5



- The layer stacking is identical to board 1 (62 mil), but:
  - no ground layer patch underneath the feedlines
  - the length, L, shortened to move the resonant frequency higher
  - the gap, g, between the feedlines was increased from 59 mils to 79 mils
- Full-port calibration performed across ports with a shared via to ground in the center.

Layer	Thickness (mils)	Characteristics
Top solder mask	1.00	$\epsilon_r = 3.8, \tan \delta = 0$
Top	1.24	$\sigma = 5.81 \cdot 10^7 \text{ S/m}$
FR4	10.20	$\epsilon_r = 3.7940, \tan \delta = 0.0183$
Ground	1.18	$\sigma = 5.81 \cdot 10^7 \text{ S/m}$
FR4	36.52	$\epsilon_r = 3.9920, \tan \delta = 0.0165$
Vcc	1.18	$\sigma = 5.81 \cdot 10^7 \text{ S/m}$
FR4	10.20	$\epsilon_r = 3.7940, \tan \delta = 0.0183$
Bottom	1.24	$\sigma = 5.81 \cdot 10^7 \text{ S/m}$
Bottom solder mask	1.00	$\epsilon_r = 3.8, \tan \delta = 0$
TOTAL	63.8	

L = 1697 mils  
 w = 83 mils  
 g = 79 mils  
 d = 237.5 mils  
 trace width = 20 mils

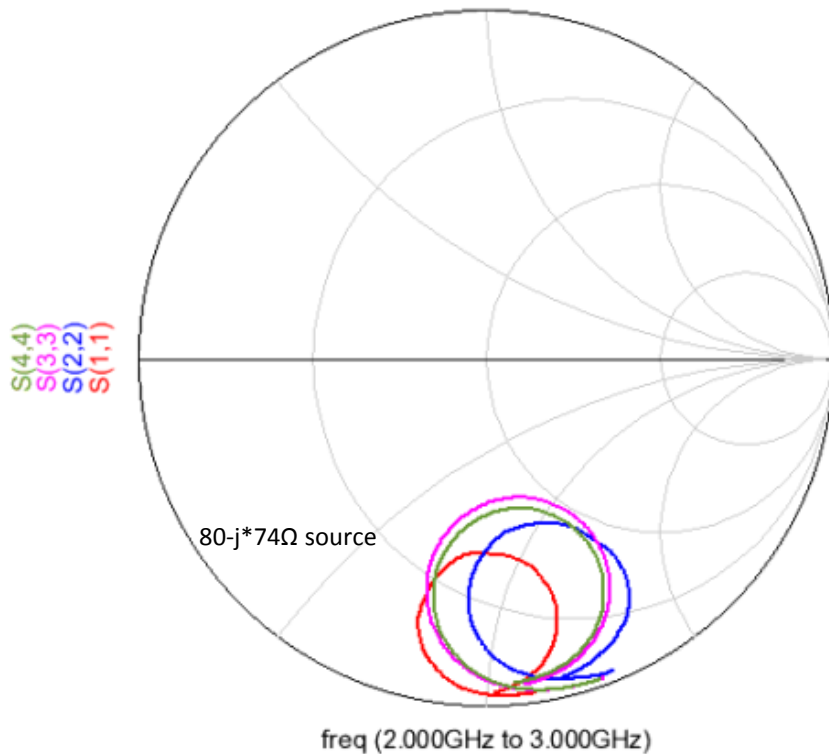


\* Do transmission (through) calibration with 0805  
 0Ω across ports

# Test boards 3 & 4: Balun and Two-port Measurements and Simulations

## Measurements

## Simulations



### Balun

m1  
freq=2.570GHz  
dB(S(1,1))=-5.043  
Min

### Two-port

m2  
freq=2.541GHz  
dB(S(2,2))=-6.150  
Min

### One internal port

m3  
freq=2.579GHz  
dB(S(3,3))=-7.842  
Min

### Two internal ports

m4  
freq=2.548GHz  
dB(S(4,4))=-7.193  
Min

