

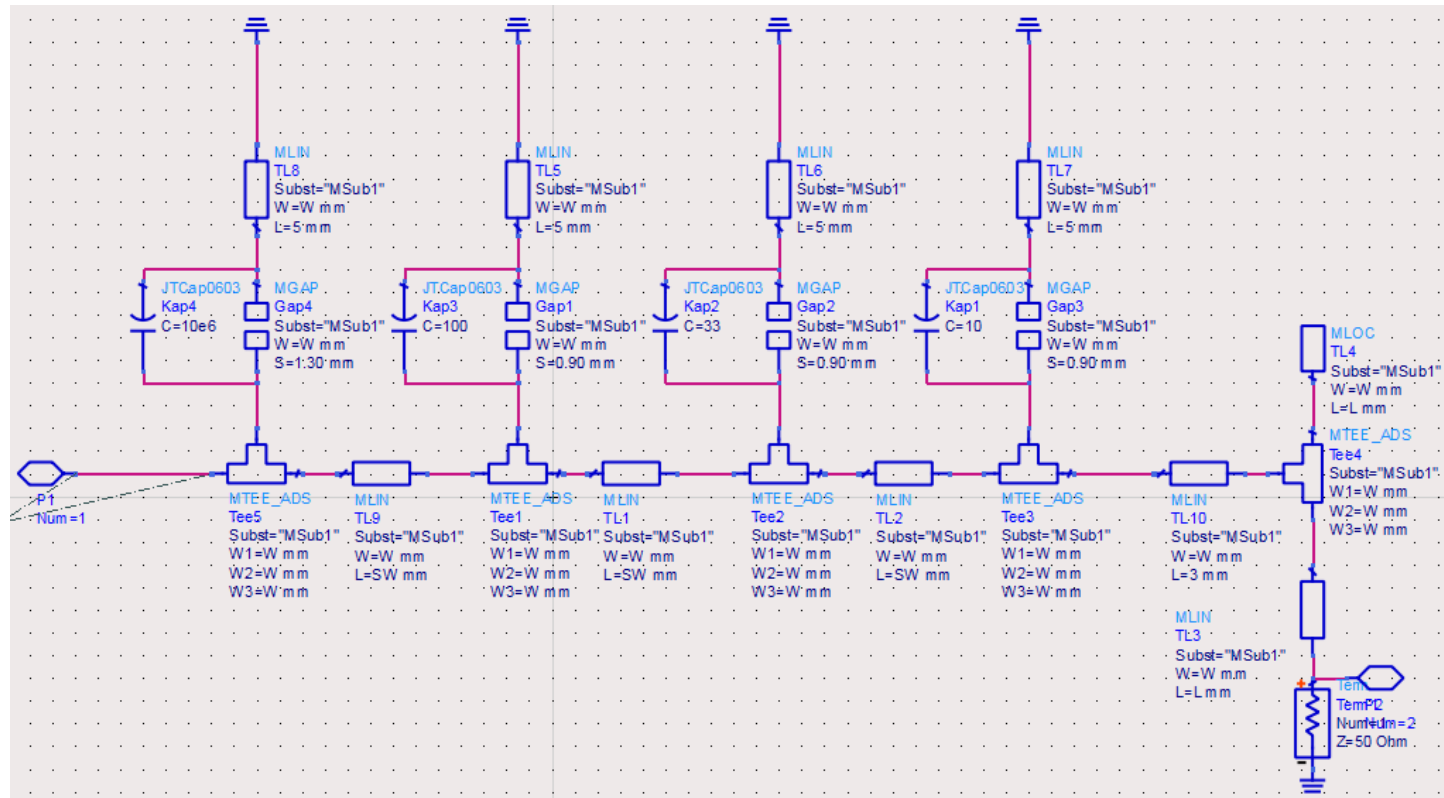
Design of power amplifier

- Design choices
- Bias/drain-network
- Stability
- Matching
- Layout
- Results

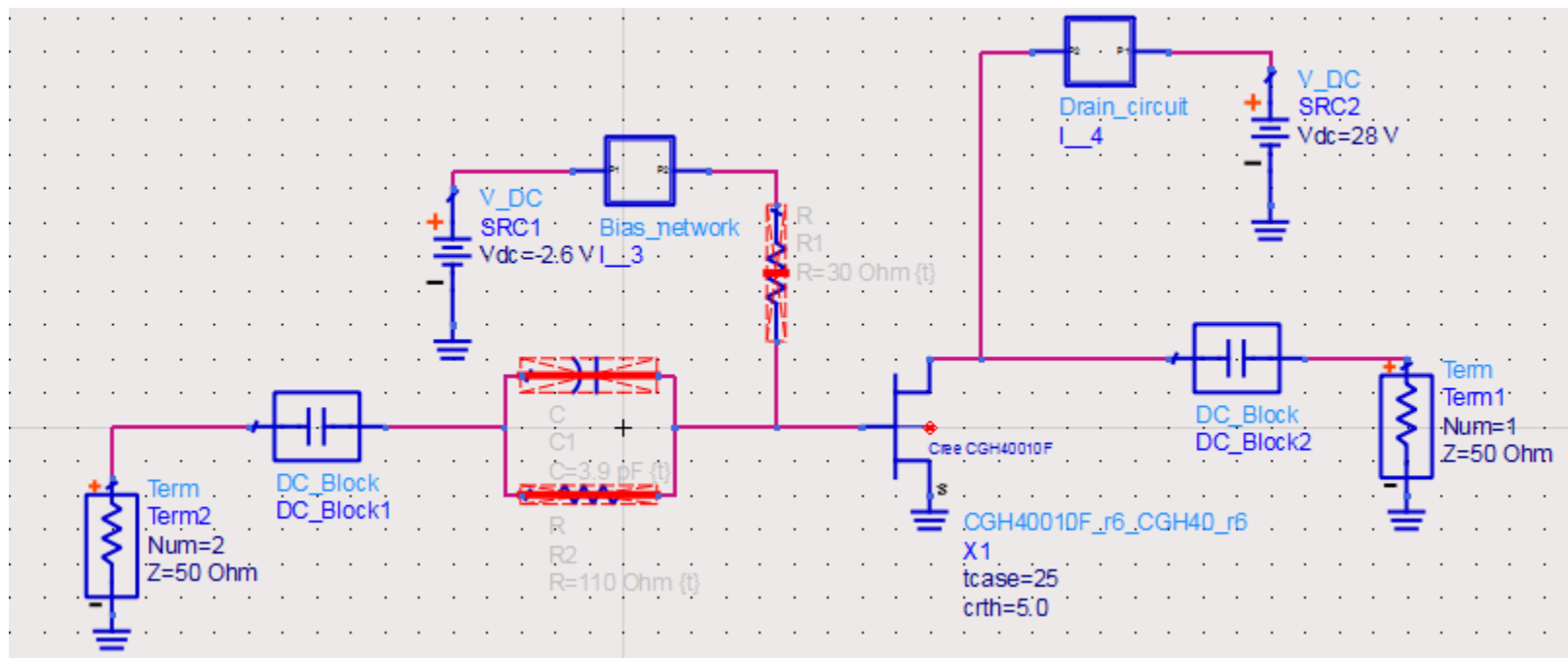
Design choices

- Class AB
- Efficiency
- Gain
- Stubs for matching

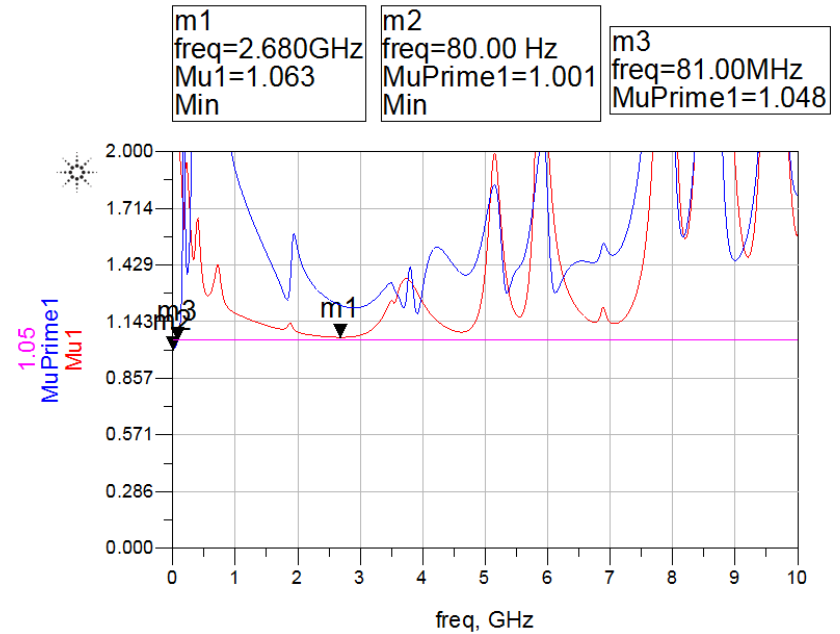
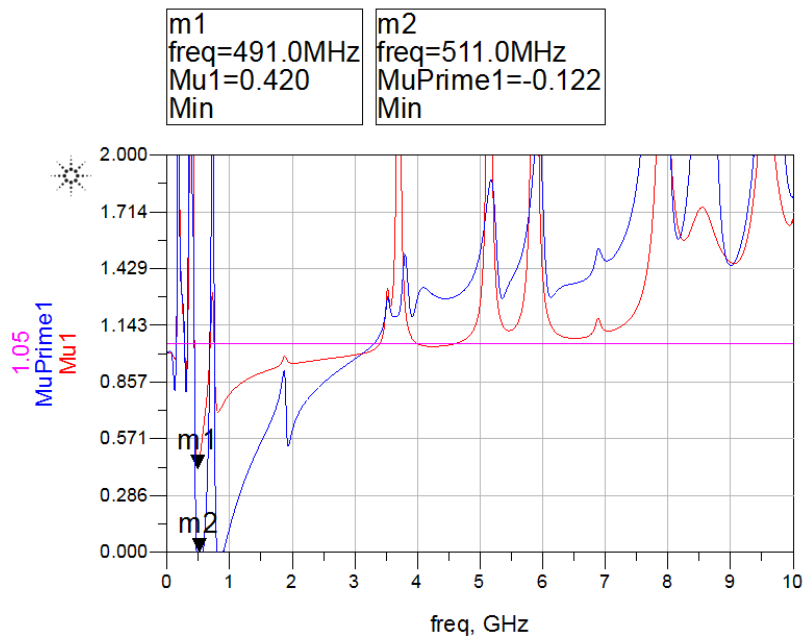
Bias/drain-network



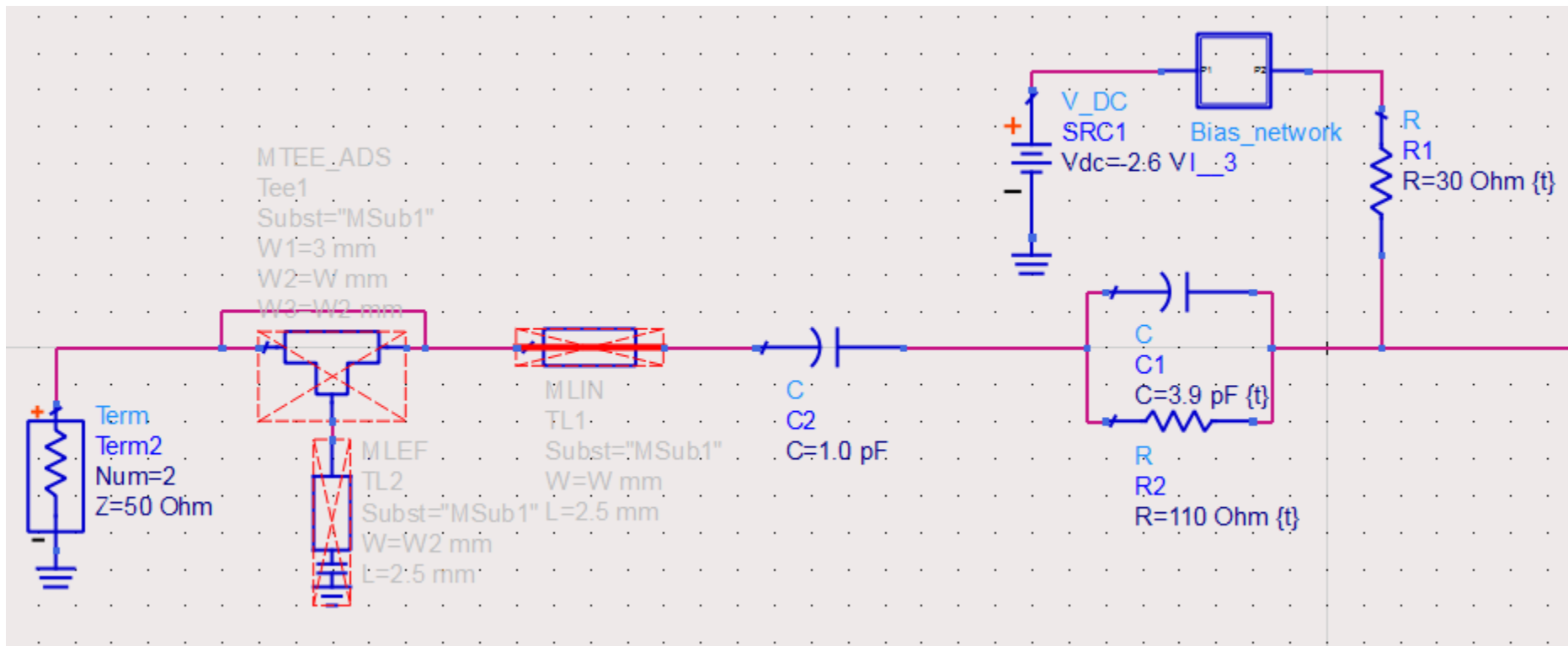
Stability schematic



Stability before-after



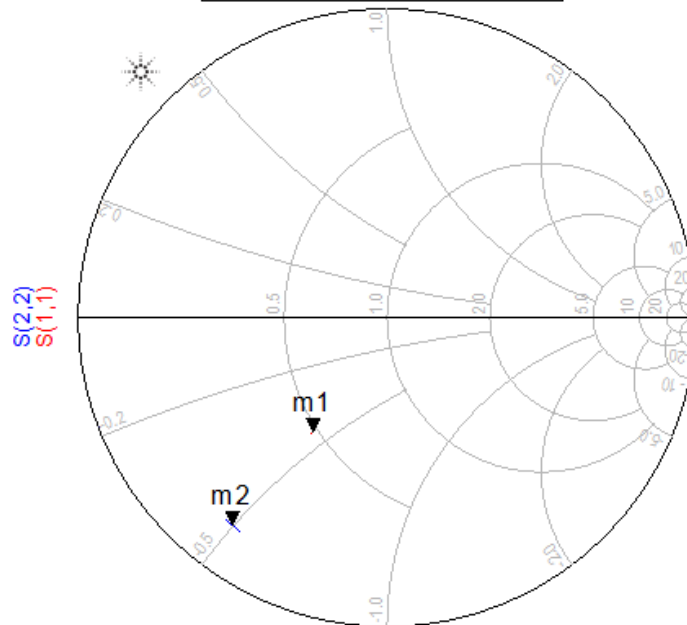
Matching schematic



Matching before-after

m1
freq=2.398GHz
S(1,1)=0.441 / -122.887
impedance = 24.054 - j22.137

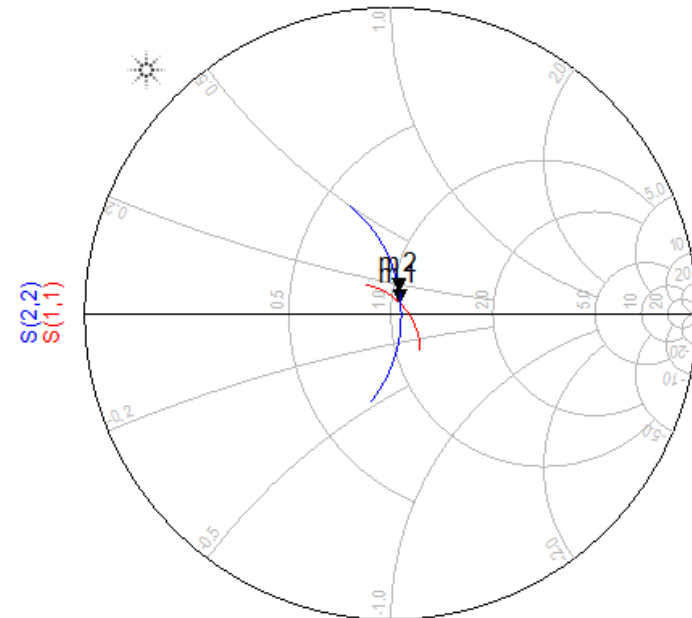
m2
freq=2.400GHz
S(2,2)=0.838 / -126.721
impedance = 5.523 - j24.836



freq (2.350GHz to 2.450GHz)

m1
freq=2.398GHz
S(1,1)=0.046 / 49.252
impedance = 52.937 + j3.665

m2
freq=2.400GHz
S(2,2)=0.079 / 69.635
impedance = 52.227 + j7.752

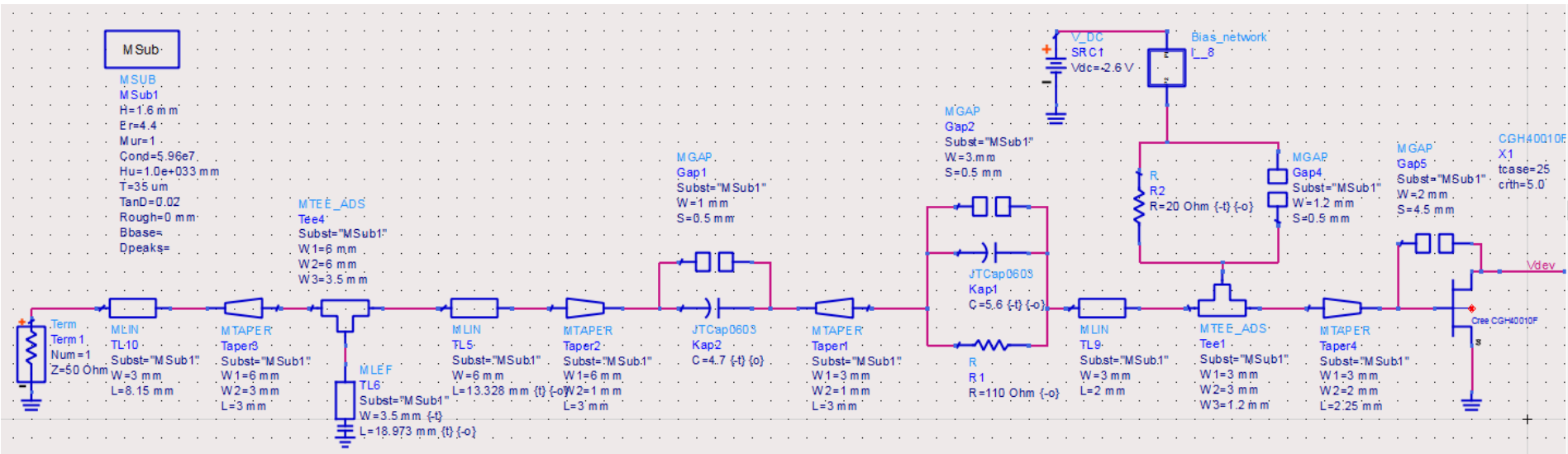


freq (2.350GHz to 2.450GHz)

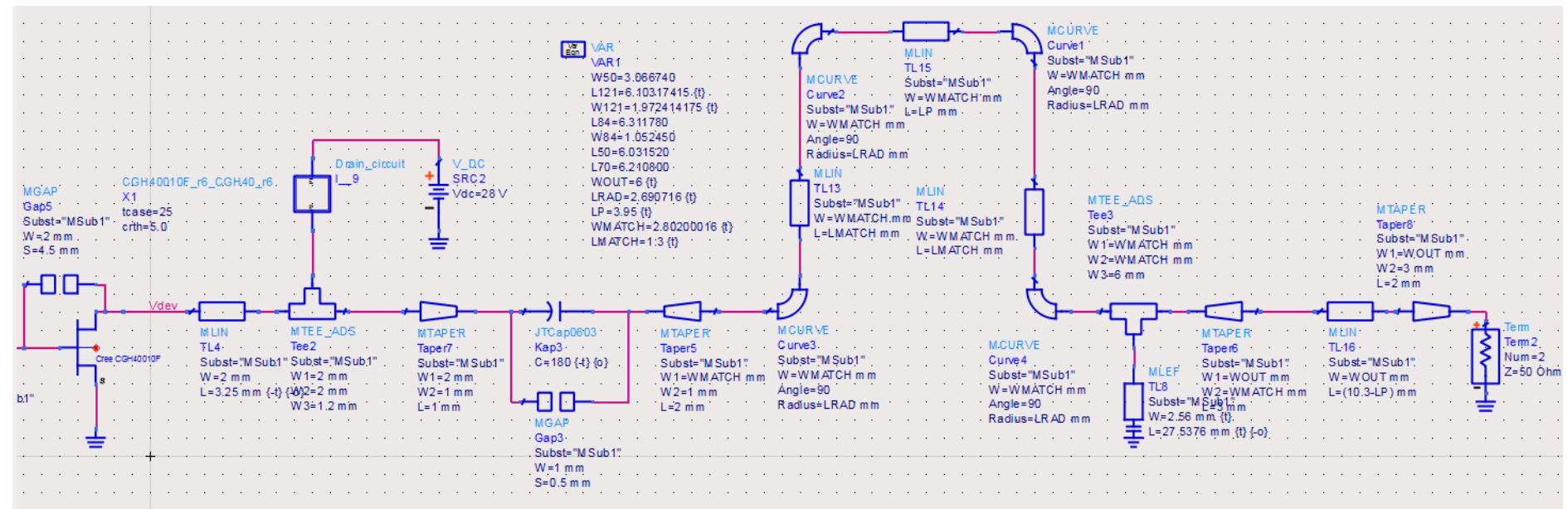
Layout

- Conversion to real components
- One at a time
- Tuned values
- Geometrical restrictions

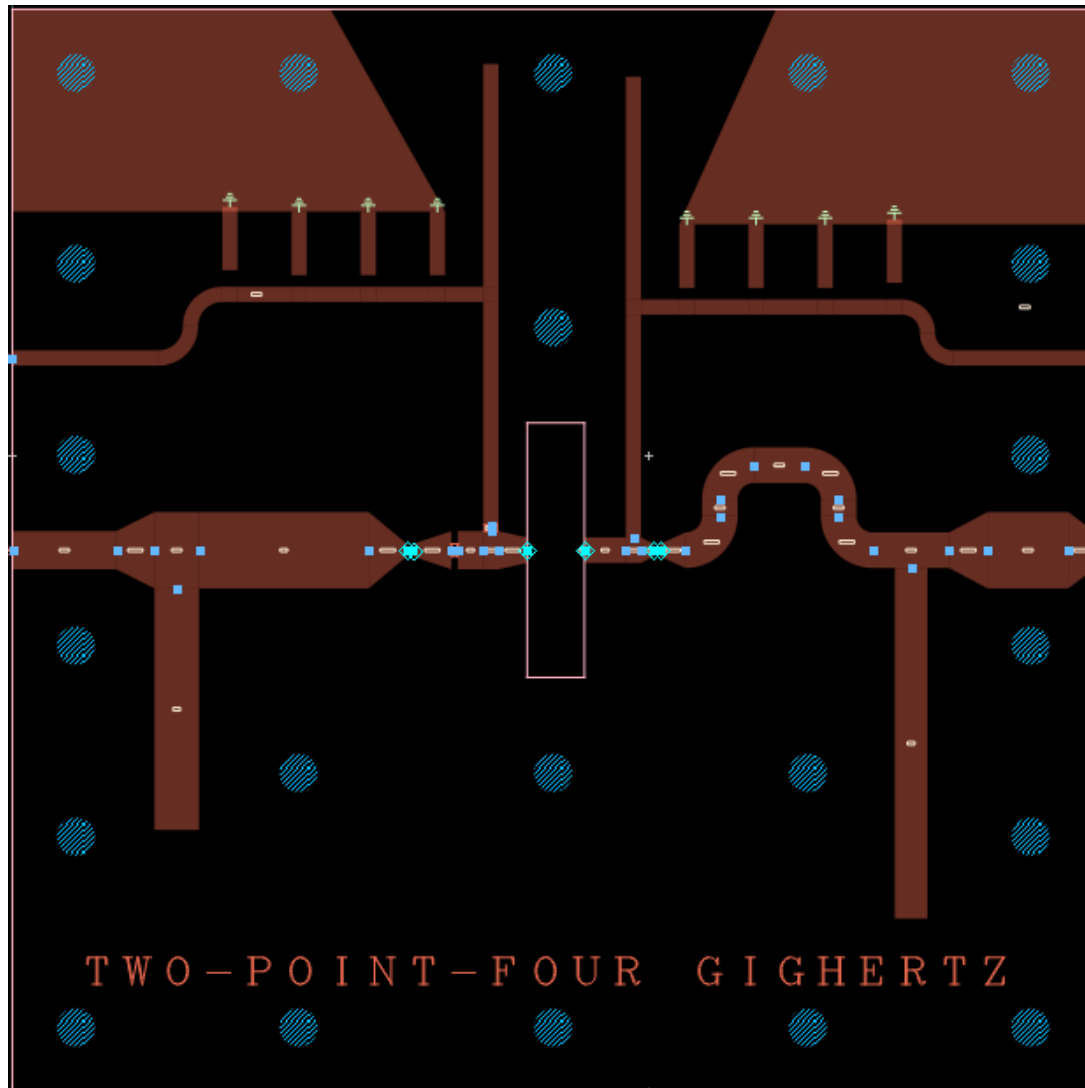
Schematic input



Schematic output



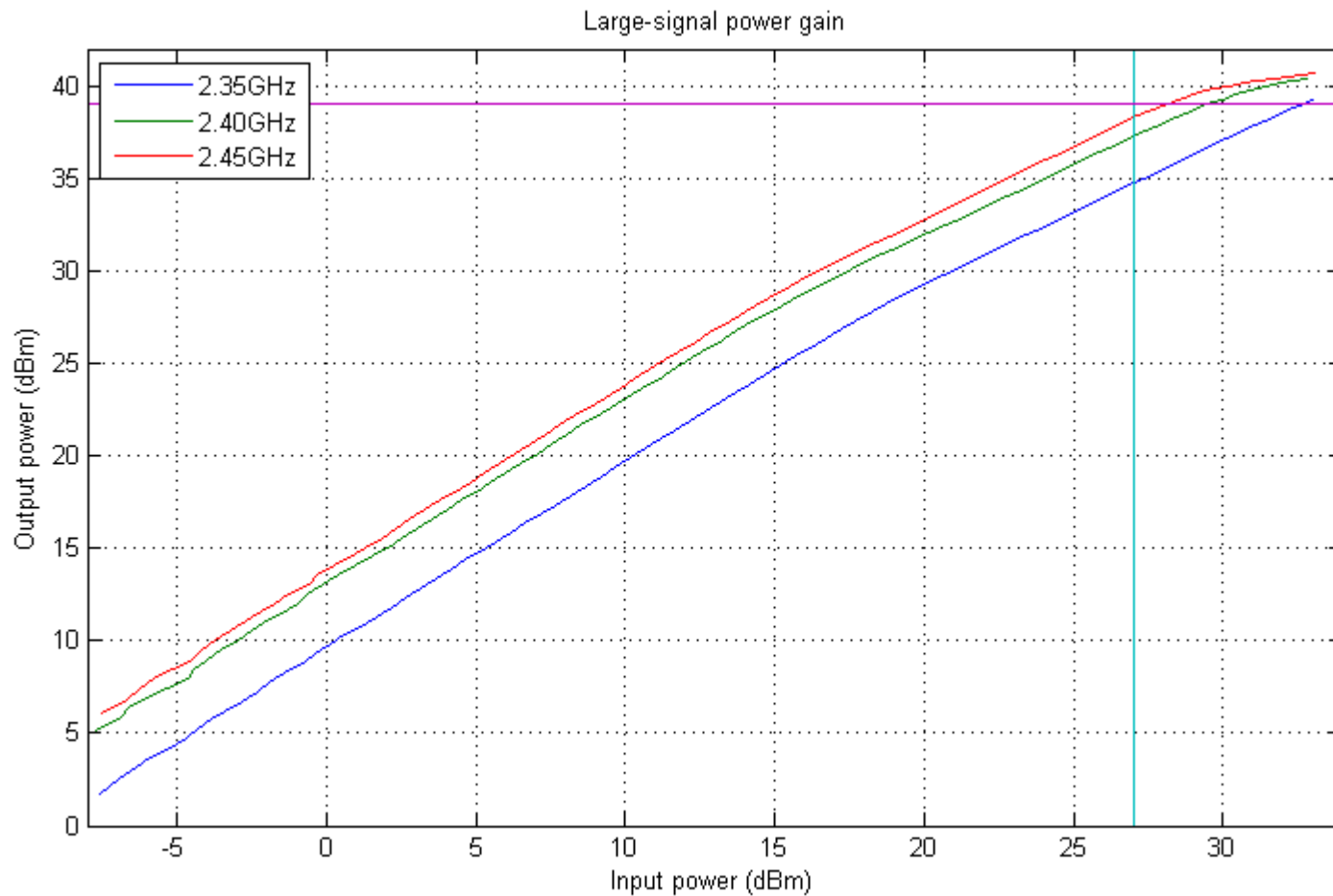
Layout



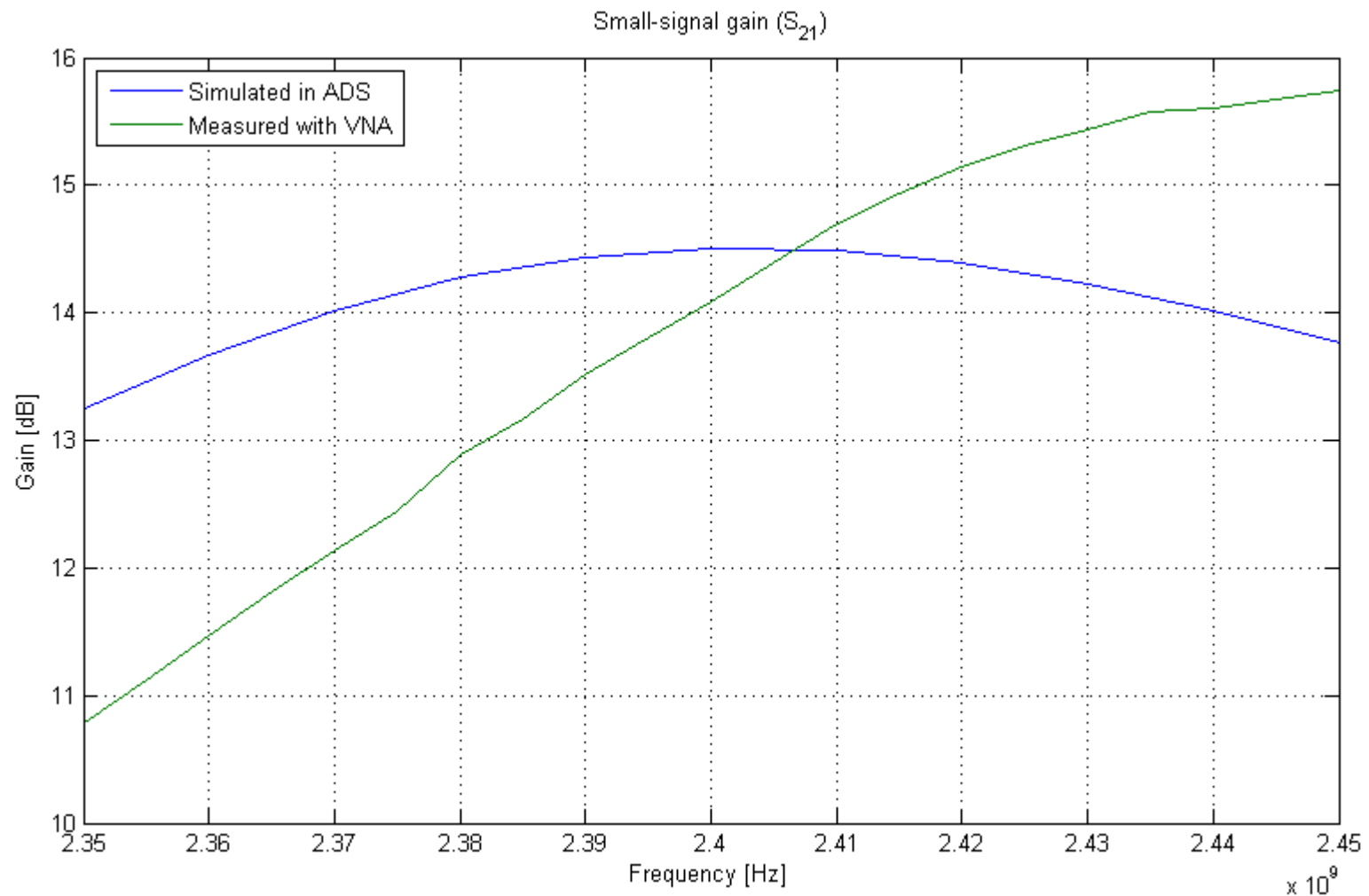
Results

| Parameter | 2.35GHz | 2.40GHz | 2.45GHz | Requirement |
|--|----------|-----------------------------------|----------|-------------|
| Small-signal gain | 10.79dB | 14.08dB | 15.74dB | >13dB |
| Output power with 27dBm input | 34.73dBm | 37.17dBm | 38.37dBm | >39dBm |
| Power added efficiency | 18.26% | 35.02% | 46.99% | NA |
| Third order intermodulation distortion | | High: -22.41dBc Low: -22.45dBc | | |

Large-signal power gain



Small-signal gain



Conclusion

- Unconditionally stable
- Gain slightly off frequency wise
- Steep learning curve

Questions?