



Motivation:

As already excessively investigated for RF and Microwave power amplifiers, load and source pull simulations and measurements prove useful in describing and improving the linearity and output power performance. These investigations can also be done for mixers in order to improve the mixer performance. Usually, the mixer is embedded into amplifying stages, couplers and other functional stages to form complete transceivers. This opens up the degree of freedom for interstage matching and harmonic terminations even in mixers. The goal is to investigate the potential of these technique to enhance mixer performance in millimeter-wave and THz analog transmit and receive frontends.

Goals:

- Deeper insight in load and source pull mechanics of frequency-converting circuits
- Design and establishing of a parameterized load and source pull testbench environment for Keysight ADS.
- Design of an optimized 300 GHz mixer in InGaAs mHEMT technology using the load and source pull simulation environment

Tasks:

- Literature survey of Load-Pull simulations and measurements for frequency-converting devices

- Building a mixer Load-Pull simulation environment in Keysight ADS
- Performing Load-Pull investigation on mixers for performance improvement
 - Optimum Load for the desired intermodulation product
 - Load investigation for suppression of undesired frequency spectrums (port Isolation)
- Design of a mixer using load and source pull simulation
- Design of buffer amplifiers to provide the necessary matching

