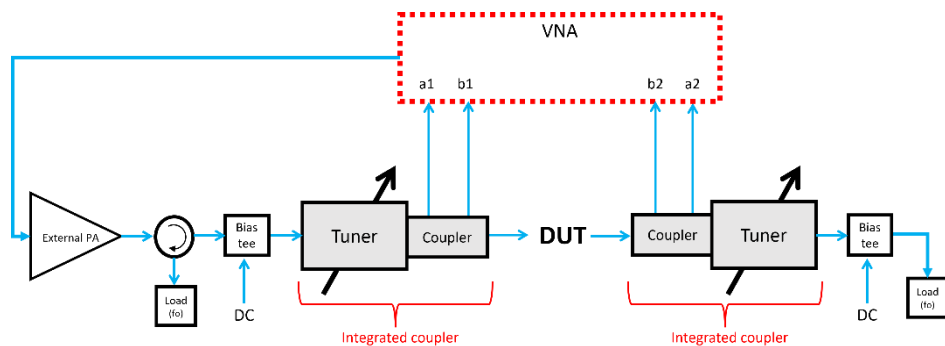# InsightPro

Passive & Hybrid-Active Load Pull Measurements

High-frequency and high-power devices exhibit smaller input and output impedances. It is therefore important to be able to characterize the non-linear behavior of devices at highly reflective impedances. The passive tuners introduce phase skew during modulated signal analysis and evaluation. This undesired effect depends on factors such as the physical distance between the DUT and tuner, dimensions of the tuner, and signal bandwidth.

With the growing importance of wireless applications and increasing use of high data rate protocols, increasing the accuracy and reliability of power gain and EVM measurement and optimizing linearity and efficiency of amplifiers has become crucial. The preferred large signal characterization test bench (passive load pull) faces significant challenges. Losses and electrical delay from tuners, cables, and probes constrain the system, limiting the reflection coefficient that can be provided to the DUT.

This demonstration features a vector-receiver source-pull and load-pull setup, utilizing Nano5G tuners (on the load) and XT tuner (on the source) to manipulate source and load impedances and optimize the performance of a high-frequency, high-power device. The measurement setup provides magnitude and phase information of the a and b waves on the input and output of the DUT reference plane with essential parameters such as power gain, output power, PAE, and measured input and output impedances. The compact size of the tuners facilitates easy installation, with probes mounted directly to the tuners' integrated couplers. As a result, the test setup reduces insertion loss, shortens the physical distance between the tuner and DUT, maximizes control capability on the Smith Chart over a larger area, and decreases total phase deviation, enabling the user to reach a higher reflection coefficient.

Demo Setup

Target Users

Target users include modeling, test and verification, reliability and quality, and R&D engineers focused on reliability testing and design/model verification for 5G systems above 18 GHz.

Product Overview

InsightPro Measurement & Modeling Device Characterization Software

InsightPro™ is the industry's premier unified software suite, designed to accelerate the component and sub-system measurement and model extraction workflow for R&D, design verification, and small-scale production testing. Built with a measurement-first approach, InsightPro serves as the primary software interface for instrument-agnostic small-signal and large-signal characterization in both 50Ω and non-50Ω environments. By streamlining data collection, management, and analysis, it enables engineers and researchers to make informed decisions with confidence.

KEY SPECIFICATIONS AND FEATURES:

- Flexible bench configuration for easy instrument/DUT setup to match any workflow.
- Automated, multi-instrument calibration workflows empower users to achieve high accuracy results across diverse setups with minimal user intervention.
- Built-in system calibration verification for accuracy before data collection begins.
- Comprehensive small-signal, large-signal, and pulsed testing captures real-world device behavior for reliable design and modeling.
- Powerful visualization and analytics suite empowers users to quickly interpret results, extract models, and drive faster design decisions.

Nano Series Automated Impedance Tuners

The Nano series (NT-series) automated impedance tuners are designed for on-wafer applications with maximum VSWR at the probe tip. The Nano5G model enables highly reliable passive load pull measurements for 5G applications, especially in the 28 GHz and 39 GHz bands allocated for FR2, although continuous operation is available from 18 GHz – 50 GHz.

KEY SPECIFICATIONS AND FEATURES:

- Maximizes tuning range and reduces phase skew
- Eliminates the need for external probe mounts, cables, and couplers
- Minimizes transmission line lengths by bringing tuning element closer to the DUT

More Resources

Visit explore.maurymw.com/ims-2025 to learn more about Maury Microwave solutions.