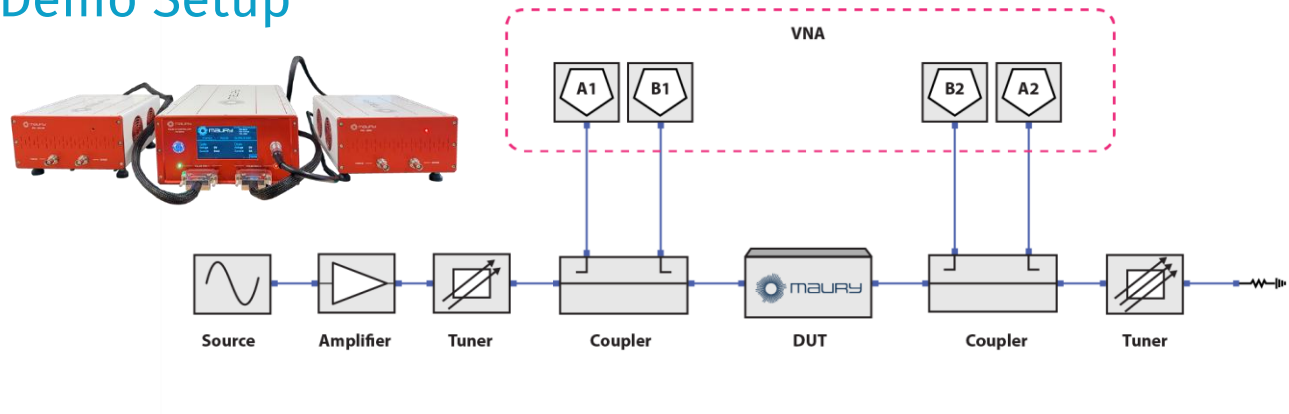
Modelling & Component Characterization: Pulsed DC & RF Vector Receiver Load-pull

Achieving accurate large-signal characterization at high frequencies to optimize efficiency and linearity requires precise control over harmonic terminations. Traditional scalar load-pull techniques are often insufficient, as they only measure fundamental power and lack the magnitude and phase data necessary to characterize harmonic signals. This "blind spot" limits an engineer's ability to analyze complex nonlinear behaviors. In addition, RF performance of high-power devices is frequently skewed by thermal effects during long measurement cycles. To isolate these effects and capture the true intrinsic behavior of a device, short-pulse measurement techniques are essential.

This demonstration introduces an advanced vector-receiver harmonic load-pull system designed for high-frequency applications. By integrating pulsed RF and pulsed biasing, the setup decouples thermal drift from electrical performance. Using NT-18G-50G-1C-C and NT-8G-67G-3C-C tuners, the system precisely manipulates source and load impedances across a wide 8–67 GHz bandwidth.

The Maury pulsed PIV system provides DC pulsing, synchronized with a VNA to ensure data acquisition occurs within the optimal measurement window. The InsightPro™ software tool enables comprehensive nonlinear characterization by utilizing short pulses to minimize thermal overhead. The system accurately captures critical data, such as power gain, output power, efficiency, input impedance, and AM/PM.

Demo Setup



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Target Users

Target users include engineers involved in process development focused on performance analysis of power, gain, and efficiency. Additional applications include compact modeling with large-signal verification of compact device models including harmonic control, production testing through the extraction of behavioral models for rapid device evaluation, and reliability and durability testing under short- and long-term large reflection conditions.

Product Overview

InsightPro Measurement & Modeling DC 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.

Nano Series Automated Impedance Tuners

The Nano™ Series (NT-series) automated impedance tuners enable high-gamma load- or source-pull characterization across a wide spectrum. Their compact size is suitable for on-wafer measurements.

KEY SPECIFICATIONS AND FEATURES:

- Compact, lightweight design optimized for seamless integration with on-wafer probe station
- Direct connection to probe maximizes tuning range and reduces phase skew
- Eliminates the need for external probe mounts, cables, and couplers
- Minimizes transmission line lengths by bringing turning element closer to the DUT

Pulsed IV Measurement System

The Maury Pulsed IV measurement system is a fully integrated Pulsed IV power supply that enables accurate IV characterizations in quasi-isothermal conditions. The integrated solutions include 3 modules:

- PIV Main: High Voltage AC/DC power supply module with 10 ns resolution
- PIV- 30V-BP: Bipolar +/-30V gate pulsed IV module
- PIV-280V: 280V drain pulsed IV module

More Resources

Visit maurymw.com/info/ims-2026 to learn more about Maury solutions.

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