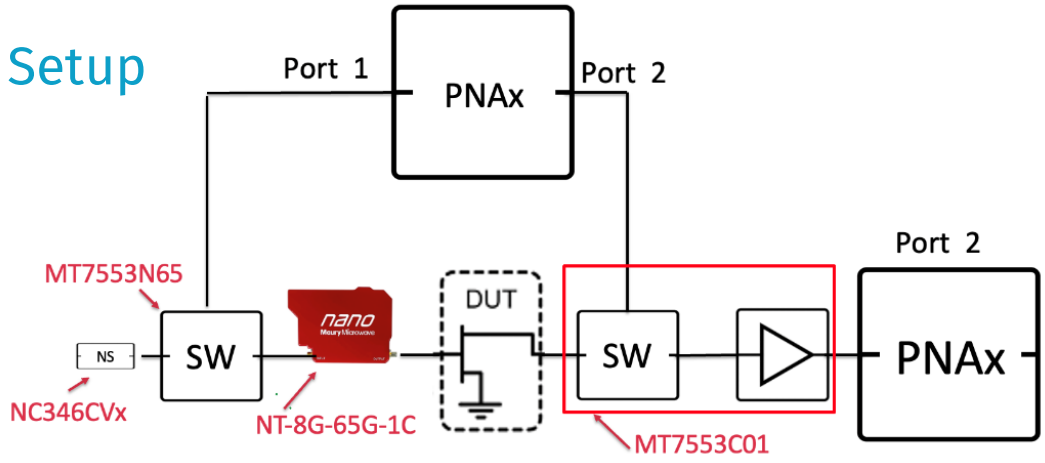
65 GHz Noise Parameters Extraction using InsightPro

In any active device or circuit, noise occurs naturally and establishes a limit for the lowest level of useful signals. It is crucial, therefore, to design circuits that minimize the effects of noise and its impact on performance. Although noise figure is typically measured in a 50-ohm environment, it varies with the source impedance presented to the device. Noise parameters, which are used to express this variation, are crucial to know when designing low-noise amplifiers (LNA) using highly mismatched devices. LNA design is even more critical in high-frequency applications that operate at lower power levels.

This demonstration highlights how the Maury InsightPro™ software, in combination with the MT7553N65 noise switching module, Nano series impedance tuner, and MT7553C01 noise receiver module, simplifies and enhances the extraction of noise parameters across a broad frequency range. With its intuitive interface and step-by-step guidance, InsightPro streamlines instrument bench setup, system calibration and calibration verification, and extracts noise parameters with unparalleled accuracy, enabling users to make faster and more reliable design decisions.

In this test setup, the noise source connects to the MT7553N65, which routes the signal to the Nano series automated impedance tuner to adjust the source impedance presented to the DUT. Featuring an integrated downconverter, bias tees, LNAs, and RF switches, the MT7553C01 connects to the DUT output, reducing the total system noise figure and enhancing noise parameter measurement accuracy.

Demo Setup



Target Users

Target users include LNA and RX designers that require accurate and reliable noise parameter measurements up to 65 GHz.

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Product Overview

InsightPro Measurement and Modeling Device Characterization Software

InsightPro is the industry's premier unified software suite, designed to accelerate component and sub-system measurement and model extraction workflow for R&D, design verification, and small-scale production testing.

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.

MT7553 Series Noise Conditioning Modules

The MT7553 series integrates a switch and wideband LNA near the DUT to lower total system noise figure and improve measurement accuracy. The noise switching module integrates the entire input network while the noise receiver module integrates the entire output network of a typical noise parameter measurement system into a turnkey solution.

KEY SPECIFICATIONS AND FEATURES:

- Automates noise parameter measurement systems; replaces external banded components.
- Integrated downconverter, bias tees, LNAs, and switches.
- Low noise figure for improved system calibration accuracy and repeatability.

NT Series Automated Impedance Tuners

The NT series tuners enable engineers to determine optimized matching conditions to extract noise parameters and maximize output power or power-added efficiency. The tuners' compact and direct probe connection simplifies on-wafer integration, effectively maximizing VSWR at the DUT reference plane and minimizing phase skew for modulated signals. Patented closed loop feedback motor control enhances measurement accuracy and repeatability.

More Resources

Visit maurymw.com/info/eumw-2025 to learn more about Maury Microwave solutions.

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