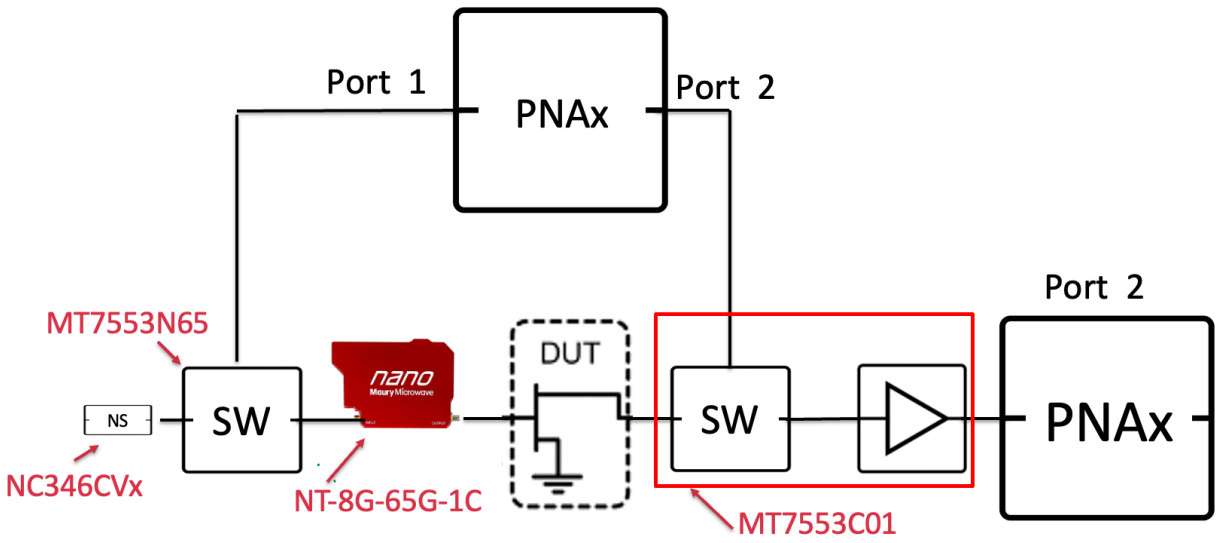
65 GHz Noise Parameters

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 features the Maury Microwave MT7553C01 noise receiver module (0.1 GHz – 65 GHz) in a broadband noise parameter system. In this test setup, the noise source connects to the Maury Microwave Nano™ Series Automated Impedance Tuner, which adjusts 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.

Product Overview

MT7553 Series Noise Receiver Modules

The MT7553-series of coaxial noise receiver modules enhance the typical noise system measurement accuracy, reducing the total system noise figure by adding an integrated switch and wideband LNA close to the DUT. 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. The MT7553C01 noise receiver module, in particular, covers 0.1 GHz – 65 GHz and is designed to operate with the PNAx 50 GHz noise receiver (029) or 65 GHz noise receiver (E29).

The noise receiver consists of the component chain from the DUT output to, and including, the noise analyzer. The noise receiver's minimum noise figure (Fmin) will affect the minimum accurately measurable noise figure of the DUT by increasing the sensitivity of the receiver. Therefore, it is critical to provide a noise receiver with the lowest Fmin possible. In addition, noise analyzers may not be available at the frequencies of interest and in these cases, it is common to use a downconverter chain to lower the frequency of the signal to one that can be measured by the noise analyzer. The Maury Microwave family of MT7553-series noise receiver modules address these critical considerations with low noise figure and integrated downconverter, wideband LNAs to improve the sensitivity of the noise receiver, RF switches to switch between VNA and NFA paths, and wideband bias tees to provide bias to the DUT.

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

More Resources

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