AMPLIFIER AND TRANSISTOR NOISE-PARAMETER MEASUREMENT AT NIST

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The Thermal Noise Metrology Project of the National Institute of Standards and Technology (NIST) develops methods and standards for very accurate measurements of thermal noise in electronic systems, and it provides support for such measurements in the communications and electronics industries, as well as for other government agencies. Work is currently in progress in three major areas. The first area is in the measurement of noise temperature of one-port noise sources, where we offer measurement services at 30 and 60 MHz and at all frequencies from 1 GHz to 65 GHz. The second general thrust of the Project is measurement of noise parameters of low-noise amplifiers and transistors, and the third major effort aims at improving methods for calibration and validation of microwave radiometers used for remote sensing. This talk will review activities and capabilities in the second area, noise-parameter measurements.

The Projects noise-parameter efforts comprise work both on packaged amplifiers and on transistors on a wafer. We have developed and are refining a measurement capability for packaged amplifiers for 1 GHz to 12.4 GHz, and we are collaborating to improve methods for measuring noise parameters of poorly matched transistors on a wafer in this same frequency range. Central to any such development are verification methods and uncertainty analysis. We have developed and implemented verification methods and a Monte Carlo uncertainty analysis for amplifier measurements and are currently extending the verification methods and uncertainty analysis to measurements of transistors on a wafer. Both the amplifier and the transistor work include measurement comparisons with other laboratories, and in the case of packaged amplifiers we intend to offer a measurement comparison service. Results of the amplifier noise-parameter work and current work on noise parameters of transistors on a wafer will be reviewed.

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2. A - Electromagnetic Metrology
3. (a) Special Session - Microwave Measurements at NIST
4. I - Invited Paper, Program chair: Jeffrey Jargon
5. Special Session - Microwave Measurements at NIST