Abstracts

Power-amplifier characterization using a two-tone measurement technique

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An accurate nonlinear model is necessary to optimize the tradeoff between efficiency and linearity in power amplifiers. Gain compression (AM/AM) and amplitude-phase (AM/PM) distortion are the two primary model inputs used to characterize the nonlinearity. The amplifier's AM/AM and AM/PM characteristics are typically measured statically using a vector network analyzer. Since the input is typically a modulated signal, it is desirable to characterize the amplifier dynamically. This paper describes and demonstrates a dynamic AM/AM and AM/PM measurement and modeling technique involving a spectrum analyzer and two-tone input signals. A complete analysis of the measurement technique is presented, along with the data processing needed for the identification of a new three-box model. The test configuration and procedure are presented with special precautions to minimize measurement error. Results for a solid-state amplifier are used to accurately predict intermodulation distortion, while those for a traveling-wave tube amplifier show good agreement with that obtained dynamically using a 16 quadrature-amplitude-modulation signal.

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