Abstracts

Extraction of accurate behavioral models for power amplifiers with memory effects using two-tone measurements

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This paper proposes a system-level behavioral model for RF power amplifiers (PAs) that exhibit memory effects. PAs with memory effects are shown to have two-tone intermodulation distortion (IMD) levels that vary depending on tone-spacing. Thus, typical single tone extracted AM/AM and AM/PM characteristics cannot accurately model PA memory effects. By varying the frequency spacing of two-tone signals, envelope frequency dependent transfer functions can be derived. Using these transfer functions, a behavioral model is developed which is based on the parallel-cascade linear and nonlinear (LN) system. This model gives more accurate results in predicting the behavior of PAs with memory effects close to the carrier frequency. The model is validated by comparing the predicted and measured adjacent channel power ratio (ACPR) of a CDMA signal amplified by a high power class-AB PA. It is found that the parallel cascade model improves ACPR prediction accuracy by as much as 4 dB compared to the single tone derived memoryless model.

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