Abstracts

Quantifying memory effects in RF power amplifiers

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This paper proposes a system-level behavioral model for RF power amplifiers (PAs), which exhibit memory effects, that is based on the parallel Wiener system. The model extraction is performed using two-tone intermodulation distortion (IMD) measurements with different tone frequency spacings and power levels. It is found that by using such a model, more accurate adjacent-channel power-ratio levels may be predicted for high PAS close to the carrier frequency. This is validated using IS-95B CDMA signals on a low-power (0.5 W) class-AB PA, and on a high-power (45 W) class-B PA. The model also provides a means to quantify memory effects in terms of a figure-of-merit that calculates the relative contribution to the IMD of the memoryless and memory portion of the PA nonlinearity. This figure-of-merit is useful in providing an estimate of the amount of correction that a memoryless predistortion system may have on PAS that exhibit memory effects.

❑ Return to main document.