Abstracts

Realistic power-amplifiers characterization with application to baseband digital predistortion for 3G base stations

S. Boumaiza and F.M. Ghannouchi. "Realistic power-amplifiers characterization with application to baseband digital predistortion for 3G base stations." 2002 Transactions on Microwave Theory and Techniques 50.12 (Dec. 2002 [T-MTT] (Special Issue on 2002 International Microwave Symposium)): 3016-3021.

In this paper, a realistic, accurate, versatile, and thermal-free complex behavior test bed suitable for third-generation power-amplifiers characterization is proposed. Using this approach, a 90-W peak power amplifier based on Motorola-LDMOS class-AB transistors was measured under several signal excitations such as W-CDMA, cdma2000, and eight-tone signals. The results obtained show noticeable discrepancies compared to those measured using a vector network analyzer (HP-8510C) for both AM/AM and AM/PM curves. This test bed was also used for the investigation of the memory effect in RF power amplifiers. In the second part of this paper, the characterization results obtained by the test bed were used to design a digital predistorter for an LDMOS amplifier. A baseband predistortion accurate synthesis algorithm is presented. Indeed, a memoryless baseband digital predistorter lookup table was directly synthesized using the measured AM/AM and AM/PM curves without any need to perform additional analytical derivations and/or numerical optimizations. The predistorter synthesis procedure requires only one iteration, contrary to previous works, which need several iterations to obtain similar performances.

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