Abstracts

Linearity of X-band class-F power amplifiers in high-efficiency transmitters

M.D. Weiss, F.H. Raab and Z. Popovic. "Linearity of X-band class-F power amplifiers in high-efficiency transmitters." 2001 Transactions on Microwave Theory and Techniques 49.6 (Jun. 2001, Part II [T-MTT] (Special Issue on RF Power Amplification)): 1174-1179.

Modern communication signals have time-varying envelopes with significant peak-to-average ratios, resulting in low average efficiency when amplified by commonly used linear power amplifiers (PAs). For linear amplification with increased average efficiency, the Kahn envelope-elimination-and-restoration method uses a highly efficient saturated PA. In this paper, an 8.4 GHz class-F PA with 55% maximum instantaneous efficiency at 610 mW output power, is experimentally characterized in several different biasing modes. Operated in linear mode with constant drain bias, this PA has 10% average efficiency. The suppression of two-tone intermodulation products is 27 dBc when operated at about 0.7 times the peak output power. For the same PA operated in a modified Kahn mode with drive and bias control, a comparable linearity (27.7 dBc) can be obtained at peak output power. Furthermore, the average efficiency increased to 44%, a factor of 4.4 over the linear fixed bias mode.

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