Abstracts

High-efficiency high-level modulator for use in dynamic envelope tracking CDMA RF power amplifiers

D.R. Anderson and W.H. Cantrell. "High-efficiency high-level modulator for use in dynamic envelope tracking CDMA RF power amplifiers." 2001 MTT-S International Microwave Symposium Digest 01.3 (2001 Vol. III [MWSYM]): 1509-1512 vol.3.

There is an inherent tradeoff between linearity and efficiency in modern microwave power amplifiers using spectrally efficient modulation techniques. This paper discusses an envelope modulation technique to improve efficiency while preserving linearity when modulating the supply voltage to the PA. Based on the SEPIC (Single-Ended Primary Inductance Converter) switchmode topology with coupled inductors, a continuous current mode (CCM) converter is used as a high-level class-S supply modulator to track the carrier envelope of a CDMA transmit signal. This results in a considerable improvement in PA efficiency while preserving linearity and modulation accuracy. Modulation frequencies up to 1.25 MHz are reproduced with about 80% efficiency. A SPICE compatible switched average converter model is described with an expression for an average current mode (ACM) control duty cycle generator. Simulated and measured data are presented for the case of a LDMOS class-AB RF amplifier with a SEPIC class-S modulated supply under IS-95 CDMA signal drive conditions.

❑ Return to main document.