Abstracts

An extended Doherty amplifier with high efficiency over a wide power range (Dec. 2001 [T-MTT])

M. Iwamoto, A. Williams, Pin-Fan Chen, A.G. Metzger, L.E. Larson and P.M. Asbeck. "An extended Doherty amplifier with high efficiency over a wide power range (Dec. 2001 [T-MTT])." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2472-2479.

An extension of the Doherty amplifier, which maintains high efficiency over a wide range of output power (>6 dB), is presented in this paper. This extended Doherty amplifier is demonstrated experimentally with InGaP/GaAs heterojunction bipolar transistors at 950 MHz. Power-added efficiency (PAE) of 46% is measured at P/sub 1dB/ of 27.5 dBm and 45% is measured at 9 dB backed off from P/sub 1dB/. Additionally, PAE of at least 39% is maintained for over an output power range of 12 dB backed off from P/sub 1dB/. This is an improvement over the classical Doherty amplifier, where high efficiency is typically obtained up to 5-6 dB backed off from P/sub 1dB/. Compared to a single transistor class-B amplifier with similar gain and P/sub 1dB/, the extended Doherty amplifier has PAE 2.6 /spl times/ higher at 10 dB back off and 3 /spl times/ higher at 20 dB back off from P/sub 1dB/. Under different bias and output matching conditions, the amplifier was also evaluated with CDMA signals. At the highest measured power of 25 dBm, the extended Doherty amplifier achieves a PAE of 45% with an adjacent channel power ratio of -42 dBc. Generalized design equations are also derived and the consequences of finite device output impedance on amplifier gain and linearity are explored.

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