Abstracts

An Experimental Study of the Effects of Harmonic Loading on Microwave MESFET Oscillators and Amplifiers

P. Berini, M. Desgagne, F.M. Ghannouchi and R.G. Bosisio. "An Experimental Study of the Effects of Harmonic Loading on Microwave MESFET Oscillators and Amplifiers." 1994 Transactions on Microwave Theory and Techniques 42.6 (Jun. 1994 [T-MTT]): 943-950.

This paper reports an extensive experimental investigation of the effects of second harmonic loading on the performance of microwave GaAs MESFET oscillators and strongly driven amplifiers. The measurement system used is an active load system based on six-port techniques. Harmonic load pull measurements were obtained for the NE72084 MESFET; the measurements show how the second harmonic load can influence the power gain and the power added efficiency in strongly driven amplifiers. The device line characterization technique was combined with the harmonic load pull technique; the measurement results illustrate how the output power and the DC to RF conversion efficiency of an oscillator depend on the choice of the second harmonic load. Amplifier and oscillator circuits have been designed using these measurements; the circuits have been constructed and measured. The results validate the experimented approach used and clearly illustrate the importance of properly selecting the second harmonic load in amplifier and oscillator circuits. Significant improvements in gain, output power and efficiency have been achieved by properly selecting the second harmonic load.

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