Abstracts

Source Second-Harmonic Control for High Efficiency Power Amplifiers

M. Maeda, H. Masato, H. Takehara, M. Nakamura, S. Morimoto, H. Fujimoto, Y. Ota and O. Ishikawa. "Source Second-Harmonic Control for High Efficiency Power Amplifiers." 1995 Transactions on Microwave Theory and Techniques 43.12 (Dec. 1995, Part II [T-MTT] (1995 Symposium Issue)): 2951-2957.

A novel technology that drastically improves output power and efficiency of amplifiers has been developed, where source and load second-harmonic impedances, as well as the fundamental impedances, are optimally terminated in the input and output matching circuits. A record high 74% power-added efficiency (PAE) with 31.4 dBm (1.4 W) output power at a frequency of 930 MHz has been achieved as a single-stage saturated amplifier using an ion-implanted GaAs MESFET under the low supply voltage of 3.5 V. As a single-stage linear amplifier, an excellent PAE of 59% with 31.5 dBm output power has been realized at V/sub d/ = 4.7 V and f = 948 MHz. Saturated and linear two-stage power modules operating at 900 MHz band with 31 dBm (1.25 W) output power have been demonstrated for analog and digital cellular applications respectively, the volume of which is as small as 0.4 cc. The saturated power module has achieved a PAE of 66% at V/sub d/ = 3.5 V, and the linear one has realized a PAE of 50% at V/sub d/ = 4.7 V.

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