Abstracts

Class-E, Class-C, and Class-F power amplifiers based upon a finite number of harmonics

F.H. Raab. "Class-E, Class-C, and Class-F power amplifiers based upon a finite number of harmonics." 2001 Transactions on Microwave Theory and Techniques 49.8 (Aug. 2001 [T-MTT] (Mini-Special Issue on the 2000 IEEE Radio and Wireless Conference (RAWCON))): 1462-1468.

Class-E operation at UHF and microwave frequencies is achieved by using transmission-line networks to provide the drain harmonic impedances of an ideal class-E power amplifier (PA). This paper develops a technique for analysis of such amplifiers that are based upon a finite number of harmonics. The technique is generally applicable to classes E, C, and F as well as PAs with harmonic reactances not corresponding to those of established classes. The analysis shows that the maximum achievable efficiency depends not upon the class of operation, but upon the number of harmonics employed. For any set of harmonic reactances, the same maximum efficiency can be achieved by proper adjustment of the waveforms and the fundamental-frequency load reactance. The power-output capability depends upon the harmonic reactances and is maximum for class F.

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