Abstracts

A 10 GHz high-efficiency active antenna

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This work discusses the use of a microstrip-fed slot antenna to directly provide the necessary output match and harmonic tuning for a 10 GHz class-E power amplifier. There is no matching circuit at the output of the amplifier since the slot is designed to provide the correct impedance at the fundamental frequency and to present an open circuit at the second harmonic. This eliminates losses in the matching circuit and decreases circuit area. Since the class-E amplifier requires a complex output load, the designed slot antenna is not a resonant structure. The device used is an Alpha AFM04P2 MESFET, which has a maximum output power of about 21 dBm. The measured performance of the active antenna shows 74% drain efficiency, 62% power-added-efficiency (PAE), and 20 dBm output power at 10 GHz, at 5 dB gain compression. The PAE is greater than 50% in a 400 MHz bandwidth.

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