Abstracts

Intermodulation Characteristics of X-Band IMPATT Amplifiers (Dec. 1972 [T-MTT])

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The intermodulation products produced when two equal-amplitude signals are applied to the input of an X-band IMPATT-diode amplifier have been measured. An Si p+nn+ IMPATT diode was operated in a double-slug-tuned coaxial reflection amplifier circuit that was tuned to provide 20 dB of small-signal gain at 9.340 GHz. The intermodulation tests consist of measurements of the magnitudes and frequencies of the amplifier output signals as a function of the input-signal drive levels and frequency separations. The gain and single-frequency characteristics of the amplifer were also measured, and are used along with the theoretical device and circuit admittance characteristics as a basis for explanation of the intermodulation results. A low-frequency dominance mechanism is found to exist in which the low-frequency signals are amplifed more than the high-frequency signals. This mechanism becomes more significant as the amplifier drive level is increased.

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