Abstracts

RF Spectrum of Thermal Noise and Frequency Stability of a Microwave Cavity-Oscillator

B. Villeneuve, P. Tremblay, A. Michaud and M. Tetu. "RF Spectrum of Thermal Noise and Frequency Stability of a Microwave Cavity-Oscillator." 1984 Transactions on Microwave Theory and Techniques 32.12 (Dec. 1984 [T-MTT] (1984 Symposium Issue)): 1565-1572.

The spectral distribution of the themal noise within a microwave cavity equipped with an extemal feedback loop has been calculated and measured. An equivalent electrical model is established from which the noise spectral density can be calculated at any post in the system, The effect of the gain and phase of the loop on the spectral distribution is measured with a spectrum analyzer through a heterodyne technique and comparison with theoretical calculations shows good agreement. Also, the modified cavity Q and resonant frequency is measured for various loop parameters. An experimental setup allowing precise measurement of frequency stability and FM noise close to carrier of microwave oscillators is presented and discussed. preliminary measurements of the short-term frequency stability of the system when operated as a microwave cavity-oscillator show a predominant flicker frequency noise. The measured FM noise close to carrier is related to time-domain measurements of frequency stabitity and to RF spectrum of the cavity-oscillator.

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