Abstracts

The Role of Baseband Noise and its Upconversion in HBT Oscillator Phase Noise

M.N. Tutt, D. Pavlidis, A. Khatibzadeh and B. Bayraktaroglu. "The Role of Baseband Noise and its Upconversion in HBT Oscillator Phase Noise." 1995 Transactions on Microwave Theory and Techniques 43.7 (Jul. 1995, Part I [T-MTT]): 1461-1471.

The phase noise spectral density (/spl Pound/(f/sub m)) of an 11.02-GHz heterojunction bipolar transistor (HBT) dielectric resonator oscillator (DRO) has been investigated in terms of the HBT's low frequency noise and the oscillator's upconversion coefficient. Experimental studies have been used for this purpose and the measured /spl Pound/(f/sub m/) ranged from -89 dBc/Hz to -101 dBc/Hz at a 10kHz offset frequency (best phase noise spectral density performance was -124 dBc/Hz at 100 kHz). It was shown that in most test cases, /spl Pound/(f/sub m/) can be described by the upconversion of the HBT's baseband noise. As a result the frequency dependence, of /spl Pound/(f/sub m/), is dictated by the low frequency noise spectrum rather than the upconversion itself. Deviation from pure 1/f frequency dependence found for the HBT's baseband noise at frequencies above 100 Hz resulted in d/spl Pound/(f/sub m/)/d(f/sub m/) deviating from about -30-dB/decade rate. Reduced oscillator phase noise at high collector current is attributed to reduced upconversion in the oscillator.

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