Abstracts

Very low phase-noise optical links-experiments and theory

M.-B. Bibey, F. Deborgies, M. Krakowski and D. Mongardien. "Very low phase-noise optical links-experiments and theory." 1999 Transactions on Microwave Theory and Techniques 47.12 (Dec. 1999 [T-MTT] (Special Issue on 1999 International Microwave Symposium)): 2257-2262.

Additive phase noise is studied in directly modulated optical links (1.55-/spl mu/m distributed-feedback laser and p-i-n photodiode). Up-conversion close to the microwave carrier, of the very low-frequency noise of the laser, is calculated. The phase-noise conversion factor is derived from the laser rate equations, as a function of laser parameters and modulation frequency. Noise sources are identified and included into the model to evaluate the microwave phase noise and then the noise-to-signal ratio in terms of phase fluctuations. Very low- and high-frequency relative intensity noise (RIN) laser measurements are performed. Theoretical RIN curves are calculated and laser parameters needed for the phase-noise model are deduced. Additive phase-noise measurements are performed. Good agreement is obtained between calculations and measurements. Very good additive phase-noise values have been obtained at 10-kHz offset: -148 and -139 dBc/Hz at 3 and 9 GHz, respectively.

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