

## Millimeter-wave signal properties resulting from electrooptical upconversion

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*K. Kojucharow, M. Sauer and C. Schaffer. "Millimeter-wave signal properties resulting from electrooptical upconversion." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part II [T-MTT] (Special Issue on Microwave and Millimeter-Wave Photonics)): 1977-1985.*

This paper describes the combined effects of laser chirp, electrooptical mixing, dispersive fiber transmission, and photodetection on the nonlinear signal properties of the electrooptically generated millimeter-wave signal (60 GHz). Analytical expressions describing the complex currents of fundamental and higher order products are provided for the case of single-tone modulation as well as for two-tone modulation, respectively. Examples will be considered including the nonlinear amplitude response (output power at millimeter-wave range versus input power at IF), the nonlinear phase response (relative output phase at millimeter-wave range versus input power at IF), the input related 1-dB gain compression condition, the amplitude response of third- and fifth-order intermodulation products, as well as the input related intercept points for the latter signals. The model developed performed well, even under moderate to large signal conditions, and very good agreement has been achieved between theory and experiment.

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