

**“Fiber transmission behavior of millimeter-wave electro-optical upconversion systems with transmitter chirp”, pp. 190 - 200**

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**Abstract** – Millimeter-wave (mm-wave) transport systems based on electro-optical upconversion using a high-speed external modulator are significantly affected by the transmitter chirp, leading to complex signal transmission behavior over dispersive fiber. In this paper, the detected mm-wave signal power in dependence on chirp is analyzed. It is shown that by direct laser diode modulation with the IF signal, a moderate laser chirp can significantly increase the achievable fiber transmission distance by more than a factor of two compared to the case with pure intensity modulation (no chirp). A strong laser chirp, however, is of detrimental effect and reduces the transmission distance. External IF modulation is also discussed in this paper. Furthermore, intermodulation distortion (IMD) due to mm-wave signal transport over dispersive fiber is analyzed, revealing the strong impact of chirp on dispersion induced IMD. Fiber transmission experiments at 60 GHz show excellent agreement between calculation and measurement.