

Characterization and Modeling of Millimeter-Wave Photonic Transmitter for Wireless-Over-Fiber Applications

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Abstract : Efficient and accurate system characterization and modeling of the millimeter-wave (MMW) photonic transmitter are presented. It is shown that the presented system modeling techniques are crucial to the implementation of a photonic transmitter with wide optical-to-electrical (OE) and intermediate-frequency (IF) bandwidth. Specifically, the accurate optical and electrical modeling of the photodiode (PD) along with the microwave network representation of the entire transmitter, including the PD, transmitting antenna, and the front-end passive circuitry, is described. The effectiveness of the proposed modeling techniques for system characterization is experimentally demonstrated through a high-speed (25 Gbits/sec) wireless link developed with the implemented MMW photonic transmitter at W-band.