Characteristics of RoF millimeter-wave generation for 5G system

ABSTRACT

An optical millimeter-wave (mm-wave) generation system is designed to be incorporated with radio over fibre (RoF) system for 5G application. The design employs the dual-sideband optical carrier suppression (DSB-OCS) technique with a dual-electrode Mach-Zehnder modulator (DE-MZM). A mm-wave of 40 GHz is generated with the intention to be used as a wireless carrier for the distribution of 1.25 Gbps data via direct modulation (DM) over a 20 km RoF system. The result shows that the system has a phase noise of -90 dBc at 1kHz frequency offset and achieves bit error rate (BER) of 10 −9 with modulation index, m above a figure of 0.5.

Keyword: Millimeter-wave signal generation; 5G; Radio over fiber; Dual sideband optical carrier suppression; Dual-electrode Mach-Zehnder modulator