Experimental Analysis of 60-GHz VCSEL and ECL Photonic Generation and Transmission of Impulse-Radio Ultra-Wideband Signals - DTU Orbit (18/12/2018)

Optical generation of impulse-radio ultra-wideband (UWB) signals in the 60-GHz band is proposed and experimentally demonstrated. External-cavity laser (ECL) and vertical-cavity surface-emitting laser (VCSEL) is employed for frequency up-conversion by heterodyne mixing with a UWB optical signal for comparison purposes. Real-time bit-error-rate (BER) performance of generated signals at 3.125 Gb/s is evaluated combining fiber and 2-m wireless transmission. Different optical fiber types including 1-km bend-insensitive single-mode fiber and 20-km nonzero dispersion-shifted fiber is evaluated. $\hbox{BER}$ for the ECL and $\hbox{BER}$ for the VCSEL requiring higher received optical power than the ECL is demonstrated employing electrical power detection.

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