In this paper, we report on a detailed analysis and performance comparison work between 60 GHz radio-over-fiber systems based on a DFB laser and a C-band VCSEL. Coherent photonic up-conversion method is applied for the 60 GHz millimeter-wave signal generation. The generated signals are evaluated by means of phase noise and bit error rate for different transmission scenarios. The results show a positive potential to adopt both DFB lasers and VCSELs for the next generation 60 GHz hybrid fiber-wireless access networks.

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