Abstracts

Millimetre wave generation by filtering the FM-IM spectra of a directly modulated DFB laser

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The nonlinear characteristics of semiconductor lasers have been exploited in order to generate low phase noise microwave and millimetre-wave frequencies for radio-over-fibre applications. This is achieved using the modulation characteristics of a MQW-DFB semiconductor laser. A high FM index MQW-DFB laser is directly modulated at the resonant frequency of its FM characteristic response in order generate high order harmonics. By optimising the rf modulation frequency drive power, high order sideband components can be generated, selected and mixed on a photodetector to generate microwave and millimetre-wave frequencies. This paper presents results utilising the direct modulation technique, which demonstrate the generation of beat frequencies up to 25 GHz. Optimization of the optical filtering process and of the phase-noise dependence of the generated beat frequency on the modulation drive source are also discussed.

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