Abstracts

Experimental Study on Close-In to Microwave Carrier Phase Noise of Laser Diode with External Feedback

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The residual phase noise at close-in to carrier offset frequency is studied for optical links using a laser diode with an external optical feedback. Since the measured FM noise degradation of the modulating signal was found to be insignificantly higher than the expected 20 log (n) in dB, the residual phase noise of the laser diode was measured to quantify the expected carrier signal FM noise floor level. The measured residual phase noise of a InGaAsP laser diode at 1 KHz offset carrier signal of 5.08 GHz is measured to be -100 and -90 dBc/Hz for with and without a 3-cm-long free-space external cavity, respectively, The close-in to carrier phase noise results of this laser at the external cavity resonance frequency of /spl ap/5 GHz is explained for the first time in terms of laser diode nonlinearity and FM noise theory of injection locked microwave oscillators. A good match between the predicted and measured results was observed.

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