Generation of High Stability Microwave Signal using Optoelectronic Oscillator based on Long Fiber Delay Line

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Abstract

An optoelectronic oscillator based on long fibre delay line to generate high stable microwave signal has been investigated and implemented experimentally. Mathematical model for this oscillator has been proposed. The experimental results are taken for different delay line lengths (2.1 Km, 4.2 Km and 6.6 Km respectively). The generated signal has a narrow bandwidth (less than 200 Hz) at carrier frequency 2.31 GHz and its phase noise is less than -80 dBc/Hz at 1 KHz offset. Comparison of the experimental results and analytical ones has been done. A critical length (Lc) concept of the used fibre delay line has been introduced as a design parameter for the proposed optoelectronic oscillator.

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