Ensuring of reliability of discrete information reception in coherent FOTSI [fiber optic transmission systems]

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Abstract

Described in this paper are different reception homodyne schemes for coherent FOTSI interference immunity increase. Coherent FOTSI immunity depends on the optical oscillator shot noise and laser phase noise, stipulated by the finite width of the oscillation line of the optical sensor generator and oscillator. The reliability of discrete information reception in coherent FOTSI depends on the optical power of the receiver input signal, signal/noise ratio and on the digital information rate, which is the aggregate determined probability of binary symbol erroneous reception. Homodyne transmission systems with phase locked-loop frequency control optical circuits, on the basis of optical analog phase shifters or with external injection synchronization by optical signals, ensure phase error between the accepted carrier and reference signal does not exceed 0.2 rads. That allows us to reach a probability of binary symbol erroneous reception equal to 10^{-9}.

Keywords: optical fibers, optical noise, optical receivers, optical sensors,