Abstracts

Chromatic Dispersion in Fiber-Optic Microwave and Millimeter-Wave Links

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The influence of chromatic fiber-dispersion on the transmission distance of fiber-optic microwave and millimeter-wave links is analyzed and discussed in this paper. It is shown that dispersion significantly limits the transmission distance in intensity modulated direct detection links operating in the above 20 GHz frequency region by inducing a carrier to noise penalty on the transmitted signal. At 60 GHz, a 1 dB penalty is induced after less than 500 m transmission over standard single-mode fiber with a dispersion of 17 ps/km · nm and the signal is completely extinct after 1 km. In remote heterodyne detection links, the dispersion induces both a carrier to noise penalty and a phase noise increase on the transmitted signal. It is shown, however, that the induced carrier to noise penalty is insignificant. At 60 GHz, the induced penalty is less than 0.3 dB after 100 km transmission. The phase noise increase proves more dominant. At 60 GHz, a 150 Mbit/s QPSK signal is timited to around 10 km of transmission.

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