Simulation and Analysis of Radio over Fiber (RoF) Systems using Frequency Up-Conversion Technique

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Abstract

Radio-over-Fiber (RoF) technology is an integration of microwave and optical networks [1]. RoF technology uses optical fiber as a backend technology due to the enormous advantages offered by it. SCM-WDM RoF systems (Sub-carrier based Wavelength division multiplexing RoF system) improves spectral efficiency with high dispersion tolerance [7]. The data to be transmitted is electrically modulated with an IF (Intermediate frequency) or a RF (Radio frequency) carrier and electrically multiplexed using a multiplexer these signals are further optically modulated using an optical modulator and multiplexed using WDM to exploit the high bandwidth offered by the optical fiber. A comparison between IF over fiber and RF over has been analyzed in terms of quality factor and BER (Bit error rate) in a RoF system. In which the IF over fiber shows better performance than RF over fiber in terms of BER and Quality factor. IF signals are up-converted using HBT (Hetero-junction bipolar transistor) electronic mixer in the remote antenna units to the RF frequencies with the help of LO (local oscillator) and transmitted wirelessly [27].
References

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Index Terms

Computer Science  Signal Processing

Keywords

External optical Modulation, Frequency up-conversion, remote antenna units, IF based RoF system, RF based RoF system, HBT (Hetero-junction bipolar transistor).