Performance evaluation of Fi-Wi network based on SCM-optical code division multiple access architecture

Abstract

This paper investigates the performance of a spectral amplitude coding (SAC)-OCDMA system design utilizing subcarrier multiplexing techniques for use in the popular fiber-wireless (Fi-Wi) technology. Zero cross correlation code is employed because of its ability to eliminate phase induced intensity noise (PIIN) and the simplicity of using a direct detection technique at the receiving end. The performances are evaluated theoretically to derive the signal-to-noise ratio and results are presented in terms of bit error rates (BER). Results are analyzed to investigate the effect of code weight and variable data rates on the system performance. To validate the results, simulative analysis is also done using Optisys version 6.0. We demonstrated that the ZCC code performed better compared to other code for a BER floor of 10-9 with larger cardinality of subscribers. Results obviously indicate that system performance can be improved with larger code weight. In addition, the choice of lower bit rate is observed to perform better and more suitable for application in this hybrid Fi-Wi network.

Keywords