

SAC-OCDMA over hybrid FTTx free space optical communication networks

ABSTRACT

This paper presents an investigation of Spectral Amplitude Coding Optical Code Division Multiple Access (SAC-OCDMA) over hybrid Fiber-to-the-x (FTTx) Free Space Optical (FSO) link under different weather conditions. FTTx and FSO are the last mile technologies that complement each other in delivering secure and high speed communication to customers' residence or office. SAC-OCDMA is one of the potential multiplexing techniques that has become a research area of interest in optical communications and considered a promising technique for FTTx access networks. It is based on Khazani-Syed (KS) code with Spectral Direct Decoding (SDD) technique. All the components involved in the network were specified according to the available market product in order to simulate the actual environment as close as possible. The result shows that for bit error rate (BER) of 10^{-9} , the network is able to perform with 20 km Single Mode Fiber (SMF) spanning from the central office (CO) and 1.48 km FSO range with transmission rate of 1.25 Gb/s during heavy rain.

Keyword: Hybrid FTTx free space optical; Khazani-Syed code; SAC-OCDMA; Spectral direct decoding