

Wavelength shifting in the Fiber Bragg Grating (FBG) based encoder and decoder modules for SAC-OCDMA system

ABSTRACT

This project concentrates on the design of Fiber Bragg Grating (FBG) based encoder and decoder modules for Spectral Amplitude Coding of Optical Code Division Multiple Access (SAC-OCDMA) system. In SAC-OCDMA system, the unique code sequence is formed by using spectral components which are inherently arranged. This is done by multiplexing the Bragg wavelengths from an array of FBGs. However, the Bragg wavelength is largely depends on the strain and temperature experienced by the gratings. This paper presents the effects of the Bragg wavelength shifting of the uniform FBG used in the encoder and decoder modules for an SAC-OCDMA code to the system performance. The results show a sharp increase of bit error rate (BER) from 10^{-12} and 10^{-14} to 10^{-4} and 10^{-5} for Channel 1 and Channel 2 respectively at 0.01 nm Bragg wavelength left and right shifts. It shows that the system performance is significantly affected by the shifting of the Bragg wavelength.

Keyword: Bragg wavelength; Fiber Bragg Grating (FBG); Wavelength shifting; SAC-OCDMA