

ABSTRACT

Free Space Optic (FSO) is a wireless communication system with high speed that utilizes the frequency of light as a propagation medium through the atmosphere (free space). Using the FSO system can facilitate the delivery of information signal. However, in free space that are some disturbances that can damage the quality of the information sent. One of them is rainy weather. Rain is divided into several types of rain depending on the intensity. One way to improve the performance of information signals is by adding amplifiers such as Orthogonal Frequency Division Multiplexing (OFDM).

OFDM is a transmission technique that uses several frequency subcarriers which are perpendicular to each other (orthogonal). OFDM divides high rate data streams into lower data rate streams which are then sent together using subcarriers. Subcarrier modulation that used is 4-Quadrature Amplitude Modulation (4-QAM) which function to combine several information carrier signals called subcarriers and create a combined signal $m(t)$ to modulate the intensity of optical sources.

The purpose of this final project design is to analyze the simulation result of Bit Error Rate (BER) performance variable values using one of the FSO multiplexing technique OFDM and 4QAM as modulation in light rain attenuation, moderate and heavy. Wavelength to be used is 1310nm and 1550nm with variances of distance is 0,5 – 10 kilometres. The expected goal of this final project design is the BER value 10^{-6} . In this final project, the optimal BER value is 10^{-6} at the distance of less than 2 km using a wavelength 1550 nm, with optical LASER of 10 Watt and 256 FFT in light, average and heavy rain conditions.

Keywords : *FSO, OFDM, QAM, BER*