ABSTRACT

Fiber optic communication systems are experiencing rapid growth, as well as wireless communication systems. The combination of Radio over Fiber (RoF) and Orthogonal Frequency Division Multiplexing (OFDM) can generate high data rate with low bandwidth in the latest wireless network technology.

In this Final Project, the system design includes three main parts, namely transmitter section, link transmitter and receiver section which are simulated using simulator software. In this study analysis is carried out only on the downstream side with a bitrate of 10Gbps, the modulation used by 4-QAM using a radio frequency of 7.5 GHz, radio signals modulated using Mach Zehnder Modulator (MZM) with a maximum link distance system transmitted as far as 100 Km using Single Mode Fiber (SMF) fiber.

Based on the results of the study it can be concluded that the distance of optical fibers and variations in Power Splitter (PS) affect performance, where the longer the distance and the number of variations of PS, the greater the BER value. Where the simulation results using PS 1: 2 with a BER value of 5.3x10-9 meets up to a distance of 60 km, PS 1: 4 with a BER value of 7.645x10-13 meets up to a distance of 40 km, PS 1: 8 with a BER value of 1, 49x10-14 meets up to a distance of 20 km, PS 1:16 with a BER value of 1.8x10-9 meets up to a distance of 20 km. The constellation diagram has a decrease in the amplitude and spread of symbols in the Real (Q) and Imaginary (I) values in each additional distance.

Keywords: RoF, OFDM, PON