

ABSTRACT

Communication Systems with coherent detection are systems that work by combining signals transmitted by the transmitter and the local oscillator. This merger is implemented into the Wavelength Division Multiplexing system which can transmit a lot of information into a single fiber optic cable. In addition, it also uses the OFDM modulation technique. OFDM (Orthogonal Frequency Division Multiplexing) is a modulation technique that has a way of working by sending data divided into several data and transmitted simultaneously through a subcarrier. So both are called Coherent Wavelength Division Multiplexing with OFDM modulation techniques.

Coherent has the advantage of coherent detection used, and WDM-PON makes it able to transmit many wavelengths in one fiber optic cable. If these two things are combined, it will make the system better at detection and more accurate with many wavelengths at once.

This final project uses a simulation of the WDM-PON Coherent system by comparing the results of system performance. The performance variation tested was the power transmitter, with variations in cable types, as well as the influence of coherent detection in a system.

The results of the research that has been carried out with the WDM-PON coherent system and 14Gbit/s bitrate using fiber compensation dispersion cables and single mode fiber installed simultaneously provide BER $1.39 \cdot 10^{-4}$ performance which indicates better than just using a single fiber mode cable that produces a value of BER $5.58 \cdot 10^{-4}$ or only using a fiber compensation dispersion cable with BER 0.39. But compared to using WDM-PON, it provides a much better performance with a value of BER 10^{-9} either using only SMF cables or paired DCF.

Key Word : Coherent WDM-PON, DCF, SMF, Bit error rate