

ABSTRACT

Advances in telecommunications technology are urgently needed to create good communication relationships. Therefore, the development of communication technology must always be improved to meet these needs, one of the developments used is the Visible Light Communication (VLC) system. The VLC system is a new technology in wireless communication using visible light transmission media that comes from Light Emitting Diode (LED) lamps.

In this final project, the author designs a VLC simulation system with a minimum Bit Error Rate (BER) of $\leq 10^{-3}$ by using the Signal to Noise Ratio (SNR) parameter which is used in On-Off Keying (OOK) modulation Non Return to Zero (NRZ) and Return to Zero (RZ) in the VLC system. In this VLC system, 3 Light Emitting Diodes (LEDs) are used as transmitters located at coordinates (0,0), (-1.5,1.5), and (1.5, -1.5). The research was conducted in a closed room with an area of 5m x 5m x 3m by using a Line of Sight (LOS) channel.

The results of this Final Project show that the OOK-NRZ modulation has better results than the OOK-RZ modulation, by the results of the comparison of the BER distribution using OOK-NRZ modulation which has a maximum BER value 0.061 and a minimum BER value 1.347×10^{-208} namely, while in OOK-RZ modulation results in a maximum BER is 0.1374, and minimum BER is 3.9221×10^{-105} so this indicates that the value of BER with OOK-NRZ is going smaller, which represents the VLC system is getting better. Then the effect of BER on the coverage area obtained on the OOK-NRZ modulation is 24m^2 and the coverage area on the OOK-RZ modulation is 23m^2 so that the OOK-NRZ modulation has a larger coverage area.

Keywords: Optical Wireless Communication, Visible Light Communication (VLC), Light Emitting Diode (LED), Bit Error Rate (BER), OOK-NRZ, OOK-RZ.