

## ABSTRACT

Telecommunications technology is one of the fastest growing technologies, including wireless technology. At this time, Visible Light Communication (VLC) is being developed mainly in the room to meet the needs of two people today, namely lighting and internet connectivity. VLC technology was chosen because it has a higher speed than Wi-Fi and is more energy efficient.

The author simulates and analyzes the use of modulation techniques VLC system performance in a closed room contributes 5 mx 5 mx 3 m using apply modulation On-Off Locking Returns to Zero (OOK-RZ), On-Off Locking Non-Return to Zero (OOK-NRZ), and Quadrature Phase Shift Keying (QPSK) with multiplexing techniques DC Biased Optical Orthogonal Frequency Division Multiplexing (DCO-OFDM). Using one Light Emitting Diode (LED) lamp that is positioned at a certain point.

The effect of modulation on VLC performance is tested by changing the distance of the receiver to the sender to produce the maximum communication point. The results of the communication distance of each modulation, 3.19 m for OOK-NRZ modulation, 2.91 m for OOK-RZ modulation, while DCO-OFDM is 4.89 m with a limit of Bit Error Rate (BER) around  $10^{-3}$ . Based on the maximum distance obtained from the three types of modulation, it has a different area of communication coverage OOK-NRZ 13,8 m<sup>2</sup>, OOK-RZ 11,3 m<sup>2</sup>, and DCO-OFDM 24,56 m<sup>2</sup>.

*Keywords: VLC, OOK, QPSK, DCO-OFDM, Photodiode, LED, BER.*