

ABSTRACT

The development of communication is one technology that is developing very rapidly, including wireless technology. With the evolution of wireless communication standards in the fourth generation (4G) and fifth network (5G), it will certainly see rapid progress and development in information and communication technology. Optical Wireless Communication (OWC) technology helps in developing communication technology indoors or outdoors. This technology focuses on visible light communication or can be called Visible Light Communication (VLC). The VLC technology is being developed to meet the two needs of society today namely lighting and internet connectivity. In VLC technology has a higher internet speed compared to existing technologies such as Wi-Fi (Wireless Fidelity) and VLC technology is very efficient in energy use.

In this final paper, the writer simulates and analyzes the effect of a specified bitrate of 1 Gbps, 2 Gbps, and 3 Gbps using the Line of Sight (LOS) and Rayleigh-at-Fading channel systems. The coordinate of the LED on the VLC system with respect to parameters in a closed room with dimensions of $5m \times 5m \times 3m$, the bits being input will be modulated with OOK-NRZ before entering into the LED lights for transmission. The system performance is evaluated using several parameters such as BER, signal-to-noise ratio (SNR), and Optical Power Distribution. The contribution of this Final Project is significantly the better coverage, the smaller the value BER 10^{-3} . The results of this study are expected to be of great use for VLC technology regarding LED placement in indoor VLC systems for OWC..

The results obtained from the parameters that have been determined, that when using a bitrate of 1 Gbps, 2 Gbps, and 3 Gbps, the coverage of BER on the LOS

channel at coordinates (1.25,1.25.3) is 25 m², 24.52 m², and 23.08 m². Whereas when using the Rayleigh at-Fading channel with a bitrate of 1 Gbps, 2 Gbps, and 3 Gbps, the coordinates (1.25.1.25.3) are 20.12 m², 12.08 m², and 6.8 m². At position (1.25,1.25.3), the LOS channel has a greater BER coverage than the Rayleigh at-Fading channel. In position (2.5.2.5.3) using 1 Gbps, 2 Gbps, and 3 Gbps bitrates, the BER coverage on LOS channels is 16.64 m², 6.52 m² and 3.52 m². Whereas the Rayleigh at-Fading channel, when using 1 Gbps, 2 Gbps, and 3 Gbps in coordinates (2.5.2.5.3), has BER coverage of 2.52 m², 0.32 m² and 0 m². At position (2.5.2.5.3), the LOS channel has greater BER coverage than the Rayleigh at-Fading channel.

Key words : VLC, OOK-NRZ, LOS, NLOS.