

ABSTRACT

In the current era of telecommunication technology development, communication between human beings has been very developed and has not become a difficult problem and there is no need to worry anymore. One of the optical wireless communication technologies using light as the transmission medium is Visible Light Communication (VLC). Along with the many activities under the sea, the VLC system has developed, namely Underwater Visible Light Communication (UVLC). The UVLC system uses a Light Emitting Diode (LED) as a light source that functions to transmit information, and a photodiode as a receiver of information.

In this final project, two simulation scenarios were carried out. Scenario I analyzes the performance of the UVLC system on *Pulse Width Modulation* (PWM) modulation without using an optical concentrator with pure seawater type at a depth of 10 m with a maximum distance between transmitter and receiver 14.14 meters. Then analyze the performance of the UVLC system on PWM modulation using an optical concentrator with pure seawater type at a depth of 10 m with a maximum distance between transmitter and receiver 14.14 meters. Both scenarios were tested based on the value of distance, received power, Signal to Noise Ratio (SNR), and Bit Error Rate (BER).

The expected result obtained of this research is to improve the performance of the UVLC system by using PWM modulation and adding an Optical Concentrator to the Photodiode. Where by using an optical concentrator can affect the performance of the UVLC system. In scenario I, the BER value that meets the requirements at a maximum distance of 12.7 meters with pure water is a BER value of $6,01 \times 10^{-6}$. In scenario II the BER value meets the requirements at a maximum distance of 14.14 meters with the type of pure water, namely the BER value of $1,05 \times 10^{-10}$, in this study using the conditions with a value of $BER \leq 10^{-6}$.

Keywords : Underwater Visible Light Communication, LED, Photodiode, Pulse Width Modulation, Optical Concentrator, BER, SNR.