

## **ABSTRACT**

*Free Space Optics (FSO) is a communication system that utilizes the atmosphere as a propagation medium. FSO technology was developed by providing wide bandwidth services for the increasing needs of users. FSO is different from radio wave communication systems, its carrier waves do not use electromagnetic or electric waves, but use light beams. On the side of the FSO transmitter, the electrical signal is converted to an optical signal and transmitted to the atmosphere or free space. On the receiver, the side converts the optical signal back into an electrical signal.*

*This final project, analyzing performasi FSO communication by performing calculations and simulations with MATLAB software in the channel model Kim and Kruse to get quality of Bit Error Rate (BER)  $10^{-9}$ . The modulation technique used is 16-Quadrature Amplitude Modulation (QAM), On-Off Keying (OOK)-Return to Zero (RZ), and OOK-Non Return to Zero (NRZ). By testing the changes in visibility, sending power, and the distance of the transmitter to the receiver at wavelengths of 850 nm, 1310 nm and 1550 nm.*

*After testing of all three modulations with the same parameters. BER using OOK-RZ is better than OOK-NRZ and 16-QAM. The wavelength of 1550 nm has the lowest BER. In both channel models, it shows that the Kim and Kruse channels can work on distant links by combining wavelength and sending power. So the results of BER OOK-RZ on the Kim channel model at a wavelength of 1550 nm with a sending power of 5 watts can reach a link distance of 10 km. BER OOK-NRZ can reach a link distance of 8.5 km and for BER 16-QAM it reaches a link distance of 8 km.*

**Keyword:** *FSO, QAM, OOK-RZ, OOK-NRZ, visibility, Kim, Kruse, BER*