

ABSTRACT

Free Space Optical Communication (FSOC) is a wireless communication system that uses a propagation medium in the form of an atmosphere. FSOC has high data transfer rate. FSOC has the advantages of space, time and cost efficiency. But FSOC has a drawback, namely poor performance and on weather conditions.

This final project analyzed the performance of Bit Error Rate (BER) using Non Orthogonal Multiple Access (NOMA) which is divided into three users on the FSOC. Each user has a different power allocation. The power allocation of user 1 is bigger than the other user, while the power allocation of user 3 get the smallest power allocation. Weather conditions are divided into clear air, light rain and strong rain. The optical source used is Light Amplification by Stimulated Emission of Radiation (LASER). While the optical detector used is Avalanche Photodiode (APD).

The BER value for clear air weather conditions for user 1 is 2.18×10^{-3} and for user 2 is 3.5×10^{-2} . In light rain weather conditions, the BER value for user 1 is $3,51 \times 10^{-4}$ and for user 2 is 1.16×10^{-1} . Meanwhile, in strong rain conditions, the BER value for user 1 is 1.46×10^{-19} and for user 2 is 4.76×10^{-1} . While the BER value of user 3 in all weather conditions is 9.41×10^{-275} . User 3 has the smallest BER value because it does not get interference from other users, while user 1 is the more powerful user optimal because it gets the largest power allocation and does not require large data capacity.

Key Word : Free Space Optical Communication, NOMA, LASER, APD, BER, SINR.