

ABSTRACT

Free Space Optic (FSO) is the wireless communication system which transmitted the optical system through free space as the media transmission. FSO communication system use *line-of-sight (LOS)* system and use LASER as a light source for the connection and it can reach unreached area. FSO has advantages such as high bandwidth, cheap installation, low power consumption dan reliable safety but it is really affected by weather like rain.

In this research, the FSO system is stimulated and analyzed with 16-QAM modulation in three rainfall conditions namely drizzle rainfall, showers rainfall and thunderstorm rainfall, two optical transmission windows that are 1310 nm and 1550 nm, three distance variances that are 3,5 and 10 km and two power that are 1 watt and 5 watt. The results from this research are the *bit error rate* for each scenario.

The results showed that the higher the wavelength and the higher the power, the higher distance can be reached and the result of BER approaches the minimum standard. In the first scenario the BER for every rainfall condition with wavelength 1310 nm and 1550 nm in 3, 5 and 10 km are 0,375 and the BER that approaches the minimum standard obtained when drizzle rainfall with wavelength 1550 nm in 1,42 km is $4,73 \times 10^{-9}$. In the second scenario by compare the power for 1 watt and 5 watt showed that the BER with power 5 watt in both wavelength increased to 0,374 in the distance 3 km with drizzle rainfall and the BER that approaches the minimum standard obtained when drizzle rainfall with wavelength 1550 nm in 1,56 km is $1,43 \times 10^{-9}$.

Key Word : FSO, 16-QAM, BER, Rain Attenuation