ABSTRACT

Free Space Optic Communication (FSO) is one of optical technology that is quite rapidly developing. One of the impacts of atmospheric usage as a propagation medium is the large attenuation. This atmospheric condition is very volatile and has many variables that affect directly to FSO performance.

The conventional FSO adopts the principle of SISO (Single Input Single Output) technique where one transmitter is for one receiver only. Research in this final project will try to apply MIMO spatial diversity technique to FSO system to improve its performance in bad weather conditions.

From the performance simulation results, the SISO system is unable to get the value of BER <$1x10^{-9}$ even if the laser emits power up to 5W. In MIMO 2x2 obtained Pt of 90 mW, MIMO 2x3 of 70 mW, MIMO 2x4 of 70 mW, MIMO 3x2 of 30 mW, MIMO 3x3 of 30, MIMO 3x4 by 20 mW, MIMO 4x2 by 20 mW, MIMO 4x3 by 10 mW and 4x4 MIMO of 8 mW. The effective Pt value is the power that each laser must emit to reach BER < $1x10^{-9}$*. The smallest power consumption is on the 4x4 MIMO system which is 32 mW. Those Pt value is only valid for transceiver distance as far as 1 km. Increasing the distance between the tranceiver will probably make the value Pt larger.*

***Keywords* :** *Free Space Optic*, MIMO, *Spatial Diversity*, BER