

## ABSTRACT

Vehicle to Vehicle (V2V) Communication is a communication system between vehicles that can send information from transmitter vehicle to receiver vehicle. Information transmitted can be in the form of vehicle speed, position, and lights. In this research, simulation of V2V Communication based on Visible Light Communication (VLC) was carried out and given the addition of optical concentrator in photodetector. The simulation is assumed at night condition without any obstacles and each vehicle in this simulation has the same speed. The type of modulation used in this simulation is On Off Keying Non Return to Zero (OOK-NRZ) modulation.

This study applies two scenarios. Scenario I, simulation is carried out to determine the effective distance parameter between vehicles so it can communicate well without any interferences. In Scenario II, simulation is assumed that there is light interference from another vehicle. Then compare the system performance between there is no interference condition and when there is interference condition. In this study, Bit Error Rate (BER) value of  $10^{-3}$ , Signal to Noise Ratio (SNR), and Signal to Interference and Noise Ratio (SINR) was used as a reference.

The simulation and analysis results in this final project show that light interference from another vehicle can affect system performance. When there is light interference, the system performance will get worse. The maximum distance the vehicle can communicate well has been reduced from 15,5 meters to 12,5 meters. Apart from distance, the SNR value is also reduced. In conditions without interference, the SNR is 18,2 dB. Meanwhile, in the presence of interference, SINR of 9,1 dB is obtained.

**Keywords:** VLC, V2V Communication, OOK-NRZ, SNR, SINR, BER