ABSTRACT

The car industry applies new technologies such as Light Detection and Ranging (LIDAR) and Vehicle-to-Vehicle (V2V) Communication, which generally uses Radio Frequency (RF) waves for data transmission between vehicles. The use of RF has limitations such as frequency allocation and interference problems. Optical Wireless Communication Vehicle-to-Vehicle (OWC-V2V) technology appears to overcome RF limitations. But there are several challenges such as propagation distance, conditions that must be Line-of-Sight (LOS), and the type of LED suitable for use.

This final project tested the OWC-V2V prototype combined with LIDAR in sending serial data to indoor channels in scenario 1 and outdoor in scenario 2. In both scenarios, the prototype sends data using Light Emitting Diode (LED), distance, and different angles. Data is collected at the receiver in the form of voltage, light intensity, and data received. It is used when analyzing the relationship between distance, angle, and LED type to obtain the optimal and maximum distance in data transmission.

In scenario 1, the same optimal distance obtained for 2 types of LED, namely 20-120 cm at 0°, 20-60 cm at 10°, and 20-40 cm at 15° with a phototransistor voltage value $\leq$4.84 Volt. Then, Ultra White-LED's use provides a maximum distance that is further than the IR-LED, which is 260 cm at 0° and 100 cm at 10°. In scenario 2, the receiver cannot accept the data due to sunlight interference, which causes the LED light's attenuation.

Keywords: *V2V*, *OWC-V2V*, *IR-LED*, *Ultra White*-LED