ABSTRACT

The car industry applies new technologies such as Light Detection and Ranging

(LIDAR) and Vehicle-to-Vehicle (V2V) Communication, which generally uses Ra-

dio Frequency (RF) waves for data transmission between vehicles. The use of RF

has limitations such as frequency allocation and interference problems. Optical Wi-

reless Communication Vehicle-to-Vehicle (OWC-V2V) technology appears to over-

come 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 sen-

ding 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 dis-

tance, 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 <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

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