ABSTRACT

Visible Light Communication (VLC) is one type of communication that continues to develop by using visible light to transmit data. There are two main challenges for visible light communication: dimming and flicker. Flicker is a fluctuation in the brightness of the light on the LED. Changes in light brightness must be within the Maximum Flickering Time Period (MFTP) ≤ 5 ms to not cause significant and harmful physiological changes to humans. Dimming is an LED dimming setting to save power and energy efficiency in Visible Light Communication (VLC). Therefore, Pulse Position and Shape Modulation (PPSM) can reduce flicker and dimming where the function shows good quality performance.

In this final project, a simulation of the design of a VLC system to control LED dimming is made, with Pulse Position and Shape Modulation (PPSM) modulation techniques, in a 5x5x3 meter room, using Line Of Sight (LOS) channels. There are two schemes in this research. The first scheme uses 2 LEDs with a power of 6 watts/led, while the second scheme uses 3 LEDs with a power of 6 watts/led. We evaluated the system performance about the SNR parameter and the maximum value of BER 10^{-3}.

Flicker mitigation is carried out by changing the brightness of the light that must be within the Maximum Flickering Time Period (MFTP) ≤ 5 ms, and the frequency for maximum light output and minimum light output must be ≥100 Hz. Pulse Position and Shape Modulation (PPSM) can reduce flicker and dimming. The function shows that the performance of flicker percentage, power, SNR, and BER can be maintained at higher data rates using filter processes and increasing the number of pulses.

Keywords: *Visible Light Communication (VLC), Flicker, Dimming support, Light Emitting Diode (LED), Pulse Position and Shape Modulation (PPSM), Bit Error Rate* (*BER).*