ABSTRACT

Current technology has shown a significant increase, especially in the field of communication. This is evidenced by the many communication media both wireless and wired. Currently the largest internet *source* is generated by Wireless Fidelity (WiFi) using the Radio Frequency (RF) spectrum. A survey by the Association of Indonesian Internet Service Providers (APJII) noted that internet penetration in Indonesia has reached 78.19 percent in 2023. The high demand will lead to dense users on the RF spectrum. Judging from these problems, it is necessary to have a new alternative technology to complement the current communication system infrastructure. One technology that is safe and has wide bandwidth is Visible Light Communication (VLC).

VLC is a telecommunications technology that uses the visible light spectrum to transmit data. This communication system consists of a transmitter, receiver, and modulator. Not only as lighting VLC can also perform data communication. In this study, a visible light-based data communication system was designed with the main components of the Metal Oxide Semiconductor Field Effect Transistor (MOSFET) on the transmitter and Trans Impedance Amplifier (TIA) on the receiver and on the modulation, section using the On Off Key (OOK) modulation method. which will be bypassed using Universal Serial Bus Transistor-Transistor Logic (USB TTL). The system is connected via the RealTerm Software. RealTerm is a terminal program specially designed for capturing, controlling, debugging binaries and other complex data streams that function to send and receive characters in text form with the help of the American Standard Code for Information Interchange (ASCII). ASCII is a standard for characters encoding in computers.

The result of designing a Visible Light Communication system is that the system can perform a downlink function in the form of text with a data download speed of 1 Mbps. The system can transmit data properly at a maximum distance of 1 m. The system requires a power consumption of 9.7 watts, namely a transmitter of 8.3 watts and a receiver of 1.4 watts. The dimensions for the transmitter are 6.5 cm x 4 cm and the receiver is 7.5 x 5 cm.

Keywords: VLC, Communication, Transmitter, Receiver, Modulation.