

ABSTRACT

Wireless technology uses radio waves, which are technologies that have high sensitivity and wide coverage at low frequencies, and Line Of Sight (LOS) at high frequencies. However, the limited radio frequency spectrum is one of the problems facing the current development of wireless technology, so Light Fidelity (Li-Fi) technology was created whose transmission concept uses Light Emitting Diode (LED) lamps. This Li-Fi technology may be a promising technology candidate in the future because this technology communicates wirelessly using LEDs where LEDs can not only carry light but also wireless connection simultaneously. Various techniques have been considered to improve the performance of Li-Fi communication systems and overcome bandwidth limitations, including the use of multiple input multiple output (MIMO) with multiplexing techniques. This study aims to analyze the effect of the multiplexing system on Li-Fi using 2 different number of channel scenarios, namely 2x2 and 4x4 channels with each scenario varying the channel spacing, namely 5, 10, 15, 20 and 25 nm. This study focuses on several parameters, namely BER, Q Factor, SNR, Power and Signal Spectrum. Based on the tests carried out from the second scenario to get a good parameter value and still meet the standards, the lowest BER value is 4.63×10^{-27} for 2x2 channel and 1.65×10^{-28} for 4x4 channel. When viewed from the channel spacing variation, the best parameter value is in the 25 nm channel space because in this channel spacing the distance between channels is wider and the possibility of interference is smaller..

Keywords: *multiplexing, LED, Li-Fi, MIMO, Channel Spacing*