

ABSTRACT

Intersatellite Optical Wireless Communication (IS-OWC) is one of the communication technologies between satellites, either in the same orbit or in different orbits. This technology uses light as an optical source to transmit information between satellites in orbits of 500 to 36,000 km, or in Low earth orbit (LEO), Medium earth orbit (MEO) to Geostationary earth orbit (GEO). IS-OWC has several advantages, such as low power consumption and high data rates. However, the performance of the IS-OWC system has several challenges, such as the influence of the pointing error angle parameter on the sending and receiving satellites, the wavelength used, and the distance the system travels for communication. The multiplexing technique is one way to improve the performance of the IS-OWC system to overcome these challenges. The use of Orthogonal Frequency Division Multiplexing technique can be a solution, it can improve system performance in terms of bandwidth and data rate. Quadrature Amplitude Modulation is used to modulate digital signals at high speed. This study aims to analyze the performance of the IS-OWC system by utilizing 4 QAM-OFDM modulation in LEO-MEO communication on the effect of the pointing error angle value where the transmission distance is limited to 500 to 5000 km (LEO-MEO). Besides that, this study varies the effect of the wavelength of the optical source, namely the wavelength of 1310 nm and 1550 nm, with the use of a continuous wave laser power of 0 dBm at a bit rate of 10 Gbps. The results of this research in general, are to see whether the pointing error angle can affect the performance of the IS-OWC system and can provide parameter values for the analysis process, such as the Error Vector Magnitude (EVM), Symbol Error Rate (SER), and the value of receiving power on optical wireless channels.

Keywords: Intersatellite Optical Wireless Channel, Quadrature Amplitude Modulation, Orthogonal Frequency Division Multiplexing, Pointing Error Angle, Performance