ABSTRAK

Proses penyambungan pada instalasi serat optik di dalam gedung atau di rumah terdapat kemungkinan terjadinya *misalignment. Misalignment* adalah suatu kondisi kedua ujung serat optik tidak tersambung sempurna. Pada penelitian ini dilakukan pengamatan dan analisis terhadap tiga jenis *misalignment* yaitu *lateral misalignment, longitudinal misalignment,* dan *angular misalignment* dengan menggunakan *Multimode Step-Index Plastic Optical Fiber* (MSI-POF). Analisis dilakukan untuk mengetahui pengaruh *misalignment* terhadap performansi serat optic sebagai media transmisi dalam sistem komunikasi serat optik. Hasil perhitungan menunjukkan bahwa batas kritis *lateral misalignment* adalah 155µm dengan besar rugi-rugi 0,321 dB, nilai BER $7{,}97 \times 10^{-4}$, *noise margin* 65,086% , *timing jitter* 6,743%, dan *bit rate* 31,807 Kbps. Batas kritis *longitudinal misalignment* adalah 55µm dengan besar rugi-rugi 0,063 dB, nilai BER $7{,}97 \times 10^{-4}$, *noise margin* 65,247% , *timing jitter* 4,011%, dan *bit rate* 31,837 Kbps. Batas kritis *angular misalignment* adalah sudut 15° dengan besar rugi-rugi 0,016dB, nilai BER $7{,}97 \times 10^{-4}$, *noise margin* 67,188%, *timing jitter* 3,429%, dan *bit rate* 31,746kbps.

Kata Kunci — Misalignment, MSI-POF, performansi sistem, serat optik.

ABSTRACT

In the process of aligning fibers in a building or house, there may be a possibility of misalignment. Misalignment is a condition where fiber butts are not jointed perfectly. Three types of misalignment, i.e. lateral misalignment, longitudinal misalignment, and angular misalignment were observed and analyzed. Multimode Step-Index Plastic Optical Fiber (MSI-POF) was used in the experiment to determine the effect on the performance of optical fiber due to losses, BER and eye diagram in a communication system. The experiment results showed that the critical limit in lateral misalignment was 155μm with 0,321 dB losses, BER of $7{,}97 \times 10^{-4}$, noise margin of 65,086%, timing jitter of 6,743%, and bit rate of 31,807 Kbps. The critical limit in longitudinal misalignment was 55μm with 0,063 dB losses, BER of $7{,}97 \times 10^{-4}$, noise margin of 65,247%, timing jitter of 4,011%, and bit rate of 31,837 Kbps. The critical limit in angular misalignment was 15^0 with 0,016 dB losses, BER of $7{,}97 \times 10^{-4}$, noise margin of 67,188%, timing jitter of 3,429%, and bit rate of 31,746 kbps.

Keywords: Misalignment, MSI-POF, system performance, fiber optic.