ABSTRACT

The cimaung area located in the southern highlands of bandung regency, West Java, Indonesia, faces limited access to network technology due to its distance from the city center. To address this network infrastructure issue is a fiber optic network, which improves connectivity, access to services and information for the local community.

This research uses 3 software, namely AutoCad, Google Earth, and OptiSystem, to overcome network infrastructure constraints in the Cimaung area. By utilizing AutoCAD, the planning and design of fiber optic based network installation is done. Google Earth is used for mapping the area that will be connected to the network. Meanwhile, OptiSystem application is used to optimize and simulate the performance of fiber optic network.

The results of the power link budget analysis show that the attenuation value on the downstream link was recorded at -34.759 dB and on the upstream link at -39.6 dB, exceeding the set limits of -7.759 dB downstream and -0.28 dB upstream. Despite the low received signal power, potential improvements in the transmission path have the potential to improve the quality of data communication. In the Rise Time Budget analysis, the Rise Time value on the Upstream link is 0.116 ns and the Downstream link is 0.07 ns, which is in accordance with the set standards, indicating the ability of the transmission system to maintain signal quality. The results of the Bit Error Rate (BER) simulation design show a BER value on the downstream link of 0 (zero), indicating excellent transmission without almost any bit errors. However, the BER value on the upstream link is 1.3746 x 10^{-6}, exceeding the common limit of $\leq 10^{-9}$. Nonetheless, potential improvements can still be made to achieve better transmission quality. With these results, this research provides important insights for the improvement of optical transmission lines and is feasible to implement.

Keywords: FTTT, Optisystem, Power Link Budget, Rise Time Budget, Bit Error Rate