

ABSTRACT

The village of Mekarwangi, situated in the hills of West Bandung Regency, West Java, Indonesia, faces limitations in technology network access due to its remote location from the city center. Therefore, a design and implementation of Fiber To The Home (FTTH) using a Mini Optical Line Terminal (OLT) was carried out in Mekarwangi village.

This research utilized software such as AutoCAD, Google Earth, and OptiSystem to overcome the challenges in the village's network infrastructure. AutoCAD was employed for planning and designing the fiber optic-based network. Google Earth was used for mapping the locations to be connected to the network. Meanwhile, the OptiSystem application was utilized to optimize and simulate the performance of the fiber optic network.

The results of the power link budget analysis indicated that the attenuation values on the downstream link were -22.878 dB, and on the upstream link were 2.164 dB, both of which did not exceed -25 dB. In the Rise Time Budget analysis, the Rise Time values on the downstream link were 0.292 ns, and on the upstream link were 0.583 ns, conforming to the established standards. This demonstrates the transmission system's ability to maintain signal quality. The results of the Bit Error Rate (BER) design were 2.44443×10^{-3} for the downstream link and 1.03447×10^{-159} for the upstream link, both of which did not exceed 10^{-9} . With these results, it is concluded that the design and implementation are suitable for implementation.

Keywords: *FTTH, Mini OLT, Power Link Budget, Rise Time Budget, Bit Error Rate*