

ABSTRACT

This final project aims to analyze the performance of the Fiber to the Home (FTTH) network at Telkom University through field measurements and simulations. The FTTH implementation in this study covers two topologies: a direct route to the Lingian Hotel ODP and a complex route to several laboratories (G9, E3, G4, G13) and the Tower ODP. Field measurements using an Optical Power Meter (OPM) and Optical Time Domain Reflectometer (OTDR) identified significant optical attenuation in some segments, which could potentially cause signal degradation.

To comprehensively evaluate network performance, simulations were conducted using Optisystem 7.0 software, replicating the field configuration. The parameters analyzed include optical power, Bit Error Rate (BER), and Eye Diagram. Simulation results show that all transmission paths have total attenuation below the ITU-T G.984 GPON standard threshold (<28 dB). The signal quality produced is excellent, as evidenced by a BER value $< 10^{-9}$ and a wide-open Eye Diagram.

A comparison between simulation results and field measurements shows that the simulation model is capable of predicting actual network conditions with high accuracy. This study concludes that Optisystem can serve as a reliable tool for planning and validating FTTH networks, and confirms that the installed network has stable transmission quality in accordance with established standards.

Keywords: *FTTH, GPON, OLT, Optical Simulation, Optisystem, Power Loss, BER, Eye Diagram.*