

## ABSTRACT

Current technological advancements, particularly in information and communication technology, are rapidly evolving. The demand for information and communication technology services has expanded beyond voice services to include data, images, and video. Fiber optic cables are now widely used in technology and communications due to their ability to transmit large amounts of information at high speeds. The technology of using fiber optic cables as a transmission medium in telecommunication systems is known as Fiber Optic Local Area Network (FOTLN). One development of FOTLN is Fiber To The Home (FTTH).

This final project conducts a study on "Performance of 10-Gigabit Passive Optical Network (XGPON) Technology in Fiber To The Home (FTTH) Networks in Sub-Urban Areas." The research successfully designed an FTTH network using XGPON technology with a two-stage method in the sub-urban area, specifically in Cluster Latigo Village. The simulations conducted demonstrated that the two-stage method effectively simplifies the design process of the FTTH distribution network. The design results also comply with the standards set by ITU-T G.987 and PT. Telkom Indonesia.

Analysis of network parameters such as Power Link Budget, Rise Time Budget, Signal to Noise Ratio, Bit Error Rate, and Q-Factor indicates that the performance of XGPON technology in FTTH networks in sub-urban areas meets the standard requirements.

**Keywords:** *Fiber To The Home (FTTH), Power Link Budget, Rise Time Budget, Signal Noise Ratio, BER Value, Q-Factor Value, Optisystem*