ABSTRACT

In this modern era, internet technology is developing rapidly to meet the needs of Indonesian society. With the increasing demand for fast connections, fiber optic-based GPON technology continues to be developed. Fiber To The Home (FTTH) connects optical fiber directly to the customer's home, improving connection speed and quality and overcoming the limitations of copper cables, offering a more reliable and efficient internet solution.

The purpose of this research is to analyze the design of FTTH in Socah, Tragah, and Modung sub-districts using GPON technology, because these areas do not yet have optical fiber. The design is done with the help of Optisystem software and mathematical calculations using the Link Power Budget and rise time budget methods. The parameters obtained refer to ITU and PT Telkom standards: BER standard is $1x10^{-9}$*, maximum attenuation value of Power Link Budget is 28 dB, and Rise Time Budget value is 11,11 ns.*

The largest Downstream Power Link Budget is 21,734 dB. The largest received power (Prx) value from manual calculation for Power Link Budget Downstream is -18,734 dBm, while the simulation results show the largest Prx is -17,864 dBm in Glisgis Village, Modung District. For Power Link Budget Upstream, the largest value is 18,405 dB. The largest Prx value from manual calculation for Power Link Budget Upstream is -15,405 dBm, while the simulation results show the largest Prx is -15,206 dBm in Petaonan Village, Socah District.

The largest Power Link Budget Downstream result is 21,734 dB with a manual received power (Prx) of -18,734 dBm and simulation results of -17,864 dBm in Glisgis Village, Modung District. The largest Upstream Power Link Budget is 18,405 dB with a manual Prx of -15,405 dBm and simulation results of -15,206 dBm in Petaonan Village, Socah District.

Keywords: FTTH, Optisystem, GPON, *Power Link Budget, Rise Time Budget*