

ABSTRACT

The development of fiber optic access network technology from active to passive optical access technology is getting better, one of which is competition for access to PON-based optical fiber. GPON (Gigabit Passive Optical Network) is an access technology that is categorized as Broadband Access based on fiber optic cable. The FTTH design chose Kelurahan Sragen Tengah in the area of PT. Telkom Witel Solo using GPON technology.

In this final project, data collection surveys using GPS were conducted. Then the FTT (Fiber To The Home) network design using GPON technology (Gigabit Passive Optical Network), the results of which will be tested for the feasibility of the system by looking at parameters such as Link Power Budget and Rise Time Budget. The parameter values are calculated manually and will be compared with the simulation results using OptiSystem software. Then the other parameter is the Bit Error Rate (BER) for system performance, this value can be seen with a design simulation at Optisystem.

The result of manual link power budget calculation is the total attenuation generated for the farthest distance of 19.91096 dB for downstream and 4.78096 dB for upstream. The calculation results meet the standards set by ITU-T and PT. Telkom, which is equal to 28 dBm. Based on the total attenuation value at the farthest distance, the value of receiving power is - 22.91096 dBm for downstream and -10.28096 dBm for upstream. For the rise time budget value, the time limit value is 0.28135 ns and the t_{system} value is 0.252662379 ns for downstream. And the time limit value obtained is 0.5627 ns and the result of t_{system} value is 0.250182259 ns for upstream. The obtained rise time budget results are good because the t_{system} value is smaller than the time limit value. For system performance parameters, namely BER, which is generated from a simulation at OptiSystem, the BER downstream value is 3.50184×10^{-128} and 1.58392×10^{-242} for upstream. This value satisfies the minimum value for optical BER of 10^{-9} .

Keyword : *Bit Error Rate, FTTH, GPON, Kelurahan Sragen Tengah, Link Power Budget, Rise Time Budget, OptiSystem*