

## ABSTRACT

*With the advancement of technology and the increasing need of society for fast and wide communication networks, as well as large bandwidth demands, users want an efficient network. The bandwidth capacity in Rosalie Hills Housing, Cimahi, is not sufficient to meet the potential demand of customers for high speed. For that, PT. Telkom Akses Cimahi designed Rosalie Hills housing to implement Fiber to The Home (FTTH) access using Gigabit Capable Passive Optical Network (GPON) technology.*

*In this Final Project, an evaluation was conducted on the feasibility and performance of the FTTH system designed for Rosalie Hills Housing. The parameters analyzed include Power Link Budget, BER, and Rise Time Budget to assess the feasibility of the system. The values of these parameters were calculated manually and compared with the calculation results using OptiSystem software. For the BER parameter, the analysis was carried out through FTTH network design simulation using OptiSystem.*

*The results of manual calculations of the power link budget show that the total attenuation for downstream at the farthest ONT is -16.960 dB, while for upstream it is 13.960 dB. In the simulation, the attenuation values obtained are -20.186 dB for downstream and -7.733 dBm for upstream. For the rise time budget, the time limit value for upstream is 0.26382 ns for NRZ encoding and 0.01638 ns for RZ encoding. In the system performance parameters, namely BER, the simulation results in OptiSystem show that the BER value for upstream is 0 (zero) and for downstream is 1.22965e-011. Both of these values meet the minimum BER limit set for optics, which is  $10^{-9}$ . Based on manual calculations and simulations, it can be concluded that this FTTH network design meets the requirements for implementation, because the parameter values are still within the maximum limits of the FTTH network feasibility standards.*

**Keywords:** FTTH, Power link budget, BER, Opti System.