

ABSTRACT

Urban areas are generally known as the industrial center of a region so that internet usage can automatically be said to be abundant, one of which is Wonokromo District. There have been many complaints that have been heard, both intentionally and unintentionally, regarding internet networks experiencing problems, especially in Wonokromo District. Therefore, this has been done data collection on existing backbone links in the area including sampling of fiber optic network route selection on one of the cores from STO to user.

This research aims to analyze the performance of backbone links on existing fiber optic networks and carry out simulations using Optisystem software. Several parameters used in analyzing network performance are power link budget, dispersion, rise time budget, maintainability, availability, and BER (bit error rate). These parameters are calculated based on existing data obtained and the results refer to PT standards. Telkom and ITU-T. Apart from that, optimization will be carried out using an EDFA (Erbium Doped Fiber Amplifier) device if the results obtained do not meet standards.

The manual calculation value of the power link budget in downstream and upstream conditions was respectively obtained at 21,335 dB and 18,472 dB with a received power of -16,835 dBm and -13,972 dBm with the simulation results of the total received power obtained respectively at -17,178 dBm and -16,346 dBm , the dispersion value is 1,53769 ps, the rise time budget value is 49,522 ps, the SNR value is 47,104 dB, the Q-factor value is 11,776, and the BER value is $1,9 \times 10^{-34}$. In addition, simulations were carried out using Optisystem software with. The Q-factor simulation results in downstream and upstream conditions are respectively 8,682 and 8,691, while the BER is $1,948 \times 10^{-18}$ and 1.798×10^{-18} . In the availability calculation, a feasibility percentage of 99,65% was obtained. This value is considered not to meet the desired network performance according to the ITU-T standard, namely 99,99%.

Based on the results of the power link budget, rise time budget, dispersion, Q-factor, and BER parameters according to the standard, optimization using EDFA is not necessary. EDFA optimization does not depend on availability.

Kata Kunci: *Backbone Network, Fiber Optic, Power Link Budget, Rise Time Budget, Bit Error Rate*