

ABSTRACT

Behind the increasing number of internet users every year, the results a survey by the Indonesian Internet Service Providers Association (APJII) still shows The big worry is that there are still hundreds of millions of people who have not been touched Internet. In remote areas, internet access is still a rarity. Karangmulya village is one of the villages in the district. Plumbon Cirebon Regency. Karangmulya Village is very far from the urban center so that internet access is still very lacking for the housing. Moreover, this year there is an epidemic that requires a school child/student to learn online so that the need for internet access is very big. It needs to be designed and analyzed to be fully using optical fiber from the provider to the customer using a 10-GigabitCapable Passive Optical Network (XG-PON) to meet these service needs. XGPON is a high-speed access technology that has advantages such as multiple services, large bandwidth availability that supports triple play services (voice, data, and video).

To solve the above problems, it is necessary to calculate the feasibility and performance parameters on the design system. These parameters are Power Link Budget and Rise Time Budget for system feasibility. This value is calculated manually and compared with the results of calculations on the Optisystem. In addition, there are other parameters such as Bit Error Rate (BER) for system performance. BER parameters can also be seen in the network design simulation on Optisystem.

The results of the design resulted in a power link budget value of -16.161 dBm for the farthest link with manual calculations. For simulation on Optisystem for the furthest link - 18.663 dBm. For the calculation of the rise time budget of 0.053617238 ns for the farthest link by manual calculation. To calculate the bit error rate 8.6656×10^{-16} for the farthest link by manual calculation. For simulation on the farthest Optisystem link 1.70301×10^{-20} . For the calculation of the signal noise to ratio of 24.04796043 dB for the farthest link. This *power link budget* value is still considered feasible because it is still above -28 dBm. For the calculation of the rise time budget does not exceed the minimum limit of 70% NRZ. For the calculation of the bit error rate does not exceed the minimum limit of 10^{-9} and the signal noise to ratio is not less than 21.5 dB. Because the greater the SNR value, the better the performance of a fiber optic communication.

Keywords : XG-PON , BER , Power Link Budget , Rise Time Budget , SNR