

ABSTRACT

The use of information technology based on fiber optic networks does not only apply to the business sector, but also to the public sector. One of the public sectors that utilizes this technology is Taman Anyelir Housing in Tangerang city. The findings of problems in the form of slow and offline network services are the basis for discussing, evaluating and conducting research on this condition. The purpose of this study is to determine and evaluate the design implementation mechanism of various types of fiber optic technology based on GPON, XGPON, and XGS-PON that can be applied to Taman Anyelir Housing.

In this research, the design of GPON, XGPON and XGS-PON technology is carried out by simulation using the optical fiber design application, namely Optisystem with version 7.0. The design is applied based on the real conditions of the location of the OLT (Optical Line Terminal) terminal point distance, ODC (Optical Distribution Cabinet), ODP (Optical Distribution Point) to the ONT (Optical Network Terminal) location as the final receiver. By using an example of an ONT location in Taman Anyelir Housing, the concept of designing GPON, XGPON and XGS-PON technology is carried out with various sample data. Furthermore, a redesign of the entire technology is also carried out to add performance to the GPON, XGPON and XGS-PON fiber optic networks for the better.

From the design results, the GPON power link budget value is -20.4 dBm, the BER (Bit Error Rate) GPON value is a minimum of 1.5679×10^{-17} and the Q-Factor GPON value is a minimum of 8.44 dB. Then the XGPON power link budget value is -19.3 dBm, the XGPON BER (Bit Error Rate) value is a minimum of 1.58126×10^{-13} and the XGPON Q-Factor value is a minimum of 7.28 dB. Furthermore, the XGS-PON power link budget value is -16.3 dBm, the XGS-PON BER (Bit Error Rate) value is a minimum of 3.82449×10^{-42} and the XGS-PON Q-Factor value is a minimum of 13.5 dB. From the results of the simulation analysis, it can be concluded that the three fiber optic network technologies are feasible to implement in Taman Anyelir Housing Tangerang City.

Keywords: Gigabit Passive Optical Network (GPON), 10 Gigabit Passive Optical Network (XG-PON), 10 Gigabit Symmetrical Passive Optical Network (XGS-PON), Power Link Budget, Bit Error Rate (BER), Q-Factor, Optisystem 7.0