ABSTRACT

At the present time, technology continues to evolve over time, including the speed of internet networks that are demanded to be faster to meet the needs in this digital era. This development is accompanied by the advancement of transmission systems, one of which is the development of Fiber Optic transmission systems. FTTT (Fiber-to-the-Tower) utilizes optical fibers as the transmission medium that can support cellular networks to provide high and efficient bandwidth services.

In this final project, the author will optimize the FTTT network in the Dampit area, Malang, which will utilize XGPON (10-Gigabit-capable Passive Optical Network) technology. This is done because of the uneven distribution of existing networks in the Dampit area, Malang, and one suitable technology for network equalization is XGPON. XGPON is an advanced technology derived from GPON that has a capacity of up to 10 Gbps.

The location was chosen due to the need for network modernization. Field surveys will use supporting software such as Google Earth to display the geographical conditions and Optisystem to simulate the collected data.

From the FTTT network design, the results obtained through manual calculations and simulations for downstream distribution 1 have a value of -17.769 dBm, distribution 2 has a value of -20.2335 dBm, and distribution 3 has a value of -19.8735 dBm. Furthermore, for upstream values, distribution 1 has a value of -14.4955 dBm, distribution 2 has a value of -18.531 dBm, and distribution 3 has a value of -18.1705 dBm. The Bit Error Rate (BER) values for distribution 1 are 1.3451×10^{-20}, for distribution 2 are 1.45564×10^{-05}, and for distribution 3 are 6.31914×10^{-07}. The rise time budget values for distribution 1 are 0.05486 ns, for distribution 2 are 0.0655 ns, and for distribution 3 are 0.0442 ns.

Keywords : FTTT, XGPON, Optisystem, BER, Rise time budget.