

## ABSTRACT

The advancement of communication technology is currently increasing rapidly, so that the bandwidth requirements are getting higher. Therefore, a telecommunications facility is needed that can provide a solution to this problem, namely by using a Radio Over Fiber system. Then implementing Radio Over Fiber to Passive Optical Network (PON), can provide more user capacity and the resulting bandwidth is quite large.

In the final project research, a Radio Over Fiber Next Generation PON2 simulation will be carried out using 4 OLT wavelengths, each of which has a bit rate of 10 Gbps. Then use the 60 GHz radio frequency. In this study there are 2 simulation schemes, the first scheme uses a total of 64 ONUs and the second scheme uses 128 ONUs, with an optical link distance of 10 km – 40 km. Then it will use an Erbium Doped Fiber Amplifier (EDFA) amplifier placed in the booster amplifier position in order to improve system performance. The simulation will analyze performance results such as Signal to Noise Ratio (SNR), Bit Error Rate (BER), Link Power Budget (LPB), and Q-Factor.

From the simulation, the best performance results are in Scheme I with a system that uses EDFA at a distance of 30 km with an LPB value of -20.441 dBm, SNR of 11.1032 dB, Q-Factor of 8.0609, and BER of  $9.3452 \times 10^{-16}$ . The best performance results in Scheme II with a system that uses EDFA at a distance of 20 km with an LPB value of -20.2639 dBm, SNR of 22.0761 dB, Q-Factor of 8.458, and BER of  $5.4516 \times 10^{-17}$ .

**Keyword :** RoF, SNR, BER, ONU, Q-Factor, LPB