

ABSTRACT

Cellular service users in recent years have increased so that the need for bandwidth is higher. Therefore, the need for telecommunications facilities that can overcome these problems, the solution is by using a Radio Over Fiber (RoF) system. Then by implementing RoF to Passive Optical Network (PON), it can offer more user capacity and the resulting bandwidth can be greater.

In this research, simulation integration of RoF with NG-PON2 will be carried out by using a bitrate of 40 Gbps from the aggregation of 4 OLT wavelengths, each of which has a 10 Gbps bitrate. This research will be conducted with 3 simulation scenarios, the first scenario with the number of ONU as many as 64 ONU, second scenario using 128 ONU, and third scenario using 256 ONU with optical link distance of 10 km - 40 km with a spacing of 10 km. Then to improve the system performance Optical Amplifier (OA) with EDFA type is used which functions as a booster amplifier. From the simulation results, performance results such as Link Power Budget (LPB), Signal to Noise Ratio (SNR), Q-Factor, and Bit Error Rate (BER) will be analyzed.

From the simulation, the best performance results obtained in first Scenario with system that uses OA at distance of 30 km with LPB value of -20.441 dBm, SNR of 11.1032 dB, Q-Factor of 8.0609, and BER of 9.3452×10^{-16} . For the best performance results in second Scenario with system that uses OA at distance of 20 km with LPB value of -20.2639 dBm, SNR of 22.0761 dB, Q-Factor of 8.458, and BER of 5.4516×10^{-17} . For the best performance results in Scenario III with system that uses OA at distance of 10 km with LPB value of -20.1843 dBm, SNR of 20.5646 dB, Q-Factor of 9.3172, and BER of 2.5528×10^{-20} .

Keyword : RoF, NG-PON2, ONU, Q-Factor, BER, Link Power Budget