ABSTRACT

Kunti Kidul is a village with the area is 0,3222 km^2 inhabited by 247 families with the population density is 1.926 people/km^2. The geogrpahical condition is a lowlands and has implemented Gigabit-capable Passive Optical Network (G-PON). Based on the high demand for bandwidth due to triple play service, it is necessary to develop technology to 10 Gigabit-capable Passive Optical Network (XG-PON) with the bandwidth is 10 Gbps downstream and 2.5 Gbps upstream. The total distance in this design is 32,50 km.

The design simulation analyzes the network feasibility with four scenarios, there are downstream and upstream for closest and farthest distance. The parameters are Power Received and Rise Time Budget (RTB) as the system performance measurement parameter and Q-factor & Bit Error Rate (BER) as the system feasibility parameter. The simulation tool is OptiSystem with drafting design using Google-Earth. Based on the result of the drafting, there are 17 Optical Distribution Point (ODP) for 135 subscribers.

Based on mathematical result, the downstream Power Received for the farthest and closest distance are -24,58 dBm and -24,63 dBm, while the simulations are -24,98 dBm and -25,03 dBm, respectively. Furthermore, upstream Power Received for the closest and farthest distance are -26,70 dBm and -26,78 dBm, while the simulations are -26,98 dBm and -27,06 dBm, respectively. The RTB result for downstream is 0,07 ns and the upstream is 0,066 ns with the modulation type is NRZ. So, the value of Power Received and RTB in this final project are fulfilled the applicable regulatory standards, which is ITU-T G.987.2.

Key Word : optical fiber, FTTH, XG-PON, RTB, OptiSystem, bandwidth