

ABSTRACT

The world of telecommunications continues to develop in line with the community's need for telecommunications services. Smooth communication is very important. Therefore a fiber optic network is needed, one of which is placed in a submarine cable or backbone network. The backbone network is the main line or channel in a network with very high speed. Optical fiber is a medium for carrying information from one point to another in the form of light made of glass or silica, which consists of several structures such as cores, cladding, and coatings. The technology used is DWDM (dense wavelength division multiplexing) with a frequency allocation of 10 and a variation of the power used, namely 0, 2, 4, 6 and 8. This design is based on multiplexing and demultiplexing with a distance of 517 km. The amplifier used is an ROA (Raman Optical Amplifier). The parameters studied were the bit error rate (BER), Q-factor and power received using Optisystem software. The simulation uses 2 scenarios, namely the Branching Unit and without the Branching Unit. In the scenario without Branching Unit, the BER value obtained is 2.70×10^{-45} with a power of 8 dBm, a Q-factor value of 14.6175 with a power of 0 dBm, the value of receiving power is 4.371 dBm. While the scenario using the Branching Unit, the value of BER is 1.32×10^{-14} with a power of 8 dBm, a Q-factor value of 7.57107 with a power of 8 dBm, a value of received power of 4.094 with a power of 8 dBm. In variations of power changes, the greater the power, the better the results. The scenario of Branching Units and without Branching Units all have good performance because they meet the specified standard values.

Keywords: *Optical fiber, BER, ROA, power receive, Q-factor, submarine cable.*