ABSTRACT

Nowadays with the increasing capacity of internet users, high-capacity data rate becomes a necessity, therefore the design of long-distance fiber optic communication with high bitrate is required. However, high-capacity data rates have disadvantages, dispersion is a problem for this system. Therefore, using dispersion compensating fiber (DCF) is expected to optimize the optical fiber design at these frequencies, especially from dispersion problems that can be optimized for receiving-end. DCF is one good method used to handle dispersion problems, because it has advantages such as wide bandwidth, good BER, stability, good sensitivity to temperature.

The use of DCF in this final project is applied to Single mode fiber (SM). With distance up to 1000km (long haul) and datarate at 10 Gbps as. The scheme used in this study is divided into 4 parts, the first is a simulation without DCF, where SM is installed at long haul distance without DCF. Then simulate with DCF where there are 3 different schemes of BC with DCF, SM with DCF designed symmetrically, and lastly SM with DCF mounted in parallel, the three schemes are supported with Erbium Doped Fiber Amplifier (EDFA) amplifier. With Q factor parameters and BER as parameter feasibility.

At the end of the study with 10 Gbps bit rate, the scheme without DCF resulted in a very large dispersion with a maximum Q factor of 100 km, with a value of 8 and a BER of 4,883 e^{-016}. The post compensation scheme produces a Q factor with a value of 6.6 and BER is worth 1,011 e-^{01}1 at a distance of 400 km. The pre compensation scheme produces a Q factor of 7.4 and BER value of 5.9 e-^{014} at a distance of 600 km The compensation scheme produces a Q factor of 6.9 and BER is 1.8 e-^{012} at 600 km The parallel compensation scheme produces a Q factor of 8 and BER Worth 1.16 e-^{016} at a distance of 1000 km.

Key Words: *DCF, BER , Q factor ,EDFA*