

ABSTRACT

The development of today's telecommunications technology has led to the need for QoS guarantees to customers, loss due to low interferences, the increase in services coverage, high-speed data access, and huge bandwidth requirements. Radio over Fiber (ROF) with DWDM multiplexed system can be an option for transmitting large amounts of data through fiber optics. But behind all the advantages it brings, there is a phenomenon that limits the performance of fiber optics communication systems such as nonlinear effects that can caused kerr effect in the optical medium used.

In this final project, a model that combines ROF is designed with DWDM technology using fiber optic based communication planning software to determine the effect of Cross Phase Modulation (XPM) under very narrow channel spacing conditions. Then, there are change in testing variables such as increased of channel spacing between wavelengths about 0.2 nm, 0.4 nm, 0.6 nm, 0.8 nm, and 1 nm. Also test the link with two different optical amplifiers scenario with 4,8,16, and 32 number of DWDM channels.

From the results of this final project, obtained the best scheme to reduce the effects of nonlinear Cross Phase Modulation by using SOA amplifier in DWDM-ROF link with 8 channels at 0.6 nm channel spacing. Highest average Q factor values obtained is 5.8587275, and three of the eight channels have Q factor values above 6 or BER below 10^{-9} .

Keywords : DWDM-RoF, Cross Phase Modulation, Channel Spacing , and Q factor