

ABSTRACT

Optical communication systems have the advantage of small transmission losses, wide bandwidth, not affected by electromagnetic waves, and data security. So that with its advantages, research continues to be carried out to improve the performance of fiber optic communication systems. There is a major problem in trying to get the wide bandwidth it has, namely dispersion along the optical fiber.

There are several options for reducing dispersion problems along optical fiber . In this study, the choice is in Dispersion Compensating Fiber (DCF) and Fiber Bragg Grating (FBG). DCF is an optical fiber that has a negative dispersion value, so it can restore pulse widening that occurs. FBG is a device containing a different refractive index grid, aiming to return a bit period value, such as before dispersion occurs. Both FBG and DCF have their own characters. So that it will be investigated which devices are suitable for dealing with dispersions at distances of up to 500 km on DWDM networks. In this reseach, DCF has three schemes, post-dispersion, pre-dispersion and mix dispersion, while the FBG will be placed once at the rise time budget boundary position.

This study found the best choice to overcome the dispersion that occurred along a distance of 500 km, namely DCF Post-compensating and Pre-compensating with Q-factors respectively 6.15525 and 6.08125. The author has the result that DCF has an advantage over FBG, because the decrease in dispersion is done gradually through the length of the DCF cable. However, FBG can be better because the lattice that is passed by the signal can overcome dispersion at distances of up to 500 km

Keywords: Dispersion Compensating Fiber, Bragg Grating Fiber, Dense Wavelength Division Multiplexing, Optical Communication System