

ABSTRACT

Radio over Fiber technology is a combining technology between radio transmission and fiber optic cables. Transmission data through cable is more faster than radio waves. At this time wireless communication has changed from voice to broadband communication, Radio over Fiber can be applied to support broadband services.

In this final project has been simulated using Wavelength Division Multiplexing (WDM) technique and combined with FBG (Fiber Bragg Grating). Radio over Fiber simulated by a 2.5 GHz radio frequency signal superimposed into wavelengths. The data rate used is 1 Gbps and using four Wavelength Division Multiplexing (WDM) channels with the wavelengths of each channels are 1555 nm, 1556 nm, 1557 nm and 1558 nm and sent simultaneously in a single mode fiber optic. The addition of Fiber Bragg Grating filter (FBG) is performed to improve network performance. In this design, the FBG is placed one side on the receiver side. The addition of SOA Optical Amplifier (Semiconductor Optical Amplifier) is given to provide reinforcement on optical fibers to support for long- distance communication.

From the design simulation results with the addition of SOA shows the BER value of 2.28082×10^{-13} , 1.90895×10^{-26} , 1.27957×10^{-14} , 1.18867×10^{-33} , at the farthest distance of 130 km is still above receiver sensitivity is -15,547 dBm . The BER value obtained at all four wavelengths meets the standard of 10^{-12} which can indicate the system can be applied to broadband services.

Keyword : Radio over Fiber, Wavelength Division Multiplexing, Fiber Bragg Grating.