

ABSTRACT

Hybrid amplifier is a promising technology and give a better performance because it can handle the network with a large load. Hybrid amplifier is used to optimize the increase in the gain bandwidth of WDM-based system. Increasing optical amplifier gain-bandwidth is the most effective way to optimal utilization of the fiber bandwidth efficiently to increase the channel number of WDM-based system.

This final project discusses the optimal hybrid amplifier configuration, doing performance simulation test, and will be implements on DWDM-based data transmission using hybrid optical amplifier (Raman-EDFA) which has to be optimized. To test the performance of hybrid amplifier that has been designed in the previous stage, needed a system to become a medium for performance test, and system U-DWDM long haul has been choosen. System U-DWDM long haul made with a link distance more than 100 km with very dense channel spacing is 0.19 nm. The result will be analyzed, related on amplification spectrum and the gain spectrum showing the Q Factor, Bit Error Rate (BER) and eye diagram.

Optimization hybrid amplifier (Raman-EDFA) gain spectrum being made around the same intensity reinforcement with lower levels of gain flatness of 4.3 dB to 0.01 dB with an average gain of about 25.7 dB with a bandwidth range of 75 nm las long as 1530-1605 nm. From the simulation results of test performance hybrid amplifier (Raman-EDFA) in long haul U-DWDM system configuration with a 205 km link length acquired BER diversified value ie on channel 1 (6,44545E-16), 20 (1,99033E-13), 40 (1,0911E-11), 60 (1,06455E-12), 80 (5,32765E-11), and 100 (1,05255E-11) with Q Factor diverse ie on channel 1 (7.97197), 20 (7.24377), 40 (6.68281), 60 (7.01838), 80 (6.4435), and 100 (6.58715) in which the lowest Q-factor on channel 80 (6.4435) but not less than 6, this indicates the system U-DWDM long haul with hybrid amplifier (Raman-EDFA) which are arranged in cascade configuration with the specifications contained in this research is only effective at a maximum distance of 205 km

Keywords: *Hybrid Optical Amplifier, EDFA, Fiber Raman Amplifier (FRA), U-DWDM, Gain-flatness, Q Factor.*