

ABSTRAK

Adrian Satria Permana, Jurusan Teknik Elektro, Fakultas Teknik Universitas Brawijaya, 26 April 2018, Analisis Pengaruh Peletakan Kompensator Dispersi *Fiber Bragg Grating* pada Sistem Jaringan *Radio Over Fiber*, Dosen Pembimbing: Dr.Ir. Sholeh Hadi Pramono, M.S., dan Ir. Erfan Achmad Dahlan, M.T.

Teknologi *Radio Over Fibre* (RoF) adalah sistem integrasi antara jaringan serat optik dan komunikasi *wireless broadband*. Teknologi RoF merupakan solusi potensial untuk peningkatan kapasitas dan mobilitas jaringan akses. Pada sistem transmisi RoF menggunakan kabel serat optik sebagai media transmisi data terjadi kosekuensi pelebaran pulsa, bila pelebaran ini dibiarkan akan memungkinkan terjadi *Intersymbol Interference* (ISI) yang menyebabkan pulsa output pada sistem menjadi tumpang tindih dan membuatnya tidak terdeteksi. Berdasarkan permasalahan itu, dirancang sebuah sistem komunikasi RoF dengan menggunakan kompensator dispersi *Fiber Bragg Grating* pada simulasi *software Optisystem* dan menganalisis sistem terhadap parameter-parameter seperti BER, *Q-Factor*, dan *Loss*. Berdasarkan hasil simulasi pengaruh peletakan FBG pada sistem transmisi RoF menggunakan *line coding NRZ* pada panjang serat optik 10 km, RF carrier 3,5 GHz, dan *bit rate* 10 Gbps, didapatkan nilai BER $5,242 \times 10^{-15}$, *Q-factor* 7,73281 dan nilai loss 2,561 dBm.

Kata kunci : *Radio over Fiber, Fiber Bragg Grating, Long Houl Telecommunications Systems*

ABSTRACT

Adrian Satria Permana, *Department of Electrical Engineering, Faculty of Engineering University of Brawijaya, 26 April 2018, Analysis of the Effect Using Compensator Dispersion Fiber Bragg Grating on Radio over Fiber Network Systems, Academic Supervisor: Dr. Ir. Sholeh Hadi Pramono, M.S. and Ir. Erfan Achmad Dahlan, M.T.*

Radio over Fiber (RoF) is an integrated system between fiber-optic network and wireless broadband communications. RoF technology is a potential solution for capacity and mobility improvement in access networks. Using fiber optic cables as data transmission medium have problems pulse width extension it's mean dispersion, if this widening is allowed, will occur Intersymbol Interference (ISI) which causes the output pulses in the system to overlap and undetected signal. Based on that problem, based on that problem, RoF communication system using Fiber Bragg Grating dispersion compensator on Optisystem software simulations and system effects on parameters such as BER, Q-Factor, and Loss. according to the data simulation of the effect of NRZ line coding format on fiber link length of 90 km, 3.5 GHz RF carrier, and 10 Gbps bit rate. The value of BER that had been obtained is $5,242 \times 10^{-15}$, Q-factor 7,73281 and loss 2,561 dBm.

Keywords: Radio over Fiber, Fiber Bragg Grating, Long Houl Telecommunications Systems