

Performance analysis of EDFA for SCM/WDM radio over fiber communication link

Abstract

The radio-over-fiber (RoF) system is one of the potential schemes for the future broadband wireless communication systems such as mobile communications, hotspots and suburban areas. In this paper, we present 16 channels of RF carrier modulation of the Sub Carrier Multiplexing (SCM), which then integrated, with Wavelength Division Multiplexing (WDM) for the Radio over Fibre Link. The integration of the two systems is responding to the demands for high data rate applications and reasonable mobility for broadband communication. The work also investigates the performance of EDFA for the optical fiber length up to 200km. The EDFA introduced as the optical amplifier in the designed system model to encounter the effects of attenuation, distortion and Rayleigh scattering. The deploying of RF carrier performs by double side band and single side band of the SCM for bandwidth utilization shown to be much better than conventional optical WDM. However, by applying EDFA with the length varies from 0m – 5m, the performance show that total power transmission has magnifying the optical signal significantly and the optical fiber length expanded to 150 km. The simulation result has shown that pre-amplifier EDFA in 150km of SCM/WDM RoF system significantly boost the performance of optical signal strength over the link.