Abstract

We demonstrate bidirectional wavelength division multiplexing passive optical network (WDM-PON) based on soliton pulse using two channels. The system uses 1550 nm and 1550.04 nm wavelength for each channel, which is capable of delivering 5-Gbps downstream data over 203 km and 2.5-Gbps upstream data over 153 km optical fiber with 0.2dB/km attenuation loss. The optical source for downstream transmission is sech pulse generator at central office and refractive semiconductor optical amplifier at each optical network unit for upstream transmission. The maximum optical to signal noise ratio for upstream and downstream transmission is obtained at input power 7.56dBm. We investigate backscattered optical power, quality factor and bit error rate (BER). The BER performance shows that our proposed scheme is a practical solution to meet the data rate and cost-efficient of the optical links simultaneously in tomorrow’s WDM-PON access networks.

Index Terms
Computer Science Networks

Keywords
Wavelength division multiplexing passive optical network (WDM-PON), soliton pulse, reflective semiconductor optical amplifier, erbium doped fiber amplifier (EDFA), single mode fiber, photo detector.