

Bidirectionally-pumped remote L-band EDFA module utilizing stimulated Raman scattering

ABSTRACT

This research was centered on an enhanced bidirectionally-pumped remote L-band erbium-doped fiber amplifier (EDFA) module. The amplifier was backward-pumped using 1455 nm Raman laser while the SRS generated in the delivery line pumped the remote EDFA in the forward direction. Gain values around 12 dB and 9 dB were measured for input signal of 30 and 0 dBm respectively. Excellent gain flatness was observed for both input levels with similar maximum gain variation of only 1.2 dB. 30 dBm input produced high noise figures up to 11.6 at the shorter wavelengths which declined as the signal moved further across the L-band window. The same trend was observed for 0 dBm input where at 1570 nm, 12.1 dB noise figure was acquired and went down to 7.2 dB at 1605 nm. Gain and noise figure behaviors were attributed to the gain competition due to the presence of the SRS, which was inadvertently amplified as well. The use of longer EDF length or careful selection of the pump wavelength can be considered to optimize the amplifier design.

Keyword: L-band; Amplifier; Pump wavelength; SRS; Gain competition; Gain flatness