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An efficient and low noise L-band erbium-doped fiber amplifier

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Long-wavelength band erbium-doped fiber amplifiers (L-band EDFAs) have recently been used to increase a transmission bandwidth as well as to reduce the four-wave mixing effect in dispersion-shifted fiber. In this paper, a highly efficient and low noise gain-clamped L-band EDFA is demonstrated using a ring laser in double-pass system. The broadband fiber Bragg grating (FBG) operating at L-band region is used to retro-pass the test signal into the system for enhanced gain. A short length of forward pumped EDF is incorporated in front of the double-pass amplifier to achieve a low noise figure. The gain clamping is achieved by routing the backward ASE into the feedback loop to create ring laser. The gain is clamped at 18.6 dB from -40 to -8 dBm with gain variation of less than ± 0.1 dB and a noise figure of less than 6 dB.