

High-gain erbium-doped fiber amplifier incorporating a double-pass amplification technique as a preamplifier

ABSTRACT

We present a high-gain erbium-doped fiber amplifier to be utilized as a preamplifier. A double-pass amplification technique is used in the first-stage amplifier together with a tunable bandpass filter. The secondstage amplifier is a counter-pumped configuration and another tunable bandpass filter is utilized to filter out amplified spontaneous emission from the first-stage amplifier. This design is able to produce a high gain of 55.6 dB and a noise figure of 6.02 dB at 1530 nm with a signal power of -45 dBm. The receiver sensitivity measurement shows that the proposed amplifier improves the minimum detectable power from -33.7 to -40.8 dBm for a bit-error rate of 10^{-11} at 155 Mbps.