Simultaneous four channel wavelength conversion of 50 Gbps CSRZ–DPSK signals in S and C bands using HNLF without additional pump signals

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Abstract   Optical wavelength conversion is expected to be an important technique for future advanced dense wavelength division multiplexing systems. It enhances wavelength routing capabilities, improves network reconfigurability and eliminating the problem associated with wavelength reuse in network. Here, simultaneous 50 Gbps four channel wavelength conversion is established in S and C bands of ITU grid using four wave mixing (FWM) technique in high nonlinear fiber (HNLF) without additional pump signals. Since the four channel wavelength conversion is to be performed, the frequency spacing between the pairs of signal in S and C bands should be maintained in order to avoid the signal degradation by the effect of higher order FWM. Thereby the best frequency spacing between the pairs of signals in S and C bands is estimated to maintain good BER over the wavelength converted signals of both bands. So the selected frequency spacing between the pairs fulfills the freedom of selecting any frequency spacing within a pair of wavelengths in S and C band signals. It is also shown that CSRZ–DPSK modulated input signal enhances the BER of wavelength converted signals over the RZ–DPSK. In addition to this, uniform wavelength conversion over a wide bandwidth with a reduced length of HNLF is achieved and also the best power range is estimated to obtain good conversion efficiency.

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