

Multi-Band Frequency Conversion Scheme with Multi-Phase Shift Based on Optical Frequency Comb

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Abstract : A simple operated, stable and compact multi-band frequency conversion and multi-phase shift is proposed to satisfy the demands of multi-band communication and radar phase array system. The dual polarization quadrature phase shift keying (DP-QPSK) modulator is employed to support the LO sideband and the optical frequency comb simultaneously. Meanwhile, the fiber is also used to introduce different phase shifts to different sidebands. The simulation result shows that by controlling the DC bias voltages and a C band microwave signal with frequency of 4.5 GHz can be simultaneously converted into other signals that cover from C band to K band with multiple phases. It also verifies that the multi-band and multi-phase frequency conversion system can be stably performed based on current manufacturing art and can well cope with the DC drifting. It should be noted that the phase shift of the converted signal also partly depends of the length of the optical fiber.

Keywords : microwave photonics, multi-band frequency conversion, multi-phase shift, conversion efficiency

Conference Title : ICOLS 2018 : International Conference on Optics, Lasers and Spectroscopy

Conference Location : Paris, France

Conference Dates : November 08-09, 2018