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Abstract
The UWB (ultra wide-band) bandpass filter has extensively been exploited as one of the key building blocks in the front of the RF (Radio Frequency) UWB system to improve signal quality. In this paper, based on the multi-mode resonance of the stepped-impedance resonator (SIR), the hybrid parallel-coupled microstrip line (PCML) and interdigitial structure, the performance of low insertion loss and wide passband can be exhibited.
The ultimate goal is to fabricate a 3.1-5 GHz bandpass filter and a 6-10.6 GHz bandpass filter on a FR4 (Glass-Epoxy Double Sided) substrate. The proposed filters not only reduce the fabrication cost but also show the good performance. The insertion loss of the 3.1-5GHz bandpass filter is smaller than -1.5 dB, and the fractional bandwidth (FBW) is 50%; and the insertion loss of the 6-10.6 GHz bandpass filter is less than -1.2dB, return loss is more than 15 dB, and the FBW is 66%. Moreover, with addition of the L-resonator bandstop filter, the selectivity of the designed filter can be further improved. Also, stepped impedance resonator (SIR) structure is used to reduce the filter size. Finally, by involving L-resonator and rejecting 5-6GHz band, a dual-band bandpass filter can be implemented in the 3.1-10.6 GHz Co-planar Waveguide (CPW) UWB bandpass filter. This structure is fabricated on a RO4003 substrate. Such a dual-band UWB bandpass filter can be integrated in UWB radio systems and efficiently enhances the interference immunity from WLAN.
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