

Improvement of Triple-Band Bandstop Filter Performances by using Parametric Analysis on Defected Ground Structure (DGS) and Mechanical Properties of Geopolymer Ceramic Reinforced Sn-0.7Cu

Abstract

In this paper, the parametric analysis of the configuration defected ground structure (DGS) for triple-band bandstop filter is proposed. The defected ground structures are used to improve the selectivity and S-parameters losses of the bandstop filter response. The rectangular-shaped DGS are added to the ground of the band stop filter. Initially, the DGS is applied to the first resonator (at 2.45 GHz) of the BSF. Several positions of the DGS are simulated to obtain the best S-parameters and selectivity performances. The same method is implemented on the second and third resonators of the BSF to obtain better performance in S-parameters and selectivity. Finally, all three resonators with the best DGS position are combined into one BSF to obtain triple-band BSF frequency response. This filter is designed by using Roger 4003C with relative dielectric constant, $\epsilon_r = 3.38$ and substrate thickness, $H = 0.508$ mm. The bandstop filter is modelled and simulated by using high frequency Electromagnetic Simulator (EM). Simulated result shows the insertion losses are, $S_{21} = -23.2$ dB (at 2.45 GHz), -16.7 dB (at 3.5 GHz) and -24.4 dB (at 5.2 GHz). The return losses are, $S_{11} = -0.49$ dB (at 2.45 GHz), -0.64 dB (at 3.5GHz), 0.49 dB (at 5.2 GHz). The results of different configurations of DGS is analysed and discussed.