NEW NARROW TO AVERAGE BAND-WIDTH DUAL-BAND PASSBAND FILTER DESIGN USING STEP-IMPEDANCE RESONATORES AND ZERO PHASE FEED STRUCTURE

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In this paper, some new configurations of the concurrent dual-band filter design are presented. Stepped impedance resonators (SIRs) are used to implement the dual-band characteristics of bandpass filters due to their tunable spurious response properties. The new filters have actually a new dual-band feature of two controllable passbands at desired frequencies, high out of band suppression as well as wide stop band region.It should be noted that the ratio of resonance frequencies depends on that of characteristics impedances of transmission lines (K) and they are briefly described as follows: f2/f1¡2 if K¿1 f2/f1=2 if K=1 f2/f1¿2 if K¡1

where f2 and f1 are the center frequencies of the second and first passbands respectively.The above essential conditions are utilized to design dual-band filters with different frequency ratios. Transmission zeros can be created by appropriate inter-coupled between resonatores,zero phase feed structure and somehow input and output cross-coupling. The new dual-band filter topologies save more than half the circuit size in comparison with those of the switch-type. They also have smaller size in comparison with former similar configurations with no input and output matching networks. Several dual-band passband filters with new topologies including Comb-line, Recrangular, Triangular and Circular Schemes adapted with different microwave circuits have been designed on RT-Duroid 6006 substrate and simulated by Ansoft Designer using the MOM. The result shows good agreement between theory and simulation and confirms the theory and new dual-band topologies to make dual-band filtes with narrow to average bandwidths, one strong transmission zero between the passbands and more tranmission zeroes on the upper and lower stopband regions.

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