

Abstract

The use of miniaturized dual-mode resonators to implement microwave bandpass filters with high selectivity is desirable in modern wireless communications. Recent development of the dual-mode filter is mainly based on ring or square structures. Significant filter size reduction is achieved by these dual-mode resonators, transmission zeros can also be easily introduced in the passband proximity to improve the filter selectivity. But this filter suffers from the problem of spurious responses and these responses could be even located near the passband.

As such, two novel dual-mode microstrip bandpass filter with meander open-loop arms and the dual-mode microstrip bandpass filter with hexagonal inner ring's meander open-loop arms are proposed to achieve size reduction and high selectivity simultaneously. Prototype filters' experimental characterizations show that at least 70% size reduction can be achieved when compared with the conventional ones. And the Q-factor is demonstrated to be over 100.

The analysis of the dual-mode bandpass filter spurious responses is also carried out, a simple suppression method by embedding the asymmetric open-loop arms is proposed. With this method, the 1st spurious response can be suppressed to ~ -26 dB and the filter compactness is also kept.