

## Improving the Frequency Response of a Circular Dual-Mode Resonator with a Reconfigurable Bandwidth

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**Abstract :** In this paper, a method for reconfiguring bandwidth in a circular dual-mode resonator is presented. The method concerns the optimized geometry of a structure that may be used to host the tuning elements, which are typically RF (Radio Frequency) switches. The tuning elements themselves, and their performance during tuning, are not the focus of this paper. The designed resonator is able to reconfigure its fractional bandwidth by adjusting the inter-coupling level between the degenerate modes, while at the same time improving its response by adjusting the external-coupling level and keeping the center frequency fixed. The inter-coupling level has been adjusted by changing the dimensions of the perturbation element, while the external-coupling level has been adjusted by changing one of the feeder dimensions. The design was arrived at via optimization. Agreeing simulation and measurement results of the designed and implemented filters showed good improvements in return loss values and the stability of the center frequency.

**Keywords :** dual-mode resonators, perturbation theory, reconfigurable filters, software defined radio, cognitive radio

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