Abstracts

New planar dual-mode filter using cross-slotted patch resonator for simultaneous size and loss reduction

L. Zhu, P.-M. Wecowski and K. Wu. "New planar dual-mode filter using cross-slotted patch resonator for simultaneous size and loss reduction." 1999 Transactions on Microwave Theory and Techniques 47.5 (May 1999 [T-MTT]): 650-654.

A class of new planar dual-mode filters are proposed and developed for hybrid and monolithic microwave and millimeter-wave integrated-circuit design. The novelty of the proposed structure is to use a pair of unequal crossed slots that are formed on a square patch resonator such that its radiation loss and structure size can be significantly reduced simultaneously. The physical background of the crossed slots on the patch resonator is explained. Our simulation results show that the proposed filter presents a number of attractive features for practical applications. It is found that the resonant frequency of a filter is reduced, e.g., by 36%, while its unloaded Q/sub 0/ is improved from 180 to 310 as the crossed slot length increases. The coupling characteristics of two degenerate modes backed by a resonator are studied with respect to unequal length of the crossed slots. A dual-mode filter is designed and fabricated with 1.6% bandwidth operating at 1.6 GHz to showcase our proposal. Measured results validate the design predictions well.

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