Abstracts

Constraints to the Optimum Performance and Bandwidth Limitations of Diplexers Employing Symmetric Three-Port Junctions

A. Morini and T. Rozzi. "Constraints to the Optimum Performance and Bandwidth Limitations of Diplexers Employing Symmetric Three-Port Junctions." 1996 Transactions on Microwave Theory and Techniques 44.2 (Feb. 1996 [T-MTT]): 242-248.

This work addresses the problem of the fundamental limitations to the optimum performance of diplexers employing three-port junctions and preassigned branching filters. In this situation it is a common misconception that optimum results are achieved by utilizing a good power divider closed by two good branching filters. From the properties of the S-matrix of a three-port junction, we show this not to be the case and derive a set of necessary conditions to be satisfied in order that the junction be successfully employed in the realization of diplexers. We derive explicit expressions for the positions at which the filters must be placed in the junction arms for optimum diplexer performance, resulting in considerable simplification of the difficult diplexer synthesis problem. A theorem on the maximum achievable bandwidth is proved and validated by means of two practical examples.

❑ Return to main document.