Abstracts

Wideband High-Selectivity Diplexers Utilizing Digital Elliptic Filters

Design techniques and element value tables are presented for the construction of compact high-selectivity diplexers using digital elliptic component filters. A brief review of an applicable diplexer theory is given and the derivation and use of the element value tables are discussed. The tables provide values for component filters with an even number of branches n for n=4 through n=12 with a prototype ripple value corresponding to maximum diplexer input VSWR of approximately 1.26 to 1. For n=8, 10, and 12 branch filters, additional tables with permuted transmission zero orders are given. Test results for an n=6 branch experimental diplexer of 2.25 to 1 bandwidth are presented. The design and construction of this diplexer is described in detail and serves to illustrate the use of the element value tables and design procedures presented. Many practical construction and alignment suggestions are given which are useful in obtaining designs with good response characteristics. The experimental diplexer has crossover frequencies at 1.5 and 3.4 GHz and provides greater than a 50 dB isolation at frequencies 0.2 GHz from crossover. The diplexer has an input VSWR <or= to, 1.5 to 1 from dc to 6.0 GHz, and has package dimensions of approximately 2.0 by 2.0 by 0.75 inches.

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