Abstracts

An Integrated T-Septum Waveguide Diplexer for Compact Front-End Applications

V.A. Labay and J. Bornemann. "An Integrated T-Septum Waveguide Diplexer for Compact Front-End Applications." 1993 MTT-S International Microwave Symposium Digest 93.1 (1993 Vol. I [MWSYM]): 463-466.

This paper introduces a new T-septum waveguide diplexer for compact integrated front-end applications in modern communication systems. The 8.74/10.14 GHz X-band design for four-percent channel bandwidths is one of the most compact waveguide diplexers ever presented. The size reduction is predominantly achieved by utilizing T-septum filter technology which reduces the dimensions of a typical waveguide filter by a factor of four to five. Moreover, a considerably improved stopband behavior towards higher frequencies is obtained. Together with a height-reduced waveguide E-plane T-junction, the overall diplexer dimensions are less than $(30mm)^3$. The computer-aided analysis and design are based on mode-matching techniques and optimization procedures, respectively. The channel filters are separately synthesized and fine-tuned by a final optimization to meet diplexer specifications. The design can be scaled to other waveguide bands. The theory is verified by measurements at the example of an X-band T-septum filter configuration.

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