Abstracts

Optimum Synthesis of Symmetrical Branch-Waveguide Directional Couplers

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An optimised synthesis procedure to design branch-waveguide directional couplers for satellite beam forming network applications is reported. This procedure allows to achieve a very significant improvement, particularly for the input reflection and isolation, also for couplers with few branches. A 5-branch 3 dB coupler, designed with the described method, has been manufactured in WR75 waveguide. Comparing scattering parameter measurements with the computed frequency performance shows that the synthesis procedure is verified very satisfactorily. Return loss and isolation values are 40 dB minimum on a 15% bandwidth. The computer package allows also to calculate the sensitivity of the electrical characteristics versus geometrical parameters and then enables to evaluate the tolerances required for the mechanical manufacturing. Moreover theoretical results of a 7-branch 3 dB coupler with wide frequency band (11.7-14.5 GHz) are presented.

❑ Return to main document.