Abstracts

Reducing losses in dielectric waveguide discontinuities

R. Elio and E.-B. El-Sharawy. "Reducing losses in dielectric waveguide discontinuities." 1998 Transactions on Microwave Theory and Techniques 46.8 (Aug. 1998 [T-MTT]): 1045-1054.

Rectangular dielectric waveguides are used in millimeter-wave applications. They have low loss and wide bandwidth at high frequencies. Another major advantage to dielectric waveguides is that they are inexpensive to design and manufacture. However, a major disadvantage to the dielectric waveguide is that they experience relatively high losses at bends and T-junctions. This paper looks at a novel approach in reducing the insertion loss in dielectric waveguide bends and T-junctions. A high dielectric material is inserted at the discontinuity, causing the electromagnetic energy to be coupled and launched toward the output. The dielectric constant of the material, position of the material, and shape of the material are instrumental in reducing the insertion loss. A transition discontinuity in the form of a 45/spl deg/ bend has also been found to reduce insertion loss when properly designed. The size, shape, and location of the discontinuity and the high dielectric material are optimized and compared to the results without a high dielectric material. The 90/spl deg/- and 45/spl deg/-bend simulations were verified by building test structures and comparing predictions of the insertion loss to measurements.

❑ Return to main document.