Abstracts

Microwave phase shift using ferrite-filled waveguide below cutoff (Dec. 1997, Part II [T-MTT])

C.R. Boyd. "Microwave phase shift using ferrite-filled waveguide below cutoff (Dec. 1997, Part II [T-MTT])." 1997 Transactions on Microwave Theory and Techniques 45.12 (Dec. 1997, Part II [T-MTT] (1997 Symposium Issue)): 2402-2407.

Unlike conventional waveguides, lossless ferrite-filled guides may exhibit a complex propagation factor below cutoff of the dominant TE mode when a transverse magnetic bias field is applied. In that case, the field in a very long waveguide has the character of a traveling wave whose amplitude decays exponentially with distance from the driven end. The wavelength and the magnitude of the applied bias field are inversely related, and at zero field as the gyromagnetic effects vanish in the ferrite the wavelength becomes infinite. For a bias field of one polarity, the traveling wave will be a forward wave, and for the opposite polarity it will be a backward wave. This peculiar behavior allows phase shift to be produced in a bandpass filter-like structure in which small cross-section below-cutoff ferrite waveguide sections alternate with sections of high dielectric constant material.

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