Abstracts

Circularly Polarized Microwave Cavity Filters

C.E. Nelson. "Circularly Polarized Microwave Cavity Filters." 1957 Transactions on Microwave Theory and Techniques 5.2 (Apr. 1957 [T-MTT]): 136-147.

A new group of circularly polarized microwave cavity filters is described. With a single circularly polarized cavity, a reflectionless filter is achieved that couples nearly 100 per cent of the energy from the main waveguide at the cavity resonant frequency. Two degenerate cavity modes may be excited, to produce a circularly polarized field, by coupling to the transverse and longitudinal waveguide magnetic fields or to the transverse electric and magnetic waveguide fields. A theoretical analysis is presented as well as experimental results. The loss between the band-pass terminals of the reflectionless circularly polarized filter is identical with the loss in a conventional reflectiontype band-pass filter with the same bandwidth and cavity-wall losses. The null at resonance between the band-elimination terminals of the reflectionless circularly polarized filter is limited only by the asymmetries of the cavity and not by the cavity-wall losses. Design equations and curves are given for eight of the lower order, circularly cylindrical, degenerate cavity modes that are coupled to a rectangular waveguide at the point of circularly polarized waveguide magnetic fields.

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