Abstracts

Millimeter Integrated Circuits Suspended in the E-Plane of Rectangular Waveguide

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Progress concerning a class of planar millimeter circuits is reported. The circuits are photoetched into one or more conductor layers and are suspended with or without dielectric layers, in the E-plane of one or more rectangular waveguides. The class includes the integrated fin line, the planar structure introduced by Konishi and a four-port printed-probe circuit. Such circuits feature standard waveguide flanges, printed-circuit economy, low insertion loss, wide single-mode bandwidth, and compatibility with low-parasitic hybrid devices. Furthermore, the equivalent dielectric constant can be close to unity, which is advantageous at millimeter wavelengths. The design and performance are reported of new E-plane millimeter components including a wide-band high-isolation low-loss SPST switch, a balanced mixer, an endfire antenna, and a four-port coupler applicable to planar channel-dropping networks. The versatility, performance, and construction features of the E-plane approach are relevant to advanced, highly integrated, millimeter systems.

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