Abstracts

Radiation Modes in Circular Patch Antennas

H. How and C. Vittoria. "Radiation Modes in Circular Patch Antennas." 1994 Transactions on Microwave Theory and Techniques 42.10 (Oct. 1994 [T-MTT]): 1939-1944.

We have formulated exact solutions of the normal modes in the microstrip patch antenna possessing circular geometry. The theory makes use of a new Green's function in conjunction with current potential analysis. The calculations demonstrate that the magnetic wall confinement boundary conditions as formulated in past theories hold approximately true if the surface wave loss is minimal compared to other losses: dielectric loss, conductor loss, and radiation loss. For practical path antennas the normal modes are not confined locally near the microstrip patch. Rather, they are composed of propagation surface waves which extend far beyond the region containing the patch antenna. We term these normal modes as leaky modes, since they resemble the leaky modes found in dielectric image guides. Measurements by us of the radiation mode frequencies and the intrinsic Q-values of the microstrip patch antennas compared very well with theory.

❑ Return to main document.