Abstracts

Complex resonance and radiation of hemispherical dielectric-resonator antenna with a concentric conductor

The probe-fed hemispherical dielectric-resonator antenna (DRA) with a concentric conductor is studied theoretically in this paper. Using the mode-matching method, the exact Green's functions for evaluation of the input impedance and radiation patterns are found, with the functions presented in computationally efficient forms. The moment method is used to determine the probe current and, hence, the input impedance as well as the radiation patterns. The results are verified by special cases available in the literature. In this paper, the effects of the conductor radius, dielectric constant, probe length, and probe displacement on the input impedance are investigated. The theory is very general and, by taking appropriate limits, can be used to study the solid DRA and the conductor-loaded wire antenna. To aid the DRA design engineer, the TE/sub 111/-mode characteristic equation of the DRA is also studied, from which the simple formulas for the resonant frequency and Q-factor are obtained.

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