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Dielectric Thickness Modulation Based Optically Transparent Leaky Wave Antenna Design

Authors : Waqar Ali Khan

Abstract : A leaky-wave antenna design is proposed which is based on the realization of a certain kind of surface impedance profile that allows the existence of a perturbed surface wave (fast wave) that radiates. The antenna is realized by using optically transparent material Plexiglas. Plexiglas behaves as a dielectric at radio frequencies and is transparent at optical frequencies. In order to have a ground plane for the microwave frequencies, metal strips are used parallel to the E field of the operating mode. The microwave wavelength chosen is large enough such that it does not resolve the metal strip ground plane and sees it to be a uniform ground plane. While, at optical frequencies, the metal strips do have some shadowing effect. However still, about 62% of optical power can be transmitted through the antenna.

Keywords : Plexiglass, surface-wave, optically transparent, metal strip
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