Abstracts

Aperture-coupled patch antenna on UC-PBG substrate

R. Coccioli, Fei-Ran Yang, Kuang-Ping Ma and T. Itoh. "Aperture-coupled patch antenna on UC-PBG substrate." 1999 Transactions on Microwave Theory and Techniques 47.11 (Nov. 1999 [T-MTT] (Mini-Special Issue on Electromagnetic Crystal Structures, Design, Synthesis, and Applications)): 2123-2130.

The recently developed uniplanar compact photonic bandgap (UC-PBG) substrate is successfully used to reduce surface-wave losses for an aperture-coupled fed patch antenna on a thick high dielectric-constant substrate. The surface-wave dispersion diagram of the UC-PBG substrate has been numerically computed for two different substrate thickness (25 and 50 mil) and found to have a complete stopband in the frequency range of 10.9-13.5 and 11.4-12.8 GHz, respectively. The thicker substrate is then used to enhance broadside gain of a patch antenna working in the stopband at 12 GHz. Computed results and measured data show that, due to effective surface-wave suppression, the antenna mounted on the UC-PBG substrate has over 3-dB higher gain in the broadside direction than the same antenna etched on a grounded dielectric slab with same thickness and dielectric constant. Cross-polarization level remains 13 dB down the co-polar component level for both E- and H-planes.

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