Abstracts

Miniaturized High-Temperature Superconductor Microstrip Patch Antenna

H. Chaloupka, N. Klein, M. Peiniger, H. Piel, A. Pischke and G. Splitt. "Miniaturized High-Temperature Superconductor Microstrip Patch Antenna." 1991 Transactions on Microwave Theory and Techniques 39.9 (Sep. 1991 [T-MTT] (Special Issue on Microwave Applications of Superconductivity)): 1513-1521.

This paper presents experimental as well as computational results for 2.4 GHz microstrip antennas which are miniaturized (total length, 6 mm) by both a, new, "stepped impedance" patch shape and a relatively high substrate permittivity. The investigated antennas were fabricated from YBa/sub 2/Cu/sub 3/O/sub 7-delta/ thin films epitaxially grown on single-crystalline LaAlO/sub 3/ substrates by pulsed excimer laser ablation or by high-pressure oxygen dc sputtering and, for comparison, from copper on the same substrate material. It is shown that the radiation efficiency of this antenna structure is only about 1% to 6% (depending on the substrate height) for copper at 77 K but is increased to values between 35% and 65% for HTS films. In the latter case, considerable improvements could be obtained if a substrate compatible with a high-temperature superconductor with a lower loss tangent were available. From experimental investigations of the power dependence of the antenna gain at 77 K nonlinearities, especially a sharp drop at a current density of about 2·10/sup 6/ A/cm/sub 2/ were observed.

❑ Return to main document.