High-*Tc* Superconducting Rectangular Microstrip Patch Covered with a Dielectric Layer

Sami BEDRA[1] and Tarek FORTAKI[2]

[1]Department of Industrial Engineering, University of Khenchela, 40004 Khenchela, Algeria
E-mail: s_bedra@yahoo.fr
[2]Electronics Department, University of Batna, 05000 Batna, Algeria

Abstract–*This paper presents a full-wave method to calculate the resonant characteristics of rectangular microstrip antenna with and without dielectric cover, to explain the difference of performance with temperature between superconducting and normal conducting antenna. Especially the characteristics of high temperature superconducting (HTS) antenna were almost ideal around the critical temperature (Tc). The dyadic Green's functions of the considered structure are efficiently determined in the vector Fourier transform domain. The effect of the superconductivity of the patch is taken into account using the concept of the complex resistive boundary condition. The computed results are found to be in good agreement with results obtained using other methods. Also, the effects of the superstrate on the resonant frequency and bandwidth of rectangular microstrip patch in a substrate–superstrate configuration are investigated. This type of configuration can be used for wider bandwidth by proper selection of superstrate thickness and its dielectric constants.*

Keywords

High-temperature superconducting antenna, substrate-superstrate configuration, resonant characteristics, critical temperature.