

Effect of Ionized Plasma Medium on the Radiation of a Rectangular Microstrip Antenna on Ferrite Substrate

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Abstract : This paper presents theoretical investigations on the radiation of rectangular microstrip antenna printed on a magnetized ferrite substrate $\text{Ni}_0.62\text{Co}_{0.02}\text{Fe}_{1.948}\text{O}_4$ in the presence of ionized plasma medium. The theoretical study of rectangular microstrip antenna in free space is carried out by applying the transmission line model combining with potential function techniques while hydrodynamic theory is used for its analysis in plasma medium. By taking the biased and unbiased ferrite cases, far-field radiation patterns in free space and plasma medium are obtained which in turn are applied in computing radiated power, directivity, quality factor and bandwidth of antenna. It is found that the presence of plasma medium affects the performance of rectangular microstrip antenna structure significantly.

Keywords : ferrite, microstrip antenna, plasma, radiation

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