

Admittance Characteristics of Open Slot Radiators

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The inclined slots cut in the narrow wall of a rectangular waveguide are commonly used for producing horizontally polarized waves. Moreover, slots of resonant length as radiating elements in the array are preferred in most of the applications. But it is not possible to accommodate the slots of resonant length in the narrow wall of standard X-band rectangular waveguide. Hence they are protruded into the broad wall and are analyzed by several Researchers. It is found from the literature and also from our investigations that the protruded pieces of slots into the broad wall lead to undesired polarized components.

In the view of the above facts, a slot of resonant length is accommodated in the present work by increasing only the narrow wall without disturbing broad wall dimensions. The analysis involves plane wave spectrum approach and the admittance characteristics of the slot are obtained. The resultant double integrals are evaluated numerically after testing for convergence.

The arrays of such slots are extremely useful for the design of planar arrays and if the inclination of the slots from broad side is made small, the horizontal polarization is found to be almost maintained.

For the design of large arrays, slots of low conductances are found to be desirable. The low conductances are obtained by controlling width, length, inclination of the slots. The narrow wall dimensions has become an additional parameter for the design of the Arrays in the present work. The admittance data presented is extremely useful for the design of both linear and planar arrays.