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INVESTIGATIONS ON ADMITTANCE CHARACTERISTICS OF S AND C BAND WAVE GUIDE H PLANE JUNCTIONS

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Abstract

H plane Tee junction couplers are formed by coupling a primary rectangular wave guide with a secondary rectangular waveguide through a slot in the narrow wall of a primary wave guide. The slot can be either in the longitudinal direction or inclined to the vertical axis, as the vertical slot does not radiate. The rectangular slot in the narrow wall of primary wave guide couples power from one wave guide to another wave guide, which can be used as a radiator with vertical polarization. A good amount of literature is available on infinitely thin slots. However, such slots cannot withstand in high power applications as there will be electrical break down. Such junctions are found to resonate and susceptance changes from positive to negative at resonant frequency. It is evident that resonant frequency is controlled by slot parameters and wave guide dimensions. In order to provide additional parameters to control resonant frequency, some investigations are carried to find the variation of admittance characteristics with frequency. From these variations, the resonant frequency is identified from the cross over point of susceptance. In the present work, the analysis is made to obtain admittance characteristics as a function of frequency for two H plane Tee junction wave guides with different dimensions. The results are numerically computed by varying the slot width and slot inclination. The concepts of self-reaction and discontinuity in modal currents of the main guide as well as Tee arm are used in the analysis .The shift/change in resonant frequency, coupling and VSWR for S-band and C-band H-plane Tee junctions are presented which are very much useful for the array designer.

Keywords: admittance, discontinuity in modal current, self -reaction, slot coupled junction

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