Abstracts

The Rotary Slot Attenuator

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A new precision waveguide attenuator is presented which is the dual of the rotary vane attenuator. The device consists of rectangular to circular waveguide transitions coupled to a section of circular waveguide containing a pair of longitudinal slots. The entire circular section may be rotated so as to couple varying amounts of microwave energy into external loads. The attenuation produced varies as 20 log Cos^2 theta where theta is angle of the slots with respect to the incident electric field. Since the absorbing material is external to the circular guide, this device is suitable for high power applications. The theoretical analysis is based on the equivalence of rectangular and circular waveguides insofar as slot coupling is concerned. The attenuation per unit length is derived and compared to the experimental results. A unit has been constructed which dissipates 10 KW average power and 100 KW peak power in the 2.6 - 3.95 GHz frequency band. The input VSWR was less than 1.15 through all values of attenuation and the insertion loss was less than 0.1 dB. The maximum value of attenuation was greater than 50 dB. Other units are described which were designed in the X- Band and Ku- Band frequency ranges.

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