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NASA TECH BRIEF

Quasi-Optical Equivalent of Waveguide Slide Screw Tuner

This millimeter wavelength tuner utilizes a metal plated dielectric grid inserted into the cross sectional plane of an oversized waveguide. The complete tuner provides both variable susceptance and variable longitudinal position along the waveguide to provide a wide matching range.

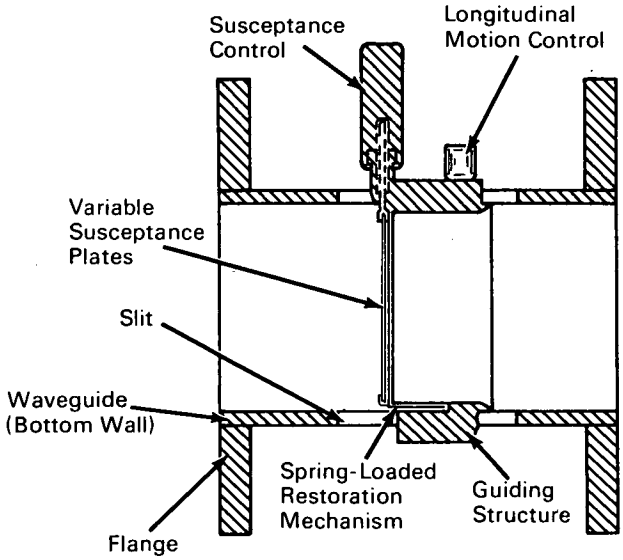
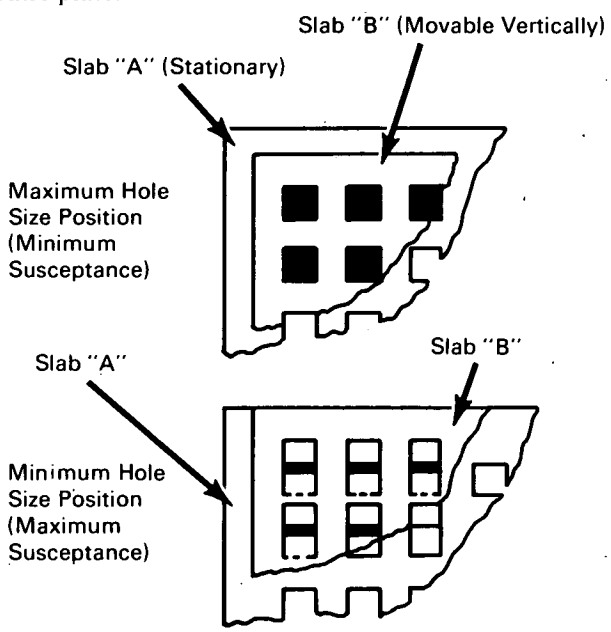


Figure 1. Side View of Tuner

Figure 1 shows a mechanical design which realizes a susceptance variable in value and position along an oversized waveguide. The variable susceptance consists of two thin dielectric slabs (quartz provides low dielectric constant and low loss tangent). One surface of each slab contains a deposited metal gridwork having an identical pattern of evenly spaced square (or rectangular) holes or horizontal and vertical metallic lines as shown in Figure 2. Both slabs have identical grid patterns and, when assembled, the metallic sides face each other but do not contact each other or the waveguide walls at any point on the metal surface.

One dielectric slab remains stationary while the other moves vertically, thus changing the composite geometric configurations from square to rectangular slits. This movement changes the susceptance value of the combined plates. Essentially, the grids effectively produce a variable metal-to-dielectric (area) ratio plate.



Note: Effective rectangular hole areas, produced by two overlapping slabs, are shown in black.

Figure 2. Susceptance Variation Principle

Note:

The following documentation may be obtained from:

Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.65)

Reference: NASA-CR-1453 (N70-11775).
Study of Quasi-Optical Circuit Techniques
in Varactor Multipliers

Patent status:

No patent action is contemplated by NASA.

Source: G.P. Kurpis of
Cutler-Hammer Airborne Instruments
Laboratory
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