Abstracts

Microwave Oven Mode Tuning by Slab Dielectric Loads

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Cold-test measurements have been made of mode tuning in a microwave oven cavity containing a slab water load of variable height. Two distinct types of mode behavior are observed: 1) a mode which is tuned generally upward in frequency, proceeding in sawtooth stew and 2) a mode whose resonant frequency is nearly constant, except for slight downward perturbations at regular intervals. Two theoretical treatments are presented to understand and verify the observed mode behavior. A plane wave analysis is found to illustrate most of the qualitative aspects of mode tuning, such as its stairstep behavior and the phenomenon of mode linking by loss. A more accurate, quantitative description of mode behavior is obtained by generalizing dispersion relationships which have been developed in the past for the analysis of rectangular waveguides with dielectric slabs. Agreement between theory and measurement is good in general except for light loads in case 2 above.

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