Abstracts

Silicon Waveguide Frequency Scanning Linear Array Antenna

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The design and experimental findings of a novel approach a relatively simple low-cost frequency-scanning milliter-wave antenna are described. The antenna consists of a silicon dielectric rectangular rod with periodic metallic stripe perturbations on one side. The feasibility of electronically scanning through a range of angles by varying the frequency fed into the silicon rod is shown. Calculations were made to determine the allowable physical size of the silicon rod in order to maintain a single fundamental mode of operation and the effect which size variations and perturbation spacing have on the angle of radiation and the range of angular scan for a given frequency shift. Efforts covered the frequency range 55-100 GHz with specific points of interest at 60, 70, and 94 GHz. The results of the experiments conducted are compared with the theoretical calculations.

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