# Experimental Investigation of the Beam-Scanning Capabilities of a Stub-Loaded Half-width Microstrip Leaky-Wave Antenna

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Microstrip leaky wave antennas find applications in such fields as radar and direction finding because of their wide bandwidth and low profile. For this class of antennas, the main beam direction typically changes with frequency. It is sometimes desirable, however, that the beam direction be held constant over a frequency range. It has been found that such beam control can be achieved by reactively loading the edge of microstrip leaky wave antennas; selective control of the beam can thus be obtained with the use of lumped capacitors. A problem that arises with the use of lumped capacitors is the difficulty in obtaining exact capacitance values. As such, a reactive loading method that utilizes etched elements as opposed to lumped capacitors in the form of the stub-loaded microstrip leaky wave antenna has been found to be feasible through simulations.

The proposed antenna has the advantage of easy fabrication and ease of modification since the stubs are simply cut off or replaced with thin copper strips to reconnect the resulting gaps. Additionally, lumped capacitors can be placed between the stubs and the microstrip to obtain lower capacitance values

In this paper, measurements of a fabricated stub loaded half-width center-fed leaky wave antenna are used to assess the extent to which the principle beam can be controlled. Two forms of measurements are carried out: 1) fixed frequency beam scanning measurements; and 2) constant angle frequency sweeping measurements. The angular range that can be spanned is to be investigated as the classic microstrip leaky wave antenna exhibits progressively poor performance away from broadside. The measurements will make use of stub combinations obtained for optimizations of simulations of the leaky wave antenna.