

PROGRESS REPORT
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BROADBAND ANTENNAS, FILTERS AND DETECTORS

Purpose: To determine the feasibility of developing a broadband system for the 50 mc to 40,000 mc frequency range.

Personnel: Electrical Engineers -

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Status: The low frequency cut off characteristics of the printed logarithmically periodic antenna of 0° angle for the 500 to 10,000 mc frequency range have been evaluated. Defining the cut off frequency as that frequency at which the response is 3 db down then at .85 of this cut off frequency the response is 9.5 db down. Our data indicated, however, that this fall off was not monotonic. The oscillations in the response curve in this region were caused by the change of impedance of the antenna below the cut off range and the position of the crystal holder which was separated from the antenna feed point by a length of coaxial line. The effect of the dielectric on this antenna has been reduced to what is considered a satisfactory amount by reducing the dielectric constant of the board the antenna is printed on and by choosing a thinner board. Detailed pattern data on this antenna will be included in the final engineering report.

The response characteristics of the antenna to be used in the 50 to 500 mc range have been evaluated. It was found that the response of the antenna was degraded considerably in certain frequency ranges when the antenna was in close proximity to a person. It is felt, however, that this difficulty can be overcome to some extent in the development phase of this program by optimizing antenna parameters

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- 2 -

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with this aim in mind. The response of this antenna was compared to that of a matched half wavelength dipole at 3 frequencies in the frequency range of the antenna. The comparison was favorable within the measuring accuracy and the assumptions that were necessary in the measurement and calculation of the response.

Future Plans: It has now been determined by the customer that the cut off characteristics of the antennas themselves will not be adequate. Therefore, the future effort will be devoted to investigating closely the size requirements for printed circuit band pass type filters. We will try to determine during the first two weeks of December whether it is necessary to devote a large amount of additional time to this filter feasibility effort.

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