

EXHIBIT A

The project proposes building a variety of low frequency transmitting antennas based on a nominal 50 foot mast and a number of top loading wires. The designs will be based on Navy work on VLF antennas that are scaled down. A 1962 Navy report by Devaney and others developed a base of antenna designs that several VLF antennas were scaled from and can be scaled to other frequencies. Mahmud prepared a Navy report which demonstrated the use of mathematical modeling with NEC that closely agreed with the Devaney work. The building of antennas below 500 kHz are a challenge because size limits the ability to build antennas of one half wave in size within a residential property.

The objective is to show simple antennas suitable for radio amateurs that can be constructed on a residential property. The objective antenna is a top loaded 50 foot mast. These antennas will be measured for base impedance which will be a basis for efficiency and from that a measure of EIRP.

This work will be used as a basis for a handbook to be used by radio amateurs to plan and evaluate their stations for LOW frequencies. Previous writings do not apply the work of Devaney, Mahmud and others at the Navy for these formidable challenges in design. The handbook will include information that can be used to try a variety of designs specifically tailored to a specific amateur's property to best meet that amateur's needs.

A radio amateur sized transmitter and a loading coil will be used along with the basic antenna structure to transmit test beacon signals that others can listen to as an example of this technology.

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