

EE 483/583 Antennas for Wireless Communications (Spring 2025)

Homework 9

Tuesday, April 1, 2025

Design an **optimum** (i.e., smallest possible) LPDA with a gain of **7.7 dBi** to cover the over-the-air television channels 2-6 in the very high frequency (VHF) low band. The LPDA is to be fed by a $75\ \Omega$ coaxial transmission line. Use booms with a 9/16 inch outer diameter and the available copper/brass tubing/pipes listed in the table given in the notes. The largest elements should have a 7/16 inch outer diameter. **Note:** Assume $c = 2.998 \times 10^8$ m/s.

- a) Tabulate design specifications.
- b) Show complete design procedure (e.g., design figures, spreadsheets, ...) in a fashion similar to the examples given in class.
- c) Make a **scale** drawing(s) of the final antenna design (i.e., show booms & transmission line) that a machinist could take and use to build the antenna. Use centimeters for all dimensions. Assume grounded boom will need to extend 38 cm past the longest elements to allow the LPDA to be attached to an antenna mast. Allow 1.6 cm past the shortest elements as well as past the longest element on the non-grounded boom for feed attachment and/or mechanical strength.

Due Monday, April 7, 2025