

**EE 483/583 Antennas for Wireless Communications (Spring 2024)**  
**Homework 9**  
**Thursday, March 21, 2024**

Design an optimum (i.e., smallest possible) LPDA with a gain of 7.5 dBi and input impedance of  $75 \Omega$  to cover the over-the-air television channels 14-51 in the ultra high frequency (UHF) band. Use booms with a 5/8 inch outer diameter and the available copper/brass tubing/pipes listed in the table given with the largest elements having a 1/2 inch outer diameter.

- a) Tabulate design specifications
- b) Show complete design procedure (e.g., design figures, spreadsheets, ...) in a fashion similar to 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 extend 40 cm past longest elements to allow the LPDA to be attached to an antenna mast. Allow 2 cm past the shortest elements and the longest element on the non-grounded boom for feed attachment and/or mechanical strength.

**Due Thursday, March 28, 2024**

**Note:** Assume  $c = 2.998 \times 10^8$  m/s.