

EE 483/583 Antennas for Wireless Communications (Spring 2022)

Homework 7

Monday, February 28, 2022

Design an optimum (i.e., smallest possible) LPDA with a gain of **7.5 dBi** and input impedance of **75 Ω** to cover the over-the-air television channels 7-13 in the upper very high frequency (VHF) band [AKA: VHF High Band/Band III]. Use booms with a **7/8 inch** outer diameter and the available copper/brass tubing/pipes listed in the table given.

- a) Tabulate design specifications
- b) Show complete design procedure (e.g., design figures, spreadsheets, ...) in a fashion similar to example given in class.
- c) Make a **scale** drawing(s) of the final antenna designed (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 60 cm past longest elements to allow the LPDA to be attached to an antenna mast. Allow 5 cm past the shortest elements and the longest element on the non-grounded boom for feed attachment and/or mechanical strength.

Note: Assume $c = 2.9979 \times 10^8$ m/s.

Due Monday, March 7, 2022.