

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

Laboratory 10

TV Station Information and Yagi-Uda Antenna Receiving Characteristics

Background (Thursday May 1, 2025 on EEP roof; backup day Friday May 2, 2025)

For this lab, you or your team will find some information about the local UHF television (TV) station for which your Yagi-Uda antenna was designed, built, and matched. Weather permitting, you will take selected measurements using the TV station as the far field source for your antenna.

UHF TV Station Information (Give sources for each answer. Hint: Use internet &/or FCC.)

- 1) Call sign (e.g., KELO) _____
- 2) Over-the-air transmit channel (e.g., 12, 28, ...) _____ & frequency range _____
- 3) Effective Radiated Power (ERP) _____
- 4) Location latitude _____ & longitude _____
- 5) Street address/location (e.g., Cowboy Hill, Skyline Dr., etcetera) _____

Antenna Measurements (use your antenna & power meter)

- 1) Maximum measured power received $P_{\max} =$ _____.
- 2) Polarization of received signal- Linear or Circular? (circle correct answer)
- 3) If linear polarization, Horizontal or Vertical? (circle correct answer)
- 4) With antenna oriented for P_{\max} , rotate antenna 90° about the boom, i.e., swap horizontal \leftrightarrow vertical polarization, and measure the received power $P_{\max,90^\circ} =$ _____.
- 5) Starting with antenna oriented for maximum received power, rotate yourself & antenna 180° , i.e., point opposite direction, and measured received power $P_{\text{back}} =$ _____.
- 6) Measure the maximum received power for the closest local UHF station NOT at your design frequency $P_{\max,\text{adj}} =$ _____.

Comments:

Antenna Parameters # elements = _____ $G_{\text{design}} =$ _____

- 1) Compute normalized received power (in dB), $P_{\text{norm}} = P_{\max} - G_{\text{design}} =$ _____.
- 2) Compute cross-polarization (in dB), $\text{CP} = -|P_{\max} - P_{\max,90^\circ}| =$ _____.
- 3) Compute front-to-back ratio (in dB), $\text{FB} = P_{\max} - P_{\text{back}} =$ _____.

Comments:

Due Friday May 2, 2025 at class or end of day.