

EE 483/583 Antennas for Wireless Communications

Spring 2024 Laboratory 5

TV Station Information and Yagi-Uda Antenna Receiving Characteristics

Name(s) _____

Background

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 (Hint: use internet)

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

Antenna Measurements (use your antenna and the power meter, set your channel, to find answers)

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

Antenna Parameters

- 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), $\text{FB} = p_{\max} - p_{\text{back}} =$ _____.

Due, along with your antenna, Friday April 26, 2024 by 2 pm at my office or department mailbox.