EE/CprE/SE/CYBE 492 BIWEEKLY REPORT 03

10/26/2022 - 11/08/2022
Group: 07
Project: Wireless Energy Harvesting
Client: Dr. Jiming Song
Team: Benjamin Brown, Christopher Marting, Greg Schmitt, Jacob Walczak, Sam Runkel, Tanner Garity

Biweekly Summary:
As a team we met with our advisor Dr. Song twice to discuss our current progress. We managed to get our wireless multimeter working via battery power with a replacement LED screen. We also used the network analyzer to measure our antenna's frequency and found it to be 3MHz instead of 2.4 so we're going to cut some lengths of wire.

Bi-Weekly Accomplishments:
Benjamin Brown - Met with the team to do more testing with our Yagi Uda antenna and the multimeter.

Christopher Marting - Met with team to do more yagi uda testing. Met with EE 414 TA to use the network analyzer to test our antennas frequency.

Sam Runkel - Researched alternative displays to get our multimeter functioning. Met with the team to do more testing with our yagi and our new multimeter. Met with a TA in the antenna lab to utilize the network analyzer and measure our antenna. Completed construction of 2 helical antennas.

Jacob Walczak - Met with the team to do testing with the Yagi-Uda antenna and the Arduino based multimeter. Met with the EE 414 T.A. to use the network analyzer and test the antenna. Unfortunately the S-parameters read from the analyzer showed that our antenna was calibrated at around 3.0 GHz, not the 2.4 GHz frequency we were aiming for. Sam took the antenna home over break to recut the wires of the antenna. I also started looking at examples of the poster for the final presentation and started working on it.

Tanner Garity- Polished the simulations for the theoretical EM harvester and signal generator. I also conducted brief research on the MATLAB Arduino implementation.

Greg Schmitt - Met with team to perform testing on antenna with various methods. Tests included: bypassing the antenna and connecting the PLUTO radio directly to the power converter, determining the total source power possible, measuring converted voltage from a microwave oven source, as well as measuring voltage from the PLUTO transmitter source. The voltage readings from the hardwired radio showed a 7-20 mV value but in contrast, the RF

transmitted voltage values were mostly unreadable, and at best showed 3 mV at times. After seeing results from the network analyser, these results can be explained by the effective frequency of the receiver antenna is slightly out of spec, lowering efficiency.

Plans for upcoming week:

- Recut antenna wires and construct new antenna
- Test new antenna with network analyzer
- Work on final documentation, presentation and poster

Individual contributions:

Name	Individual Contributions	Hours this week	Hours cumulative
Benjamin	● 2 Advisor meetings - 1hr ● 2 Team meetings - 4hr	5	46
Jacob Walczak	● Advisor Meeting - 1hr ● Team meetings for testing - 2hrs ● Meeting with T.A. to use Network Analyzer - 0.5 hrs ● Working on poster - 1 hr	4.5	43
Greg Schmitt	● Advisor meeting - 0.5 hr ● Team meeting for testing - 3 hr	3.5	46
Christopher Marting	● Advisor Meeting - 1hr ● Team meetings for testing - 3hrs ● Meeting with T.A. to use Network Analyzer - 0.5 hrs ●	4.5	59.5
Sam Runkel	● Advisor Meetings - 1hr ● Team meetings for testing - 4hrs ● OLED and LCD troubleshooting, wiring and coding - 3 hrs ● Network Analyzer testing - 0.5 hrs ● Helical antenna final 3D printing and construction - 2 hrs	10.5	63.5
Tanner Garity	● EM Harvester Sim - 1 hr	2	49

Name	Individual Contributions	Hours this week	Hours cumulative
	• MATLAB Research - 1 hr		