EE/CPRE/SE 492 BI-WEEKLY REPORT 6

Introduction

Date: 11/22/2019
Group Number: 21
Project Title: Battery-less IoT Devices
Advisor: Dr. Henry Duwe
Clients: Dr. Nathan Neihart, Dr. Daji Qiao

Team Members:

Derek Nash – *Meeting Scribe, Power Systems Engineer, Test Engineer*

Matt Goetzman – *RF Systems Engineer, Test Engineer*

Mohamed Gesalla - *RF Systems Engineer, Test Engineer*

Adithya Basnayake – *Report Manager, Power Systems Engineer, Test Engineer*

Mohammed-Al-Mukhaini – *Meeting Facilitator, Embedded Systems Engineer, Test Engineer*

Bradley Rhein – *Embedded Systems Engineer, Test Engineer*

Past Week Accomplishments

This week we integrated the parts from all the 3 teams to one prototype to test the final product functionality. We also performed tests as a group on power harvested, voltage regulator stability, and optimum conditions for the circuit overall.

RF and Antenna Team

This week we worked on more circuit analysis and power analysis of the rectifier as well as researching parts for future designs. We realize that most of the work we do now will not be used on our project but be helpful for next iterations of the design by teams in future semesters.

Power Circuit Team

Incorporated a linear voltage regulator into the design, which would reduce efficiency but greatly increase stability. Also, we included a Schottky diode on the output of the CW rectifier going to the cap bank; this

would keep the stored charges in the CW from collapsing on themselves when the WiFi router wasn't transmitting (intermittency problem).

Pending issues

Whole team needs to collaborate on the poster and final document.

Power Circuit Team

- Build cap bank board and linear voltage reg board
- Cut acrylic board for final model
- Complete testing

Embedded Systems Team

- Prepare a system for the router to yield steady transceiving
- Prepare second body of code for constant operation of MSP430

Individual Contributions

Team Member	Contribution	Weekly Hours
Derek Nash	Designed a linear voltage regulator, designed a 5-stage CW with ground plane, helped with testing, and learned how to use the school's laser cutter in preparation for final model.	20
Matt Goetzman	Participated in multiple tests of the circuit. Researched higher quality RF components for use in future designs.	8
Mohamed Gesalla	Helped with testing the final circuit	12
Adithya Basnayake	Tested the final prototype and researched ways into improving the efficiency of the voltage regulator.	15
Mohammed-Al-Mukhaini	Tested the final design of our prototype to obtain measurements that would help us problem solve our design. Optimized the msp430 code to obtaining temperature readings that suit our power rate consumptions. Design our end product using solidworks	17

Bradley Rhein	Tested the final design of our prototype to obtain measurements that would help us problem solve our design. Optimized the msp430 code to obtaining temperature readings that suit our power rate consumptions	15

Plans for the upcoming week

The RF team plans on ordering a few test parts. These components are higher quality RF components and be more useful for characterizing for 2.4GHz.

Summary of Weekly Advisor Meeting

We met with Dr. Duwe to show the final design prototype. There were a few issues so we tested the prototype in his lab and managed to gain some insight on how to make the next design better.