Lab 1: Reading and Writing RFID Tags

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1 Goal
The student will further develop concepts learned in the modules by reading and writing data on a tag and experimenting with tag orientation.

2 Assessment
A student should:

- Be able to read and write data on a tag
- Know that tag orientation affects read range

3 Equipment
- Reader with antenna, preferable a linear polarized antenna such as a patch antenna
- Antenna stand
- Tag stand
- Several tags
- PC to communicate with reader

4 Software
- Reader software

5 Prelab

5.1 Preparation
- Read the TagSense Help File for the reader available at the class website
- Review the TagSense documentation for the reader available at the class website
- Review the Gen2 specification

5.2 Prelab Questions
- Answer the Prelab Questions at the end of this document and turn them in before the lab.
6 Experiments

6.1 Experiment 1: Reading/Writing a Tag

6.1.1 Configuration
- Place a tag near the antenna of the reader and start the program that controls the reader.

6.1.2 Exercise
- Read and record the EPC and TID model numbers of three tags.
  - EPC1 in hex: _________________________________________________________________
  - TID1 in hex:  _________________________________________________________________
  - EPC1 in hex: _________________________________________________________________
  - TID1 in hex:  _________________________________________________________________
- Rewrite/Change a tag’s EPC number. Record the EPC number below and show one of the instructors.
  - EPC in hex: __________________________________________________________________
- Determine and record the default Q value of the reader.
  ___________________________________
- Determine the reader session that is being used by the reader.
  ___________________________________

6.2 Experiment 2: Tag orientation

6.2.1 Exercise
- Use a tag that is easy to determine the antenna polarization. A tag that is long and thin will tend to have a more vertically polarized signal when the tag is oriented so that the longer measurement is up and down.
- Determine the best tag orientation for the maximum read range. Describe it. Is the antenna pattern vertical or horizontal?

- Determine the best tag orientation for the minimum read range. Describe it. Is the antenna pattern vertical or horizontal?
6.3 Experiment 3: Password

6.3.1 Exercise

- Find a tag in which you can read the password.
  
  - Write down the password. ________________________________
  
  - How many bits is the password? ________________________________
7 Checklist
   o Turn in answers to Prelab.
   o Turn in answers to Experiments.
   o Complete and turn in Feedback sheet.
   o Notify instructor lab is complete.
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Feedback

- Complete this form after completing the lab exercises and turn it in to the instructor.
- **Do not put your name on the form** and keep it separate from the lab report.

- What did you like about the lab?

- What did you dislike about the lab?

- Make a suggestion on how to improve the lab.
Lab 1 Prelab Questions

16 pts.

Answer the following questions and turn them in **before** the lab.

1. Describe the main mistake that can damage a reader. (2 pts.)

2. How many bits are in the EPC of Gen2? (2 pts.)

3. How many bits are in the TID of Gen2? (2 pts.)

4. What is the suggested default Q value that is listed in the Gen2 specification? (2 pts.)

5. How many sessions does Gen2 define? Describe each of them. (8 pts.)