In Lecture 10 we learned that wireless devices can work with a simple transmitter and receiver system, where the receiver listens for a pre-determined and pre-programmed signal from a transmitter.

Among your lab equipment is a wireless doorbell. For this homework assignment you will only need the transmitter (the push button). Your task is to simply determine the sequence of symbols transmitted from your doorbell transmitter.

Step 1: Determine the operation frequency of the device ***[0.5 pts]***

1. Place the battery in the transmitter
2. Place the transmitter next to the antenna of the HackRF and push the button
3. Use the spectrum analyser app, URH, SDR#, your spectrum analyser from Homework 1 or some other GNU script to capture the signal emitted and find the operation frequency of the device (or some other useful tool that you discovered/saw in DragonOS – mention the name please)
4. Take a screenshot of the captured signal
    - This should ideally show the tool that was used to capture the signal. If not, mention the name

Step 2: Capture the signal ***[1 pts]***

1. Use one of the tools mentioned in the lab manual/lecture to capture the signal and store it in a file.
    - State which tool was used (i.e. the command or upload the (gnu) script that was used)

Step 3: Determine the symbol sequence of the transmitted signal ***[1.5 pts]***

1. Open the file in Audacity or URH (or some other tool that you have discovered)
    - Remember to use the correct import settings
2. Take a screenshot of the signal in Audacity/URH
3. Find the number of symbols in the transmitted signal
4. Write down the pattern of symbols e.g. 1 0 1 0 or A B A B

You can use the supplied homework sheets to submit your answers/screenshots

Bonus [2pt]

The file thermometer_433_92MHz-2MSps-2MHz.complex16s contains a temperature and humidity reading from a device using the Nexus-TH protocol. What is the 36 symbol pattern and the temperature and humidity value encoded in the signal?

Due Date: Check Moodle for date
Late Submission Deadline: Check Moodle for date (usually 1 week after due date)
Submission Files:

- a file with the answers and screenshots (or the screenshots as image files)
- any gnu scripts if used and
- the file containing the captured signal (compressed e.g. `file.zip`)

Location: Moodle Homework10 link