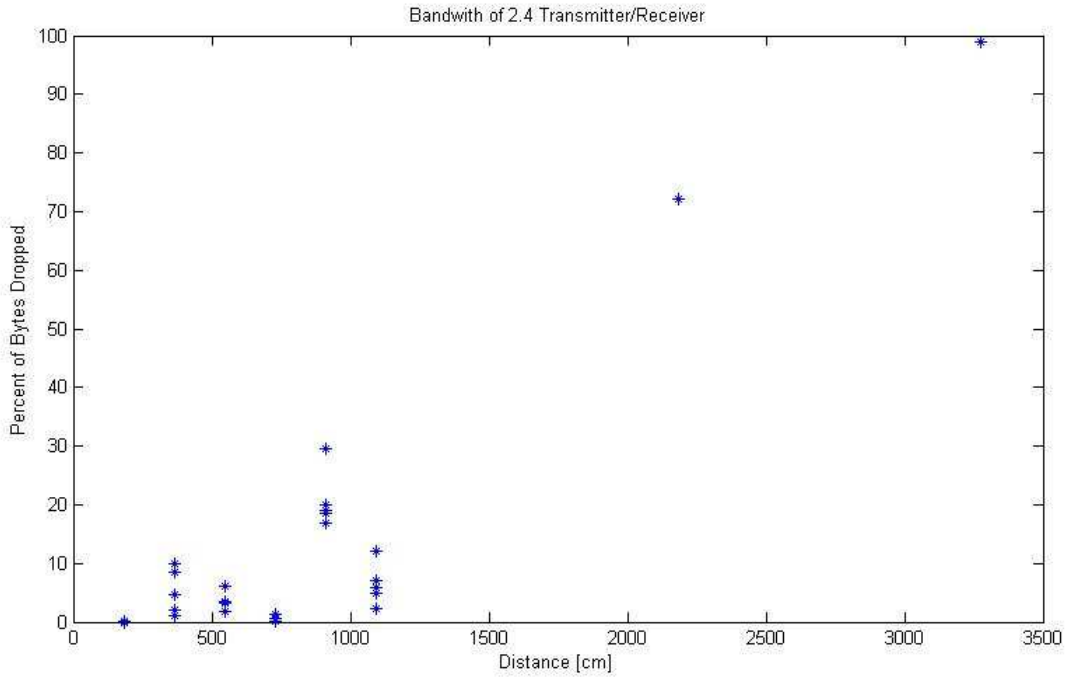
Conrad Holda
Jasmine Zhao
April 5, 2016

Lab 1

The goal of this lab is to test wireless communication between two red boards and approximating bandwidth and dropped packet rate.

RFChat is modified to be able to transmit bytes over radio as fast as possible for five seconds and count how many bytes were sent, and to count the number of bytes received since the last time this count was requested. To make the board transmit data and display the number of bytes sent after 5 seconds, send the board serial message ‘t’. To get the count of how many bytes the board received, send the board serial message ‘r’ (the counter resets to 0 after each ‘r’ command).

Bandwidth is measured by multiplying the number of bytes sent by 8 and then dividing by 5 (number of seconds RFChat sends data). Packets are dropped if the number of bytes received is less than the number of bytes sent. Dropped packet rate is this difference divided by number of bytes sent. This is measured with different distances between the two boards. The following is a graph of our results.



Bandwidth = 24.533 kbps

Success of data transfer stays relatively constant for a good distance but starts dropping considerably as can be seen on the plot. Data can be sent as fast in both directions but if sent

simultaneously, packets will be continuously dropped because they cannot transmit and receive data at the same time.

Problems were encountered modifying RFChat to accurately measure bandwidth and dropped packet rate. For example, initially it was changed to print to the serial monitor every time a byte has been received, but that resulted in a lot of dropped packets resulting in a high dropped packet rate. There was also difficulty measuring the distance at which the the communication is no longer reliable. The experiment was conducted in the library where large distances were difficult to accurately measure, so distances were estimated.