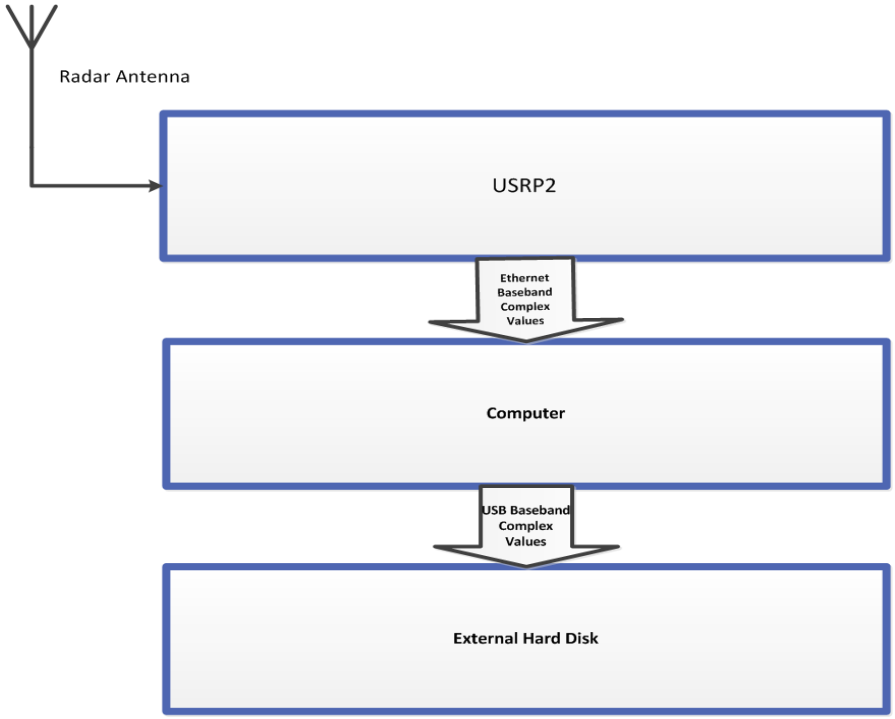
Description:

Recording Information:

The data in these folders was recorded in room 433 of Sieg Hall at the University of Washington. The data was obtained using a radar antenna, a USRP, a laptop and a two gigabyte external hard-drive. Below is the system diagram for this setup.



The data was recorded at four different times and at six separate channels. It was sampled at a rate of 16.66 MS/s which gives a channel width of 16.66MHz. The data was in complex form from the I and Q channels. This larger bandwidth was later cut in half to yield 8.33333 MHz channels.

Time	Date/Time
Time 1	20 Dec 2011, 15:00
Time 2	21 Dec 2011, 00:01
Time 3	21 Dec 2011, 07:00
Time 4	21 Dec 2011, 12:00

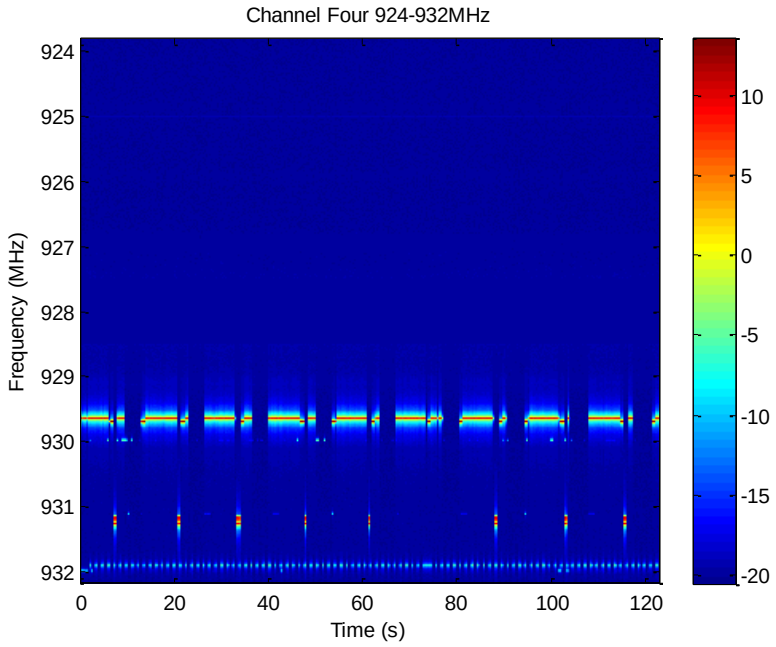
Channel	Frequency Range
Channel 1	899.8333333-908.16666666
Channel 2	907.8333333-916.16666666
Channel 3	915.8333333-924.16666666
Channel 4	923.8333333-932.16666666
Channel 5	931.8333333-940.16666666
Channel 6	939.8333333-948.16666666

Processing:

The data was processed by averaging 1200, 832 point FFTs. The data was then inverted to compensate for the USRP's frequency characteristics. The data was also filter for harmonics which showed up at 1Mhz increments. There was also a DC offset at the center frequency which was clipped to the estimated noise floor. There are a total of six .mat files for each recording time which contain a 2000x416 matrix. Each row of this matrix is an averaged 416 point FFT processed using the above proceedures. Each element of the matrix is a value representing the power at that time and bin. The power is a scaled version of the watt. The USRP is un-calibrated so the exact power is unknown. There are 2000 total rows which represent 2000 total time sweeps. The time between each row is .0599 seconds. The characteristics of the processed data is summarized below.

Property	Value
B/W per channel	8.33333333MHz
Channels per recording time	6
Total recording times	4
Total files	24
Time between rows of the matrix	0.0599 seconds
Total time per channel	119.81 seconds
Total time sweeps	2000
FFT size	416
Noise Floor	1.047E-5
Frequency Per Bin	20KHz

Sending a 2000x416 matrix to the Matlab imagesc function yields a plot like the one below.



The above graph shows the variation in frequency of the channel as time progresses.

Pij Calculation:

There are four total .mat files per recording time which represent Pij calculation tables. Pij is the probability that the channel i subchannel j is occupied. The tables are MxN where M is the number of channels and N is the number of subchannels.

There are four total files where Pij was calculated using 20KHz and 200KHz subchannels and at 4 and 8 MHz channel widths. An example of a use would be if you wanted to know the probability of occupancy of channel 4 subchannel 350 call the variable as follows:

```
EDU>> Pij20at8MHZ(4, 350)


ans =


    0.1065
```

This means that this subchannel has an 11% probability of occupancy. This data is for 15:00 so this is the probability at this time.

File Listing:

Below are the is the list of files with a short description:

File Name	Decription
Seattle TVWS Recording Detail v2.pdf	Description of recordings
Dec 20 at 1500 Processed FFT 416	December 20 1500 file directory
ch1b1500.mat	Channel one 2000x416 matrix
ch2b1500.mat	Channel two 2000x416 matrix
ch3b1500.mat	Channel three 2000x416 matrix
ch4b1500.mat	Channel four 2000x416 matrix
ch5b1500.mat	Channel five 2000x416 matrix
ch6b1500.mat	Channel six 2000x416 matrix
Pij20at4MHz.mat	Pij for 4 MHz channel 20 KHz subchannels
Pij20at8MHz.mat	Pij for 8 MHz channel 20 KHz subchannels
Pij200at4MHz.mat	Pij for 4 MHz channel 200 KHz subchannels
Pij200at8MHz.mat	Pij for 8 MHz channel 200 KHz subchannels
Dec 21 at 0001 Processed FFT 416	December 20 1500 file directory
ch1b0001.mat	Channel one 2000x416 matrix
ch2b0001.mat	Channel two 2000x416 matrix
ch3b0001.mat	Channel three 2000x416 matrix
ch4b0001.mat	Channel four 2000x416 matrix
ch5b0001.mat	Channel five 2000x416 matrix
ch6b0001.mat	Channel six 2000x416 matrix

Pij20at4MHZ0001.mat	Pij for 4 MHz channel 20 KHz subchannels
Pij20at8MHZ0001.mat	Pij for 8 MHz channel 20 KHz subchannels
Pij200at4MHZ0001.mat	Pij for 4 MHz channel 200 KHz subchannels
Pij200at8MHZ0001.mat	Pij for 8 MHz channel 200 KHz subchannels
Dec 21 at 0700 Processed FFT 416	December 20 1500 file directory
ch1b0700.mat	Channel one 2000x416 matrix
ch2b0700.mat	Channel two 2000x416 matrix
ch3b0700.mat	Channel three 2000x416 matrix
ch4b0700.mat	Channel four 2000x416 matrix
ch5b0700.mat	Channel five 2000x416 matrix
ch6b0700.mat	Channel six 2000x416 matrix
Pij20at4MHZ0700.mat	Pij for 4 MHz channel 20 KHz subchannels
Pij20at8MHZ0700.mat	Pij for 8 MHz channel 20 KHz subchannels
Pij200at4MHZ0700.mat	Pij for 4 MHz channel 200 KHz subchannels
Pij200at8MHZ0700.mat	Pij for 8 MHz channel 200 KHz subchannels
Dec 21 at 1200 Processed FFT 416	December 20 1500 file directory
ch1b1200.mat	Channel one 2000x416 matrix
ch2b1200.mat	Channel two 2000x416 matrix
ch3b1200.mat	Channel three 2000x416 matrix
ch4b1200.mat	Channel four 2000x416 matrix
ch5b1200.mat	Channel five 2000x416 matrix
ch6b1200.mat	Channel six 2000x416 matrix
Pij20at4MHZ1200.mat	Pij for 4 MHz channel 20 KHz subchannels
Pij20at8MHZ1200.mat	Pij for 8 MHz channel 20 KHz subchannels
Pij200at4MHZ1200.mat	Pij for 4 MHz channel 200 KHz subchannels
Pij200at8MHZ1200.mat	Pij for 8 MHz channel 200 KHz subchannels