TV Band Research Objective

We would like to obtain a license to transmit wireless signals over unoccupied TV white space bands (400 MHz to 700MHz). We are a research group at Princeton University and the objective of our research is multi-fold. First, we would like to understand the propagation and penetration characteristics of TV white space bands versus 2.4 and 5GHz ISM bands. Second, we would like to come up with new applications that can potentially benefit from white space bands or re-design current applications such as video to work in TV white space bands while taking into account temporal and spatial characteristics of these bands. Finally, we would like to design and test optimal spectrum sharing algorithms for TV white space bands.

We have already purchased a white space transmitter from Volo wireless LLC. The radio can transmit UHF signals (from 400 to 700 MHz) with output power of maximum 15 dBm. The radios are carefully designed such that the leakage to adjacent channels is according to FCC specifications (i.e., interference to adjacent channels is lower than the limit specified by FCC). The purpose of our measurements would be to understand a single link throughput as a function of receiver location and repeat the same experiment for 2.4 and 5GHz bands.

Our transmitter would be located at one of the buildings inside Princeton University. According to Telecordia white-space database, the coordinate is (40.35039, -74.65113). The receiver would be at most 500 meters away from the transmitter. Currently, according to Telecordia database, UHF channels 48 and 49 are available. Our experiments consist of 1 minute throughput measurements for available (free) white-space channels. We will continuously check with the Telecordia database prior to any transmission.

Our research will significantly contribute to our understanding of TV white space bands and utilization of this spectrum. Currently there is a big gap in designing applications that can work in TV white space bands due to the poor understanding of the characteristics of these bands. Once we have a clear understanding of TV band characteristics, we will design new applications that can benefit from TV bands or re-design current applications such as video to work in TV bands. Further, we will develop optimal spectrum sharing mechanisms. The understanding that we get from our academic experiments will let us bridge the gap between theory and practice and at the same time we will be able to contribute to the TV white space research community.