

a. The complete program of research and experimentation proposed including description of equipment and theory of operation.

A non-line-of-site digital network in the 700 MHz frequency band will be tested in various terrain and vegetation conditions using a fixed station on a ridge that is approximately 15 miles distant from a community where both mobile and temporary fixed stations will be deployed. Ubiquiti XR7 mini-PCI radio cards and associated computers, operating OFDM modulation using the narrowest supported bandwidth (5 MHz) will be tested to determine the performance of the 700 MHz band for this application. Other experiments will simultaneously be conducted on amateur radio frequencies in the 900 MHz and 3.4 GHz bands.

b. The specific objectives sought to be accomplished.

To determine the real-world performance of the 700 MHz band for deploying ad-hoc digital networks of both hub-and-spoke and mesh configuration in extreme non-line-of-sight conditions. The test community has a wide variety of vegetation, including redwood forest, and steep terrain. The results of this experiment will contribute to the future development of rapidly-deployable public safety networks for disaster situations.

c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated.

The noise floor on the 902-928 MHz band makes it impractical to directly compare the performance of high UHF frequencies with SHF frequencies effectively. Using the 700 MHz band provides an effective comparison with the 3.4 GHz band for non-line-of-sight performance. The 700 MHz band is also a planned future band for public safety operations, so the results will be directly applicable.