Attachment A – Background Information, Response to Item 7 Questions & Requested for Extended License Term

This application has its roots in Experimental License WI2XPQ (expired) but goes beyond those experiments. That license allowed the Applicant, Carnegie Mellon University ("CMU") to participate in the Naval Post-Graduate School's Joint Interagency Field Experimentation ("JIFX"), sometimes referred to as "Naval Postgraduate School Field Experimentation ('NPS-FX')." Information about the experimentation is available online at https://my.nps.edu/web/fx. These events are generally held at Camp Roberts, Highway 101, Camp Roberts, CA 93451-5000. CMU has been, and will continue to be, an active participant in JFIX exercises, as well as certain experiments for the U.S. Department of Agriculture ("USDA").

JFIX

JIFX enables a diverse group of academics, government labs, private industry, end users, and others to come together to develop and refine new technologies in a field environment. The results advance both the science of radio engineering and national defense. At times, emergency first responders also participate. Due to the sponsorship of the Army and Navy and the relationship of JFIX to military effectiveness and national defense, the exact nature of the experiments and exercises are generally treated as confidential and not disclosed beyond the sponsors and, as appropriate, the participants. As permitted by the Army and the Navy and upon reasonable request by the Commission, CMU would disclose information to the Commission on a confidential basis. This information would include: a) The complete program of research and experimentation proposed, including description of equipment and theory of operation; b) The specific objectives sought to be accomplished and 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 a line not already investigated.

USDA

In addition, CMU has been approached by the USDA to participate in similar radio technology research throughout the state of California. CMU believes that this additional research, the results of which can generally be disseminated, can and will provide further benefits the public interest. Therefore, in this application, CMU is seeking permission to extend the license footprint throughout California, although CMU expects much of the experiments will be carried out in rural parts of the state.

CMU conducts many of its "on-location" experiments from its mobile RF laboratory (a retrofitted EMT rescue vehicle, length 7 meters, height 2.7 meters) with an extendable antenna mast (16 meters maximum from the top of the mast to the bottom of the tires) illustration filed previously. This vehicle will be deployed at Camp Roberts and around the rest of the state. Accordingly, it is impossible to provide exact details requested in the questions about antenna height except at Camp Roberts.[1] Other experiments will be conducted with mobile transmitters

[1] CMU's application includes antenna height location for Camp Roberts and is the same as that which was approved as part of WI2XPQ.

outside the mobile lab.[2] When operating in locations within 805 meters of a covered airport, CMU will make any notifications to the Federal Aviation Administration ("FAA") as explained in Section 17.7 of the Commission's rules, 47 C.F.R. § 17.7.

Since the JFIX and USDA-related experiments will be ongoing,[3] CMU requests that it be granted an experimental license for the maximum period of five years. Section 5.71(a), 47 C.F.R. § 5.71(a).

Also, CMU is seeking approval of this application to continue its work with remote sensing using radio technology and CMU-created sensing platforms. For example, CMU uses 3D printers to create a protective frame to hold sensors and radios. CMU has created sensors that measure changes in intermittent stream depth and water flow volumes and speed. These are placed in streambeds and monitored remotely. Similarly, CMU has created sensors that measure traffic volumes and speeds. These are sometimes embedded in freeway entrance or exit ramps. The goal is to develop long-lasting, battery-powered devices that are embedded in a single location for as long as five years.

Therefore, a single experiment in one location could last five years if the batteries survive. One of the experimental goals is to minimize battery use through efficient sensing and radio transmission. With a shorter license term, the devices would need to be removed mid-test and the research goal frustrated

Such a grant would allow more CMU resources to be spent on research, rather than on license renewals. Further, CMU has a good compliance record with Commission rules, such that a longer license term does not increase the risk of harmful interference.

If requested, the stop buzzer contact for this project is:

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[2] CMU's use of directional antennas will be in compliance with Part 15, Subpart C of the FCC's rules.

3 For example, JFIX events are held quarterly.