

Explanation of Need for Radio Spectrum

Background:

Raytheon Missile Systems (Raytheon) has been experimenting with the development of Unmanned Aircraft Systems (UAS) for some time. Those experiments were accomplished in the past under government contracts, and for Raytheon technology development. The radio frequency use requested here was previously authorized under an Army frequency assignment, which recently expired. In the summer of 2011, Raytheon sought to renew its federal frequency assignments to use 225 to 230 MHz channels for command and control of the UASs in flight. The renewal request was denied, because this program was between contracts. The research program, now funded internally by Raytheon, must continue, and the frequencies that are the subject of this application are required for the UASs to fly safely. As soon as the frequency assignment renewal issue arose, Raytheon sought temporary authorization for the use of the 225-230 MHz frequencies from the FCC. That authorization was granted; the STA call sign is WF9XDC. Because Raytheon does not yet have a new military contract in place, it might not be able to secure new frequency assignments prior to the expiration of the temporary authorization in Feb. 2012. Therefore Raytheon is seeking authorization to modify its current license (WF2XLZ) for use of spectrum for UAS testing. The program will be shut down without the requested authorization, because it will have no other means of controlling the UASs in flight.

Advancement of UASs is essential to the US government. The proposed ongoing experimentation is expected to lead to the development of advanced technologies that will be highly valuable to various branches of the military and other departments in the US government.

Synopsis:

- Proposed radio use was previously authorized under a federal frequency assignment, and there were no interference issues
- Proposed radio use will facilitate essential experimentation with unmanned aerial systems.

Description of radio use:

The UAS operation proposed will use the FreeWave radios for command and control in Raytheon's work to optimize its operations. . The radio use is not the experiment itself, but the use of the radios is essential in the development of the underlying UAS technology. When these radios were in use under the DOD frequency assignment, they had been coordinated with the DOD. There was no

interference, and nothing about the currently proposed operation has changed from the operations that had been permitted under the frequency assignment.

Freewave Radio Channels and Frequencies required:

<u>Channel</u>	<u>Frequency</u>
2	225.5616
3	225.7920
4	226.0224
5	226.2528
6	226.4832
7	226.7136
8	226.9440
9	227.1744
10	227.4048
11	227.6352
12	227.8656
13	228.0960
14	228.3264
15	228.5568
16	228.7872
17	229.0176
18	229.2480
19	229.4784
20	229.7088
21	229.9392
22	230.1696

Area of Operations:

The proposed radio use will include airborne and ground operations. The airborne use will be at altitudes of 2000 feet or less. There are two locations specified on the license, one in Tucson, AZ, and another in Whetstone, AZ. All airborne operations will take place within a 25 kilometer radius of the two specified locations.

Conclusion:

Raytheon is seeking to add these 21 radio frequencies to its existing experimental license to continue its ongoing development of experimental unmanned aerial systems technologies. The frequencies will be used for command and control of UASs in flight. Previous operations, which had been

authorized under a federal frequency assignment, caused no interference to other users in the area. Raytheon's license modification application would shift the authorization to an FCC license from the newly expired federal frequency assignment.

If there are any questions regarding this application or the proposed radio use, they should be directed to Thomas J. Fagan, Raytheon Missile Systems Spectrum Manager, 520-794-0227, tjfagan@raytheon.com or to Anne Linton Cortez, Washington Federal Strategies, 520-360-0925, alc@conspecinternational.com.