

### **Experimentation Description**

This Experimental Radio Service license application is to support electromagnetic compatibility (EMC) immunity testing of Caterpillar, Inc. Products. This testing is necessary to ensure product safety and to comply with regulations in certain countries in which the applicant offers machines for sale. EMC immunity testing involves placing a transmitting antenna on or near the equipment under test (EUT) and generating an RF signal with an RF signal generator and amplifier. This experimentation supplements EMC testing that is performed in an absorber-lined shielded enclosure. However, the size of some of the applicant's products makes testing in a shielded enclosure difficult or impossible. This license is requested to allow testing of products that are not easily tested in a shielded environment in order to ensure product safety, quality, and regulatory compliance.

#### **Duration**

A license term of 5 years is requested, since products are tested on an ongoing (although very intermittent) basis. Total operation time on any one frequency is expected to be less than 1 hour per month. Several other manufacturers have received 5 year experimental authorizations to conduct EMC immunity testing. *See* WD2XKH, FCC File No. 0133-EX-PL-2004.

#### **Frequencies**

Although a large range of permitted frequencies have been requested, actual testing is done at discrete frequencies in steps of several MHz (2 MHz, 5 MHz, 10 MHz, and 20 MHz steps are typical). To minimize the potential of interference on Private Land Mobile and Public Safety Pool frequencies, the FCC license database will be consulted when selecting frequencies for testing.

#### **Power Levels**

EMC immunity testing requires uniform field strength to be generated across the frequency range of interest. This means that, in theory, the effective radiated power (ERP) across the frequency range should be the same. However, transmitter output power will vary across the frequency range depending on the efficiency of the broadband antenna at any given frequency. At low frequencies where the transmitting antenna is an inefficient radiator, the transmitter output power will be much greater than the ERP due to high-reflected power. On the other hand, at high frequencies where the transmitting antenna has significant gain, the transmitter output power will be much lower than the ERP. The requested transmitter output power is the maximum that will be required at

low frequencies. At most frequencies, transmitter output power will be much less than this maximum.

Location

Licensing is requested at Caterpillar's Peoria Proving Grounds site in Tazewell County, IL. The Tucson Proving Grounds site will be used for testing large mining equipment that is not normally available for testing at the Peoria site due to site logistics.