

NARRATIVE FOR EXPERIMENTAL LICENSE

Headsight, Inc. (Headsight) seeks this experimental license to conduct experimental operations and testing in connection with product development and/or market trials of its ultra-wide band (UWB) ground penetrating radar device (GPR Device or Device) that is regulated under Part 15 of the Commission's rules. Experimental activities will be conducted in limited, rural (farm) locations in the United States.

The Device is designed for header height control of combine harvesters, which are used to harvest grain crops. The Devices are mounted under a combine header to image and measure ground/crop levels for accurate cutting and harvesting in place of surface contact devices that are currently used. The GPR Device communicates with a control box via a controller area network (CAN) bus which then sends a voltage signal to the combine. The combine raises and lowers the header with the machine's hydraulics to keep the header a specified distance from the ground. This control system relieves the operator from the task of manually controlling the header – reducing crop loss and operator fatigue (which improves safety) as well as improving precision and efficiency.

The Device will be operated only in rural areas in connection with farming activities, and all GPR emissions will be directed toward the ground. After mounting the Device on the header, the GPR sensors can be calibrated and operated from a control screen in the combine cab and should not require physical contact from the operator.

The Device emits a very low power RF signal, using UWB chip technology and operates in spectrum between 1 and 6 GHz (-20dBm, ~1.25% duty cycle-pulsed radar). The Device transmitter will comply with technical standards applicable to UWB GPR devices, and will be used to detect the crop/ground interface, ground undulations, etc. When imaging crop/ground structures, the transmitter will be operated less than 1 meter above the crop/ground structure. Therefore, the signals will be attenuated much like they would for a conventional GPR application. We note that Canadian regulations define "ground" to include "any lossy dielectric materials" and includes crops and other ground based vegetation. See Industry Canada, RSS-220, Devices Using Ultra-Wideband (UWB) Technology, Section 6.2, Ground Penetrating Radar (GPR) and In-wall Radar Imaging Devices. The Device is powered from the 12 V DC vehicle battery.

The intent of the experimental operations would be to test the functionality and imaging accuracy of the Device in various crop, harvest and weather conditions (e.g., crop height, crop moisture, yield conditions, soil conditions, air temperature, air humidity, etc.) as well as on various types of combines and headers to assess machine speeds, wear conditions, operator preferences, machine settings, etc. Data recordings would be made in conditions that appear challenging for the purpose of continuing development of the Device. It is critical that the Device be tested in multiple locations with different conditions so that Headsight can adequately assess the Device.

The geographic area where the Device will be tested is also of critical importance to the success of the testing. This application requests that the area of operation for each site consist of the area within a 30 mile radius of each site's coordinates (by longitude and latitude as listed in the application). This is necessary to accomplish the testing objectives because some farms may be 20,000+ acres. [Note that 20,000 acres equals approximately 31 square miles.] Given the size of the farms where the Device will be tested and the fact that these farms are in rural and remote areas (and that the Device will comply with the technical parameters of UWB ground penetrating radar devices), this area of operation is necessary and should not create any interference concerns.

Headsight respectfully requests approval of this application on an expedited basis. Harvest windows are often short and we are fast-approaching harvest season for some key crops where Headsight would like to test the Device. If approval could be obtained by September 30, 2015, Headsight should be able to make the necessary arrangements to begin testing the Device this harvest season.

To the extent that a waiver of one or more Commission rules is needed to market and operate the device beyond the permitted uses under the experimental license requested pursuant to this application, Headsight will seek such a waiver.

SUPPLEMENTARY TECHNICAL INFORMATION

Given the field and character limitations in electronic FCC Form 442, the following clarifies the information provided by Headsight in the attached application:

- Occupied bandwidth: 0.71-6.24 GHz (according to 0.5% on upper and lower bands)
- Power output (mean/max mW): ~0.016 / ~0.630
- EIRP (mean/max mW): ~0.063 / ~2.5
- The mean ERP is approximately -14.15 dBm/0.0385 mW
- Frequency tolerance (max): 6% for UWB center frequency over full temp range, but if referring to oscillators, then ~0.002%