

Request for STA and Description of Program

3M Company seeks special temporary authority (STA) for a 6-month period to conduct tests in connection with a federal funded program. STA is requested because of the short-term nature of program and so that testing may begin promptly as requested by the federal agency. Because of the classified nature of the program, the government agency cannot be disclosed.

The basic goal of the program is the development of an RFID system that can provide longer range, more robust reads of RFID tagged objects than attainable with commercially available RFID equipment. This enhanced performance is needed to meet the operational requirements of certain activities related to Homeland Security. In order to provide the enhanced performance, the RFID system developed under this contract utilizes higher EIRP powers than allowed by FCC part 15 regulations. The higher EIRP is obtained through the use of higher RFID reader transmitted powers and/or higher RFID reader antenna gains. Another key requirement is the need to operate at “non-standard” frequencies, that is, frequencies not necessarily allocated for RFID applications. The realization of these performance parameters is accomplished through the use of:

- 1) A commercially available FCC approved, 902-928 MHz, frequency hopping, 1W RFID reader to supply the basic properly modulated (per the EPC Gen 2 protocol spec) rf signals that would normally be used for a UHF RFID system.
- 2) A frequency conversion module whose primary functions are to:
  - a. Up or down convert (unless it is desired to stay within the 902-928 MHz band) the 902 to 928 frequency hopped rf signals to another frequency range somewhere within the range of 300 MHz to 3 GHz.
  - b. Amplify the signals to produce adjustable output powers with a maximum conducted output power of 50 W
  - c. Down or up convert the rf signals backscattered from the RFID tag to the 902 to 928 MHz range so that they can be successfully decoded by the commercially available reader
- 3) An RFID reader antenna(s) that may have gains of up to 20 dBi or dBic depending upon the antennas polarization
- 4) Specially designed RFID tags that will operate at specific frequency ranges within the 300 MHz to 3 GHz band.
- 5) A computer to control the reader, operating frequency, output power and number of antennas plus to provide the resultant data obtained from reading the RFID tags.

Although the system is designed to operate anywhere within the 300 MHz to 3 GHz range, testing will be limited to a region around 433 MHz, the normal 902-928 MHz band and a region around 2.45 GHz. In this way there will not be any interference with existing services such as GPS, cell phones, etc.

The testing will be performed at the 3M road test track located in Cottage Grove, MN as described in the application. The tests include

1. Tagging of vehicles (automobiles) at either the license plate or windshield areas.
2. Placement of the readers and antennas along the side of the test track road with relatively low (1m) antenna heights and the antennas oriented to “look” across the lanes of the test track road.
3. The running of a series of tests where various vehicle speeds, numbers of vehicles, etc. are employed to determine the ability to read the RFID tags.

and a second series of tests where

1. A portal approximately 3m high with a width ranging from 3 to 30m and having RFID reader antennas (2 to 4 total) at heights of about 1 to 2 m above the ground that are aimed to “look” inward across the portal.
2. The running of a series of tests where people will walk through the portal carrying RFID tagged objects. The people may also be tagged. The tests will determine the ability of the system to read the RFID tags.

The specific objective of the tests is to demonstrate increased read range and read robustness of passive RFID in order to meet the requirements of the government agency applications.