Description of Request for Experimental Authority

Purpose of Testing

Toyota Motor Engineering & Manufacturing North America, Inc. ("Toyota") seeks experimental authority to allow it to perform research and evaluation, and product development testing of a wireless battery charging system that currently is in development for vehicles with an electric powertrain. The technology is intended to be implemented in hybrid and electric vehicles and will allow battery charging of a parked vehicle without a plug or cord, making the charging process for electric cars simpler and more convenient for consumers. Testing will assess user satisfaction, the ease of use of the system, the misalignment rates, and charging behavior, which will further develop and ultimately facilitate commercialization of the technology.

Description of Testing Program

The proposed testing program will consist of the operation of the wireless charging system under conditions that are expected for use by consumers in the United States. The charging system uses magnetic-resonance technology, which transmits electricity by utilizing the magnetic resonance resulting from changes in magnetic field intensity between a coil on the ground that transmits and a coil on installed on the bottom of the vehicle that receives the transmissions. The system will transmit at 85 kHz with an input voltage of AC 200 V and a transmit power level of 2 kW. Details regarding the equipment specifications and the parameters of operation are provided in Exhibit A attached hereto, which is being submitted with a request for confidential treatment.

Testing authority is requested for a two-year period. The testing will be conducted at two sites, with up to two systems operated at each location. One site will be located on Toyota's premises, and the equipment will be operated by employees of Toyota. The second site will be located at Argonne National Laboratory ("ANL"), which is a multidisciplinary science and engineering research center managed by a collaboration of entities for the U.S. Department of Energy. Toyota intends to enter into an arrangement with ANL to conduct research and provide data in connection with the proposed program of experimentation.

The equipment and technical specifications for the experimental operations will be the same at each location. All equipment will be owned by Toyota's parent company. The charging station consists of a charging coil installed on the ground. Charging is initiated when a vehicle fitted with the wirelessly-charged battery is parked over the charging coil, as illustrated in the photographs below:

Note however that the installation shown above illustrates the configuration used for Toyota's testing in Japan, where drivers typically park by backing into the parking spot. The equipment configuration for the testing proposed in this application would be modified for forward parking, which is more typical in the United States. Testing will evaluate the accuracy in alignment that can be achieved by a typical user in the United States and will enable Toyota to gather data regarding system performance, and to develop solutions to improve alignment as needed.

The system uses a wireless communications link for control and monitoring of the system's functions and will operate in the 2400-2483 MHz band at a power level of 10 mW using an existing commercial radio standard. The communications link will operate on these frequencies before, during and after charging.