Exhibit 1: Description of Rappahannock Electric Cooperative
Program of Research and Experimentation

Rappahannock Electric Cooperative ("REC") respectfully requests an experimental license authorizing the deployment of the equipment with the operating parameters specified in this application. Rappahannock Electric Cooperative is a member-owned electric utility that provides service to more than 155,000 customers in portions of 22 counties in Virginia. REC was formed in 1980 with the consolidation of two cooperatives, Virginia Electric Cooperative in Bowling Green and Northern Piedmont Electric Cooperative in Culpeper. The Cooperative's general office is in Spotsylvania County.

In addition to providing electricity to 155,000 rural customers, REC is responsible for maintaining more than 16,000 miles of distribution power lines throughout its service area, which ranges from the Blue Ridge Mountains to the Middle Peninsula. In June 2010, REC purchased a portion (50 percent) of the Virginia distribution assets of Allegheny Energy, Inc. This new territory consists of challenging terrain with weak public telecom infrastructure. Large portions of the service area lack even basic voice cellular coverage.

The requested license will allow REC to conduct research and experimentation using a small portion of vacant spectrum in the television broadcast bands (the "TV White Spaces"). This experimentation is supported by a smart grid grant from the Department of Energy (the "DoE") (Award No. DE-OE0000295REC) as part of the American Rescue and Recovery Act.

REC will test the usefulness of these frequencies in supporting smart grid fixed and mobile data connectivity. Fixed applications include long range point to multipoint backhaul of internal utility traffic including supervisory control and data acquisition (SCADA) traffic and automatic metering infrastructure (AMI) traffic, both located at REC's electric utility substations. The AMI system also enables real-time load management thereby improving system reliability and reducing peak demand, all of which further the nation's goal for greater energy independence and reduced carbon emissions. In terms of mobile data connectivity, REC plans to leverage this technology to test the efficacy of these frequencies for mobile workforce management applications in the utility service vehicles including processing work orders – new connects, disconnects, reconnects, and outage orders. REC also has a need to test automatic vehicle location (AVL) to optimize routing of service vehicles in real time.

REC has chosen the frequencies subject to this application because REC has an extensive distribution electrical grid, and these frequencies provide the signal reach required for REC to more efficiently conduct this experimentation by using REC's existing land mobile radio and microwave towers (rather than needing to construct new towers) and existing backhaul facilities. This experimentation will not involve the sale, rental or distribution of devices to consumers or end users, or any commitment by any consumer or end user. It will be solely used to test and evaluate the ability of the system to support REC's private remote data needs.

The management of REC's electrical grid involves challenges not encountered by companies serving either flat or densely populated areas. REC has some of the most challenging service territory in the United States. This territory is largely rural and includes a portion of the

Blue Ridge Mountains. In portions of this territory, there are no viable communications options that meet the core requirements. The experimentation on the TV White Spaces frequencies will assist REC in determining whether lower band terrestrial radio facilities can efficiently support these modern distribution control systems.

To conduct this experimentation, REC requests the use of up to 4 (500 kHz) channels between 174 and 216 MHz. The equipment will be TDD, IP-based and will provide actual test data on the usefulness of these frequencies in supporting SCADA, AMI and real time load management through mid-grid automation or distribution automation. The initial phase of the experimentation will involve up to a base station at one of the eleven existing REC tower locations listed below, using three transmitters and three 120° sectorized antennas, and communicating with 3 temporary -fixed units and 3 mobile units. A follow-on, second phase of experimentation is contemplated during which base stations will be deployed at up to 3 tower sites to communicate with 24 temporary-fixed radios. REC's existing tower locations are as follows:

Location	Latitude	Longitude
Blakey Ridge Tower	38-25-34	78-20-15
Linden Mountain Tower	38-57-08	78-01-43
Bowling Green Tower	38-03-48	77-21-19
Culpeper Tower	38-26-30	78-00-27
Dawn Tower	37-50-14	77-21-45
Dunbrooke Tower	37-53-32	76-57-51
Glenora Tower	38-05-27	77-48-03
King William Tower	37-42-12	77-03-16
Louisa Tower	37-55-20	77-51-37
Fredericksburg Tower	38-15-47	77-30-18
Paytes Tower	38-13-35	77-50-05

The temporary-fixed stations will be deployed at electrical substations. The fixed stations will carry SCADA and AMI data so that REC can monitor and restore the grid during outages as well as accommodate connectivity to residential and commercial smart meters using the Aclara power line communications technology. Each temporary-fixed station will communicate with an assigned base station. A temporary-fixed station may be as far as 25 miles from its assigned base station and will use a yagi or other directional antenna mounted on a utility pole at the substation to communicate with its assigned base station.

The 3 mobile units will operate within a 25 mile radius of a base station. The mobile units will be used to transmit mobile workforce management data traffic including work orders. Mobile stations will be used only within that tower radius. Mobiles are only functional if they can receive a downlink signal from the base station and therefore will not operate outside the RF coverage area.

REC is working jointly with Full Spectrum Inc., a Santa Clara County-based manufacturer of radio systems designed for electric power grid control. All of the radios used in the experimental program will be provided by Full Spectrum Inc.

The base station radio is the FullMAX BS1000. The temporary-fixed service station is the FullMAX FS4000. The mobile station is the FullMAX MS4000. Each operates at a maximum TPO of 4 watts. Base stations will use 120° sector antennas up to 10dBi. Temporary-fixed stations will use directional yagi or similar antennas providing gains of up to 12 dBi. Mobiles use omnidirectional antennas mounted on the vehicle and providing between 1 and 3 dBi of gain. Below is a list of the pertinent technical parameters:

Station Class	*Emission Designator*	*Authorized Power*
Mobile Station	500KA7D	4.866 W (ERP)
Temporary-Fixed station	500KA7D	24.390 W (ERP)
Base Stations	500KA7D	12.224 W (ERP)

In the Form 442 application, the temporary-fixed stations are listed as mobile.

REC's choice of the specific TV White Spaces frequencies will be based upon a thorough review of frequency usage that may be impacted by the proposed experimentation. REC has satisfied itself that there are TV White Space frequencies in all areas of proposed operation that can be used as proposed in this application without causing harmful interference to incumbent television stations. REC recognizes the secondary nature of operations conducted pursuant to the requested experimental license and REC will not transmit on any channel or in a manner that causes harmful interference to the reception of an incumbent television station licensee.