EXHIBIT

(Amended 6/23/2017)

This application seeks a two (2) year authorization to conduct experimental testing to characterize the propagation of surface waves within a wire used as a waveguide. The wires employed as waveguides are not intended to operate as antennas and are not intended to emit radio signals, but the experimentation will allow the company to measure unintentional leakage from the waveguide during its operation under various conditions, including potential malfunctions. Moreover, the operation is not an example of "carrier current" radio in which the conductor is intended to serve both as a conduit and as a "leaky" radiator.

The testing to be conducted focuses on one aspect of what is broadly termed Project AirGig. Eventually, Project AirGig may encompass multiple technologies including low power radio systems, but those aspects of Project AirGig are not included within the authority being sought in this application.

Testing will involve launching an unmodulated, continuous wave ("CW") excitation into a waveguide at low power (<10 dBm) at various fixed frequencies between from approximately 0.9 to 13 GHz as specified in the application. The frequencies have been chosen to avoid the restricted bands listed in 47 C.F.R. §15.205 and various other bands, as listed in the attached table and in the accompanying application. The experimental operations will be conducted at temporary fixed sites to be determined by the applicant and located within a 5-kilometer radius of the coordinates 40-21-53N; 74-06-58W (NAD83) in Middletown, NJ. Once a location is selected within that area, the experimental operations will be conducted within a radius of less than approximately 600 meters of that site.

No Marketing

The company does not propose to conduct marketing trials under the requested experimental license. None of the equipment is to be made available to members of the public, sold or leased or advertised for sale or lease. No service is to be offered under this experimental authority.

Waveguide Systems:

As noted above, a CW excitation will be launched into one or more experimental waveguides. The waveguides are based on electrical wires of the type used by electrical utilities for transporting electrical power via so-called medium-voltage distribution grids. Some wires will be mounted on temporarily installed conventional utility poles in a manner that is customary for such distribution grids. The height of the utility poles will be approximately 11 meters (35 feet) above ground. Other wires will be mounted on support structures that are to be lower than 6 meters (20 feet). No structures will be installed in a fashion that will require approval under FAA and FCC rules and regulations; in particular, no structures will be installed within the proposed 5-km radius of operation that will be closer than 3 km from an active airport, heliport or aircraft landing area.

Test equipment will include one or more programmable sources (laboratory test equipment signal generators) that generate CW waveforms. Each waveform is to be launched onto a waveguide using a launcher intended to maximize the power fraction launched into guided modes and, thereby, minimize unwanted leakage. Measurement equipment will be positioned at several locations to detect and characterize any leakage.

Spectrum:

The CW sources will generate frequencies ranging from approximately 1 to 10 GHz, and exclude frequencies in any restricted band listed in 47 C.F.R. §15.205 (2016). Only a single signal will be sent through the waveguide at a time. The signal will be a carrier signal (no modulation). Moreover, each frequency will be cycled on for a period of only 5–10 seconds so that measurements can be made and then a different frequency will be employed for another 5–10 seconds, and so on.

In addition, no more than six sources will be active at any given time, the sources being distributed among no more than three distinct sites. The sources will be highly stable and accurate; therefore, the spectral width of the generated CW excitation is expected to be less than 10 Hz, and the frequency tolerance is expected to be within 0.0002% or better. If, upon IRAC coordination, any proposed frequencies or bands are deemed not feasible, the applicant would accept recommendations to use nearby, alternative frequencies, as those could also yield useful data concerning the performance of the waveguide.

Emissions:

Each CW source would, under no circumstance, generate more than +10 dBm (10 mW) of power; however, most of the time, the generated power will be substantially less than this absolute upper limit. As noted above, the design of the system is not intended to emit any radio signals, as all the power generated by each of the CW sources is intended to be coupled onto a waveguide. Unwanted leakage may occur nevertheless, and the experimental authority requested here is intended to allow the applicant to detect and characterize that leakage. The spatial pattern of leakage emissions is difficult to predict and will be determined during testing, but it is unlikely that it will occur in highly concentrated beams. Therefore, the peak effective radiated power ("ERP") that is emitted unintentionally from the waveguide for such emissions should not be much more than the total power sent to the waveguide (*i.e.,* 10 mW) and is expected to be far less in most tests.

In the unlikely event that interference should occur, Giovanni Vannucci has been designated the "stop buzzer" for the proposed operations, and he will take steps immediately to remedy any interference, including if necessary discontinuing the experimental operations. Mr. Vannucci can be reached at (732) 420-1790.

TABLE OF PROPOSED FREQUENCIES

Frequency (GHz)*
0.9270
1.2450
1.6270
1.9200
2.4800
3.3600
4.4800
5.8700
7.8700
10.400
13.200

* A limited number of frequencies would be used as specified above, and applicant will change frequencies when necessary to avoid interference. Applicant will not operate on channels in the bands set forth in Section 15.205 of the FCC's Rules, 47 C.F.R. §15.205 (2016).

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