From: Joseph Camp

To: Jose Trevino
Date: June 06, 2011

Subject: FCC file number 0250-EX-PL-2011

Message:

Dear Mr. Trevino,

Thank you for the quick response to our application for an Experimental License. For clarity, I have included the original email with responses below:

Mr. Joseph Camp, 1. The Federal Aviation Administration (FAA) operates in the frequency band; 5000-5250 MHz. Please prior coordinate the use of the frequency band with the Central Service Area (CSA) FAA Regional Office. Please obtain the NGT number(s) from the FAA Regional Office at the completion of the coordination and report it in your response to this correspondence. Please report the parameter below in your coordination with the FAA Regional Office: - Peak envelope power (PEP); - Type of antenna; - Transmit antenna gain; - Elevation above sea level of the antenna site; - Height above ground of the focal point of the antenna; - Antenna polarization; - The azimuth that the antenna is pointed or appropriate designator to indicate whether the antenna is rotating, non-directional, etc.; - Pulse repetition rate (PRR) that the equipment is capable of operating on to include PRR stagger sequences if appropriate, whether the PRR is adjustable and what PRR's the equipment can accept, and any other information that would be helpful in understanding the pulse characteristics of the equipment; - Pulse width; - Equipment nomenclatures; - Whether the equipment is capable of blanking transmissions in certain azimuths and any limitations with respect to blanking; - Radius of operations if appropriate; - Detailed description of the proposed operation to include any technical parameters that will be altered during operations. Phone numbers to the FAA Regional Frequency Management Offices may be obtained at: www.faa.gov/ats/aaf/locations/fmos.htm

>>We do not need to specifically transmit on 5000-5250 MHz. Thus, I have altered the frequencies to be above 5300 MHz which should be sufficient for us. We are interested in the propagation characteristics over a broad range of frequency bands and 5000-5250 MHz is not significantly different from the unlicensed band in the 5 GHz range. Thus, I have altered the range of transmissions of this band to 5300-5900 MHz. However, you will notice that I also added 5900-6100 which was previously overlooked (notice that the Doodle Labs DLM113 operates in this region). The motivation for transmission in this band is for DSRC communications in vehicular experiments connected to our NSF project.

2. The Aerospace & Flight Test Radio Coordinating Council (AFTRCC) oversees the frequency bands; 2310-2320 MHz, and 2345-2390 MHz. These frequency bands need to be removed or need to be prior coordinated. The Aerospace & Flight Test Radio Coordinating Council (AFTRCC), the telephone number is (770) 494-2893.

>>Similar to the reasoning for 5000-5250 MHz being similar in propagation characteristics to 5.8 GHz, 2310-2320 and 2345-2390 MHz are not needed in our research. Thus, I have altered the range of transmissions of this band to 2412-2500.

3. The following frequency band: 335.4-399.9 MHz is used for military purposes and they are required to coordinate with Military Assignment Group (MAG).

>>We can make use of the range of 400-520 MHz. Thus, I have altered the range of transmissions of this band to 400-520 MHz.

4. Please provide a designated point-of-contact to terminate transmissions if interference occurs.

>>The designated point-of-contact to terminate transmissions would be myself: Joseph Camp, 214-768-8541, camp@lyle.smu.edu.

5. Since this is the license using for experiment only and because the number of equipments on your application is greater than 50 units, please submit a justification letter for why your project use many equipments for testing or you send to us a request to reduce the number of equipment in your experiment.

>>We have deployed a location atop 6200 SMU Blvd that currently operates in the unlicensed bands of 2.4 and 5.8 GHz. If this experimental license is approved, we will immediately add the transmissions of 700 and 900 MHz. In the near future (as a result of our discussions with Doodle Labs and Arada Systems), we will deploy cards that are transmitting at 400-520 MHz and 5.9-6.1 GHz, respectively. The former is to study the propagation and capacity characteristics of the newly opened white space bands for future for context-aware operation and multihop network deployment as outlined for the CRI/II-New: Dallas-ARea Testbed for Context-Aware, Cognitive Research (DART-CARs). Similarly, the latter band will be used for vehicular experiments for vehicle-to-vehicle, vehicle-to-infrastructure, and vehicle-to-roadside topologies that leverages context information for DART-CARs which is also funded by Toyota InfoTechnology Center. We will additionally, be deploying an indoor, multihop wireless mesh network testbed in the Expressway Tower (6116 N Central Expy # 130 Dallas, TX 75206-5101) which we anticipate using each of these cards in 25-30 nodes. Finally, we plan to deploy a few other fixed locations in and around campus to characterize the wireless bands in different environmental contexts as outlined for the DART-CARs infrastructure and project. We will seek pre-approval for each additional fixed location if bands are used outside of the unlicensed bands. However, each node should be within 50 km of the original GPS point given. The wide range of nodes used is to ensure that we have as much observability of the channel measurements as possible (for instance, channel state information, H-matrices, multipath, etc.).

6. Please provide the person from National Science Foundation point-of-contact, name and phone number.

>>In summary, Theodore Baker is the National Science Foundation Program Officer for the project (NSF: 703-292-8608 and cell: 850-443-0165). He is reachable via cell phone today through Wednesday, but has a review panel Thursday and Friday and cannot take the call those days.

Below is the correspondence with Theodore Baker, the National Science Foundation Program Officer for our project (if the original message is needed, please let me know and I would be happy to forward it):

Begin forwarded message:

From: Baker, Theodore <tbaker@nsf.gov>
Date: June 6, 2011 2:00:44 PM CDT
To: Joseph Camp <camp@lyle.smu.edu>
Subject: RE: FCC Experimental License

You can use me as an NSF contact point. My NSF phone number is 703-292-8608, and cell phone is 850-443-0165.
I?m in a review panel at the moment, and will be for 4 out of 5 days this week.
If I receive a call on the cell phone I?ll try to step out of the room to receive it, if the call comes in today through Wednesday.
Thursday and Friday, I?ll ignore the phone, since I?m chairing the panel those days and am not allowed to leave the room.

Ted Baker
Program Officer CISE/CNS

From: Joseph Camp [mailto:camp@lyle.smu.edu]

Sent: Monday, June 06, 2011 2:50 PM
To: Baker, Theodore
Subject: FCC Experimental License

Dear Dr. Baker,

I am the PI on the CRI project 0958436 which you are the Program Officer. As you are aware, we are performing many experiments on a broad range of wireless frequency bands to understand wireless performance in different contexts (http://nsf.gov/awardsearch/showAward.do?AwardNumber=0958436). Recently, we have shown that the gains can be up to three times the original throughput of a network which uses merely SNR to adapt transmission parameters (per our recent submissions to IEEE GLOBECOM and VANETs). We have been running extensive experiments on the channel emulator that was purchased for the project which allows experimentation from 400 MHz to 6 GHz. Additionally, we have been performing outdoor experiments predominantly on 2.4 and 5.8 GHz since that is what WARP supports.

As specified in the proposal, we are now using an off-the-shelf platform (with Ubiquiti radios) alongside WARP to enable transmissions on 700 MHz and 900 MHz. We are also working with companies such as Doodle Labs on a white space radio (300-700 MHz) and Arada Systems on a DSRC radio (5.9-6.1 GHz). Toyota InfoTechnology Center is collaborating closely on the project. Thus, many vehicular scenarios and infrastructures are being studied as well. In order to do experimentation outdoors in different contexts, we are filing for an experimental license through the FCC for a 50 km radius around the SMU campus that would include mobile and fixed scenarios. This, of course, is not necessary for transmission on 900 MHz, 2.4 GHz, and 5.8 GHz. However, outside of these, it is required. Thus, the reason for the filing.

The FCC contact that is reviewing the experimental license application has requested a contact with NSF for our project. Could I give him your name and contact information? Also, if you would like to discuss this over the phone, my number is 214-768-8541.

Sincerely,
Joe

--
Joseph Camp
Assistant Professor, SMU
J. Lindsay Embrey Trustee Professor
Lyle School of Engineering (EE)
http://lyle.smu.edu/~camp

Sincerely,
Joseph Camp