October 08, 2001

Mr. Julius Knapp
Mr. James Burtle
Federal Communications Commission
Office of Engineering and Technology
445 12 th Street, SW
Washington, DC 20554

Re: Experimental Application (FCC File Number 0170-EX-PL-2001) of MeshNetworks, Inc.

Dear Mr. Knapp and Mr. Burtle:

Thank you for taking the time to meet with me and my colleagues earlier this week. Per our conversation, MeshNetworks, Inc. ("Mesh") herein provides additional technical information for the above captioned pending experimental license request. With this additional information and guidance, Mesh believes that the Commission will be in a position to authorize the four-city test of its technology.

**Mesh Technology.** Mesh is seeking to deploy an Internet protocol ("IP") based wireless communications network that provides data to mobile devices, such as laptop computers, personal digital assistants and other nomadic devices. The key to this system is the peer-to-peer networking capabilities of the technology and use of high performance modems. Unlike traditional wireless communications networks, the Mesh system will utilize all the fixed and mobile transmitters as part of its network routing capability. As such, each additional user in effect enables the Mesh system to become more robust and provides better system coverage. In its current configuration, Mesh is utilizing direct sequence spread spectrum technology in order to comply with Section 15.247 of the Commission's rules for unlicensed use of the 2.4 GHz band. Additionally, Mesh expects to migrate its system operations to the unlicensed U-NII band at 5.7 GHz. Mesh's 2.4 GHz system, as specified currently, will use four 20 MHz channels in the 2.4 GHz band.

**Certification Status.** The current radio technology has not been finalized prior to full network testing and therefore remains at a prototype stage. Mesh does not anticipate developing and manufacturing radio equipment, rather, we anticipate licensing our patented technology to wireless manufacturing partners so that they might construct radio equipment that best accommodates their particular requirements. We expect to make variations in the equipment during the course of testing, consistent with the constraints imposed by our experimental license and the need to comply with Section 15.247. Accordingly, we do not believe it to be practical to pursue a variety of certification applications for this equipment we do not anticipate marketing.

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**Conduct of the Experimental Tests.** Mesh, as noted above, does not anticipate manufacturing prototype equipment. However, all equipment to be utilized in the experimental test will be appropriately labeled as follows:

"This device has not been authorized as required by the rules of the FCC. This device is not, and may not be, offered for sale or lease, or sold or leased until authorization is obtained."

At the conclusion of a market test, Mesh will gather all prototype equipment used in the test in a particular market for deployment in the next market test. Mesh would expect that specific tests will run for three to four months, with a period of time to construct an appropriate test, deployment of equipment, and several weeks allotted for the collection of needed data and network performance.

Mesh does not plan to sell directly to end users, but plans to license its technology to major industry partners. As such, Mesh will not operate the units externally except to demonstrate the capabilities to these potential partners on a non-revenue producing basis.

Finally, Mesh is fully committed, if needed by the Commission, to inform it prior to beginning any market test. Further, Mesh would readily provide summary information of completed tests to the Commission, as required.

**The Need for 4000 units.** The Mesh technology has been deployed and tested on a small basis (ten to twenty units) and Mesh has received an FCC experimental special temporary authority to deploy a more extensive (several hundred units) test. However, Mesh now seeks to demonstrate the capability of the network to accommodate subnets of users numbering as many as 4000 units. Mesh requires a large number of units to demonstrate the technology's capabilities for handling high volumes of data traffic within subnets, a concept that has yet to be demonstrated in an actual field environment. Additionally, the testing of several thousand units in a single market will enable Mesh to gather and measure a variety of diagnostic system characteristics that have not been tabulated. In parallel, Mesh is developing the capability to simulate a large number of units in a network configuration which will then be compared to the empirical data of the field trials. Today, one second of real performance requires several hours of simulation time. Therefore, there is a practical limit to current simulations of a few hundred units. Field testing is therefore the only method of obtaining larger network data.

As a small technology company Mesh will run these market tests in one market at a time, as the costs to develop and produce several thousand units is the limit of the capabilities of the company. Thus, each market test will use the exact same units. Further, the underlying experimental application has been amended to remove the ambiguity concerning "base" and "mobile" units. For the Mesh technology, no more than 4000 units of any kind will be deployed for the experimental test. In terms of power usage and other technical characteristics, a Mesh "base" station and "mobile" station are exactly the same except for the fact that a "base" station is stationary. In

fact, the need for base stations is greatly reduced by the use of "mobiles" as repeaters to create a more robust operating network. Absent a large scale test of several thousand units, equipment manufacturers and wireless providers will not be confident in deploying the Mesh network to the many millions of customers to be served nationwide.

**Need for Tests in Multiple Markets.** Each particular market has its own particular climatic, topographical, population density and urban infrastructure characteristics that differentiate it. Mesh has selected four urban markets that provide a variety of environments to demonstrate the capabilities of the Mesh network. The important variables for Mesh to accumulate test data include dense urban, urban, suburban, rural, high and low humidity, flat and hilly terrain, urban canyons, high forestation, and minimal vegetation environments. The four markets selected for experimentation will provide all these necessary test conditions and are also close to industry partners that Mesh expects to test its technology.

**Impact on Other Users of the 2.4 and 5.7 GHz bands.** Mesh's experimental prototypes have been designed to comply with Section 15.247 of the Commission's rules for direct sequence spread spectrum devices. As such, Mesh anticipates that its system would not cause harmful interference to other unlicensed devices in this band. Moreover, due to the nature of the Mesh network, most experimental units would be expected to operate well below the one watt power limits for unlicensed spread spectrum devices. This powering down functionality will also serve to mitigate harmful interference to existing unlicensed users.

**Compliance with FCC RF exposure guidelines.** While not currently certified the devices have been designed, built, and tested to comply with Part 15 of the Commission's rules. In addition, we have evaluated the environmental issues for RF exposure and believe the experimental products will not pose a significant environmental impact for the reasons described below.

The current embodiment of the device and application consists of a laptop computer or PDA running several applications that will be viewed by the user while voice communication is handled by a corded headset. The device will typically be held 18-30" in front of the user. Future embodiments may replace the corded headset with a wireless headset and may change the form factor to be more like a current cordless phone. At this time the environmental impacts will be reassessed.

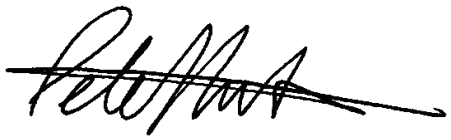
The current implementation of the transceiver has a maximum power output of 27 dBm into a 0 dBi antenna. The transmissions from the transceiver would experience a 4 dB degradation once the antenna is displaced by 18 inches from a user. We would derate the exposure as the worst case duty cycle of the transmitter (constantly transmitting packets at the highest rate @6mbits/sec) is 70%, but the average duty cycle for the current experimental products is approximately 13%. This is due to the fact that the transceiver utilize a burst packet transmitter where each packet is acknowledged before another is sent with typical communication somewhat duplex. Therefore, the average sustained output is very low. The fixed assets have the same

transceiver with a higher gain antenna and produce a maximum ERP of 32 dBm. These units are typically placed on a light pole or the side of a building 3-10 meters above the ground. This configuration will result in at least a 30 dB reduction in absorbed power by the time it reaches a person on the ground.

With this understanding of the Mesh system, one can model the power density for the worst case scenario (i.e., with a user 20 cm from the device). Using the equations for predicting RF fields in OET Bulletin 65 the power density (S) will be less than 0.1w/cm2 (Where ERP=1w, R=20cm). Mesh therefore believes that the RF exposure presented by the experimental tests will be in compliance with the Commission guidelines.

Please contact the undersigned should you have any additional questions about the proposed experimental license application of Mesh.

Sincerely,



Peter Stanforth
CTO MeshNetworks Inc.