EXHIBIT 1

Response to Item 4(a)

Georgia Tech Research Institute ("GTRI") proposes to construct a Personal Communications Network (PCN) radio frequency environment testbed. This PCN RF testbed system will be used to conduct experiments, on a non-interfering basis, into the general characteristics of in-building communications environment, with the goal of creating a detailed office Radio Frequency (RF) environment model. Such a model will be used for evaluation of modulation techniques, power levels and other design parameters of Personal Communications Networks.

Three bands are being requested in this application. The reason for the selection of each band is as follows:

Frequency Band	Discussion
866-869 MHz	This band is currently allocated under Part 90 for several private mobile service uses.
902-928 MHz	This band is currently allocated for several services including radio location and Industrial, Scientific and Medical use. Proposed equipment from several US manufacturers of CT-2 like equipment can be used in this band.
1.85-2.2 GHz	This band is currently allocated for non-governmental microwave use. It is near the upper limit of the range of frequencies proposed in Europe and the US for possible PCN services. It is also of sufficient bandwidth to result in good resolution for channel characterization, leading to good propagation model integrity.

EXHIBIT 2

Response to Items 4(e) and (f)

All measurements will be made with frequency-stepped, unmodulated sinusoidal emissions. Dwell time at each discrete frequency will be approximately 100 milliseconds. The purpose of such tests is to measure, frequency by frequency, the multipath and absorption characteristics in a given frequency band, both in magnitude and phase. Transmit power will be at or below the requested levels as necessary to measure through the clutter of the in-building environment. The test gear will consist of laboratory grade frequency synthesizer and network analysis equipment.

Response to Item 4(g)

For the test equipment to adequately resolve channel characteristics resulting from the density of reflecting and absorbing objects (desks, cabinets, etc.) in the in-building environment, as wide a bandwidth as possible must be measured. The requested higher frequency bandwidth of 350 MHz (1.85-2.2 GHz) translates directly into a model resolution of approximately 0.86 meters. The other bands are of sufficient width to provide a statistically significant sampling of the RF characteristics in that region of the spectrum.

EXHIBIT 3

Response to Item 5(d)

The system will consist of a Transmit station and a receive station. They will be operated either both inside a building at various locations (different floors, different locations on a given floor) or one inside and one immediately outside (within 1000 feet) of the building. In all cases, measurements will be made within 5 miles of the location referred to in item 5. The outdoor unit will not exceed six meters above existing structures.

EXHIBIT 4

Response to Item 10

A. Background

Georgia Tech Research Institute is a non-profit research institute associated with the Georgia Institute of Technology. GTRI has a long history of research into leading edge RF technologies of all kinds, with design and measurement research projects ongoing for both commercial and military sponsors.

Recent work for BellSouth Enterprises, Inc. provided the basis for this measurement program. Under this program, GTRI performed a number of measurements similar to those proposed. Additional measurements are required before a sufficiently detailed model may be constructed.

B. Eligibility

As a major technical resource for both government and industry in the area of RF Research and Design, GTRI is constantly involved in similar projects. Our expertise and technical resources make us uniquely suited to this research. Funding for this research is already in place.

C. Research Program

The proposed program involves testing in typical office and in-building environment conditions. GTRI will conduct basic loss measurements in various office, building and inside-to-outside (e.g. to parking lot) locations. The purpose of these experiments is to further characterize the nature of the radio environment in and near various urban structures. Effects of interest in this program are multipath loss and phase distortion from office furniture and other 'clutter', path loss through walls and partitions, and potential interference from outside RF sources.

At this time, no particular band has been allocated by the FCC for the provision of personal communications. Nearly all the discussions before the FCC and in the public forums, however, have centered on the range between 800 MHz and 2.5 GHz. All of the frequencies in this range are currently assigned to other services. Therefore, we propose to make our studies near the lower and upper limits of this range in order to better understand radio wave propagation and building penetration in this range of frequencies.

Specific Objectives:

The primary objectives of this testing are to further understand RF environment problems involved with PCN systems, such as multipath and path losses, and to generate an accurate, data-based model of such an environment. The many issues outstanding in this area, including modulation type, antenna configurations, power levels and even frequency allocations demand better tools than are presently available for system evaluation.

Personal Communications Networks face unique problems with office clutter and other path and multipath interference challenges. Such systems will operate at lower power levels and in three dimensions (vertically between floors as well as at various locations on a given floor). Frequencies will ideally be re-used on different floors and in adjacent buildings. Implementations will need to be sufficiently robust to track users as they move about with a minimum of dropout and signal degradation.

While work has been done in the area of direct path and multipath losses in similar environments, very little information is presently available that includes all of the necessary data to completely model the in-building environment. For this type of model, both the magnitude and phase information must be available. Our measurement system provides such information.

The data obtained during testing produces a channel model of sufficient resolution to directly test proposed and yet-to-be proposed implementations for PCN. Models of various network configurations, such as those using antenna diversity or spread spectrum (CDMA) implementations, will be used to drive a simulator that uses the measured data to evaluate the configuration directly. Statistical information derived from this data will also be used to aid in the design and development of various PCN options.

D. Summary

The proposed experimental license will be used to evaluate the in-building RF environment and create improved indoor and near-building models. These models will in turn be used to facilitate design and testing of various PCN systems.