Exhibit 1
FCC Form 442, line 7

Single-Input Single-Output (SISO) Indoor Wireless OFDM links

a. This proposal is in connection with a state-sponsored research project called the Yamacraw Wireless Prototype, funded by the State of Georgia. The goal of this research includes the design and development radio prototypes to demonstrate a high data-rate air interface for indoor wireless communications. More specifically we hope to implement appropriate technologies to achieve high spectral efficiencies, with a goal of developing algorithms and architectures that can be extended to data rates approaching 1 Gb/s with spectral occupancies near 100 MHz. For the experimental system associated with this submission, however, the proposed spectral footprints will range between 6 MHz and 40 MHz due to equipment limitations. The waveforms to be employed by the radios will be based on orthogonal frequency division multiplexing (OFDM) modulations in a TDMA/TDD system. Various antenna architectures are anticipated as the research progresses, including single-input single-output (SISO), single input, multi-output (SIMO), multi-input single-output (MISO), and multi-input multi-output (MIMO) architectures. Attempts to maximize the spectral efficiencies and the data throughput associated with the experimental system will be optimized through use of smart antennas, space-time coding, low density parity check (LDPC) or similar coding, OFDM, and associated processing algorithms.

The radios will be configured with the equipment indicated in Exhibit #2, with likely upgrades as new boards become available. Anticipated upgrade boards for the next year are included in the list. The radios are comprised of a number of VME-based subsystem components that include single- or multi-channel RF receive front end configurations, single- or multi-channel RF transmit front end configurations, wideband A/D and digital downconversion boards, multiple quad DSP boards for IF and/or baseband processing, and D/A and I/Q upconversion boards. The programmable nature of many of the subsystems makes it very flexible in defining waveforms and processing algorithms for leading edge research in communications.

The experimental set-up will be utilized for testing and demonstrations of the indoor wireless air interface and associated prototcols between as many as four modems in an indoor multiple access environment

b. The specific objectives of the program are to integrate technologies associated with smart antennas, space-time coding, LDPC codes, OFDM, MAC protocols, automatic speech recognition, and system-on-a-chip design technologies to advance the state-of-the art associated with the design of a fixed-wireless radio system having high spectral efficiencies (e.g., 6 to 10 bits/s/Hz) that can potentially lead to data rates approaching 1 Gb/s (assuming an eventual 100 MHz footprint). While the prototype radios will only be able to achieve a fraction of the desired rates, algorithms employed in the testbed will be investigated in a system-on-a-chip architecture study to identify SOC architecture yielding improved processing efficiency and performance.

c. OFDM-based waveforms have either been adopted or are under consideration for a number of standards, including IEEE 802.11a, ASTM DSRC, IEEE 802.16a, etc. This research, which will combine the collective efforts of approximately 20 faculty and 30 PhD students at Georgia Tech, has already resulted in contributions into the standards development of 802.16a (submission of a preamble design proposal). The goal of high spectral efficiencies (e.g., > 6 bits/s/Hz) is one that, if achieved, would help utilize scarce spectrum resources in an efficient manner. Moreover, since the collective goal of Yamacraw is to stimulate collaboration with industry, technologies developed from the research would have a means for transfer to the commercial sector. Wireless testing and demonstrations are key components in the development cycle and in soliciting commercial interest in developed technologies.