EXHIBIT A
SiBEAM, Inc.
FILE NUMBER: 0029-EX-ML-2008
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FCC FORM 442 - FEDERAL COMMUNICATIONS COMMISSION APPLICATION FOR NEW OR MODIFIED RADIO STATION UNDER PART 5 OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

In answer to Question 7, Form 442, we offer the following:

1. "The complete program of research and experimentation proposed including description of equipment and theory of operation."

SiBEAM, Inc., is the designer and manufacturer of wireless personal area networking (WPAN) electronics that operate in the 57 – 64 GHz Unlicensed Spectrum band. The products that SiBEAM produces are based on highly-integrated, modern solid-state technology. Those products are currently in the prototype phase; the prototypes comprise "bread-basket" sized enclosures consisting largely of digital electronics (PFGAs) and two pairs of SiBEAM custom RF chips. In their final product form, the products will be fully integrated into four integrated circuit chips, two of which will be digital and two of which will be RF.

In order to continue to characterize and test the reliability of these prototypes, including the measurement propagation characteristics, further experiments with modulation schemes, and to explore system-level implementation alternatives, we need to continue our experimental development. We are currently operating under an FCC Experimental License (call letters WD2XWY) and need to continue the experiments for up to an additional 24 months.

The electronics that we have assembled to conduct our experiments consist of the following:

- The transmitter consists of 1.5 Gb/s serial digital data source which is modulated with on-off keying at a 3-3.5 GHz IF center frequency. The IF spectrum is about 3 GHz wide from null to null. The IF is then up converted to a 60-60.5 GHz center frequency (57 GHz LO) where is radiated by a 36-element antenna array (nominally 15 dBi gain) measuring approximately 2 cm on a side.
- The receiver consists of an identical antenna array that feeds the modulated signal at 60-60.5 GHz center frequency to the RF receiver chain. A 57 GHz LO is used to down convert the RF signal to a 3-3.5 GHz IF. The 1.5 Gb/s on-off keying signal is detected at the IF frequency.
- The transmitter 3 GHz first LO is generated with a PLL while the transmit and receive 57 GHz LOs are generated with DROs.

- The gain of the antenna (a 6-by-6 array of ~0.5 mm dots) is about 15 dBi
- The width of the directional antenna beam is about 30 degrees.
- The antenna radiates at 0 degrees in the vertical and horizontal directions.

2. "The specific objectives sought to be accomplished."

- Using the experimental system described in outline form above, we seek to prove that we can transmit multi-gigabit/sec data over a 60 GHz wireless system over a distance up to 10 meters in an indoor environment.
- We wish to establish the influence of reflections from common indoor structures (walls, furniture, windows, ceilings, floors, etc.) on the robustness of the transmission of those data.
- We wish to optimize our modulation scheme and methods for dealing with multi-path interference.

3. "How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion or utilization of the radio art, or is along line not already investigated."

The commercial use of the 57 – 64 GHz Unlicensed Spectrum band is just a little over a decade old (first *Report and Order* dated December 15, 1995). While most of this band's commercial uses to date involve industrial, outdoor point-to-point links, there is an interesting set of indoor, short-range uses that have a vast consumer market potential. One testament to this potential is the IEEE's commissioning a special Task Group of its 802.15 Standards Committee to develop a standard appropriate for Wireless Personal Area Networking (WPAN). Also, an international group of companies has formed the WirelessHD Consortium in order to develop a set of commercial interoperability standards. Other efforts also exist.

Recent developments in conventional CMOS integrated circuit technology[1] point to the promise of low-cost realizations of WPAN systems suitable for both the industrial and the consumer markets. We believe that such realizations will be possible but only with the incorporation, in low-cost IC technology, of substantial amounts of digital signal processing and novel microwave transmission architectures. In this endeavor we will be developing and expanding the radio art along new lines that demonstrate multi-giga-bit per second data transmission, multi-path mitigation through extensive digital signal processing and novel beam-steering methods. Our modeling and simulation efforts already show great promise for these developments. We need to continue our series of

[1] "Millimeter-wave CMOS design," Doan, C.H., et. al., *IEEE Journal of Solid-state Circuits*, Jan. 2005 Volume: 40 , Issue: 1, pp. 144 - 155

experiments, now incorporating some of our own proprietary, custom integrated circuits, in order to prove commercial viability.

Based on the past 18 months' work, we believe that we have an excellent chance of contributing substantially to a new suite of products in this portion of the millimeter-wave band.