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Federal Communications Commission
Office of Secretary

July 24, 1998

VIA HAND DELIVERY

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
Experimental Licensing Branch
2000 M Street, NW
Suite 230, MS 1300E1
Washington, D.C. 20554

Re: Spike Technologies, Inc.
Experimental Station WA2XCV
Nashua, New Hampshire
Progress Report

Dear Ms. Salas:

Submitted herewith on behalf of Spike Technologies, Inc. ("Spike"), licensee of the above-captioned experimental facility, is an original and one copy the station's semi-annual progress report pursuant to Section 5.204(a) of the Commission's Rules. This is Spike's fourth progress report filing.

Please contact the undersigned if there are any questions.

Respectfully submitted,

E. Lawrence Zolt

cc: Carl Huie, OET

Enclosure

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Spike Technologies, Inc.

Experimental License

Progress Report No. 4

Introduction

Spike Technologies is a microwave equipment provider with technical facilities in Nashua, New Hampshire. Spike's technical strengths include a proprietary sectored antenna system that creates a multitude of narrow, individually-focused beams, resulting in greatly increased capacity through frequency reuse, two-way capabilities, and the ability to reduce interference to and from the system by positioning the beams accordingly.

In late 1995, Spike began developing equipment for bi-directional delivery of digital services such as Internet, data connectivity, videoconferencing and telephony over MMDS channels. These services will enable the wireless cable operator to more effectively compete in a highly competitive marketplace for delivery of communications services.

In July 1996 Spike was granted an experimental license to test its systems using MMDS and ITFS spectrum in the vicinity of the Company's Nashua, New Hampshire technical facility. The license specifies that Spike is required to submit semi-annual reports of its progress to the Commission. The first of such reports was filed in January 1997 ("the January 1997 Report"), and contains details of Spike's accomplishments in both technical and market development issues. The second of such reports was filed in July 1997 ("the July 1997 Report"), and focuses on equipment integration issues, macro cell size, the pending two-way ruling and future development plans. The third report was filed in January 1998 (" the January 1998 Report"), and provides information on equipment design and test improvements, type acceptance and the current two-way rulemaking proceeding, CLEC certification activity and International efforts.

This is the fourth of Spike's semi-annual updates to the FCC.

Summary of Items from the Prior Reports

Throughout the January 1997 Report, we touched on various technical issues, and in many cases we mentioned our approaches going forward in these respective areas. By January, we had made significant progress in our component-level designs, and our planned enhancements for our components were fairly clear. We needed to add diagnostic capabilities to our transceivers, so they could be monitored remotely. Also, we needed to examine additional modem designs, to explore different modulation techniques. We were less clear on what system-level issues might arise, although we knew they were certain to surface.

By June 1997, we were well focused on system level issues including the integration of computer networking equipment with the broadband RF equipment. Additional modem prototypes suitable for bi-directional broadband data transmission had still not yet become available.

By January 1998, we had improved our transceiver design and the equipment type acceptance process was underway. Necessary system performance parameters, to ensure robust operation, were becoming clear and our first international system was installed in South America. We also began the process for certification as a Competitive Local Exchange Carrier (CLEC).

We have continued significant progress since the last report. This report will focus on several areas: (I) Equipment design and testing; (ii) Expansion of system operations and CLEC certification; (iii) International efforts (iv) Type acceptance and the current two-way rulemaking proceeding; (v) future activities.

Design and Test

Transceiver Design

Spike has completed a second iteration of Transceiver Design. This step in the ongoing evolution of the product incorporates features for remote control of key parameters (frequency channel, gain and output power). Control commands are passed along the IF signal cable to the transceiver, making it less often necessary for technicians to climb towers. The safety of the work environment has thus been improved. Phase noise characteristics have been improved to support higher modulation densities. Other key features are in overall cost reduction of the CPE equipment. Although we enhanced performance we dropped total cost by nearly $200. This newer version, which also includes diagnostic capabilities described in the January 1998 Report, is in the process of being built and tested. Transceiver test results, coupled with system level operational knowledge, will allow us to continue cost and performance optimization. We continue to work toward the inclusion of a Simple Network Management Protocol (SNMP) chip set, which would send vital information back to the network management software. With this feature, a systems administrator could view a map of the network, identify a defective transmitter and take appropriate remedial measures.

Modem Equipment

Most of our efforts have continued to include the QPSK (or QAM 4) symmetrical modems we have been using all along. These modems continue to perform reliably with more than adequate throughput. Recently we have examined a new modem design and different modulation technique. A Direct Sequence- Code Division Multiple Access (DS-CDMA) based modem has been incorporated in our system level testing at Nashua. This modem is asymmetrical with a QAM16 data rate downstream and QAM 4 data rate upstream. We are continuing the characterization of the modem's performance and plan to deploy in Germany later this year.

Antenna Development

Spike's core technology lies in the Base Station Sectored Antenna. Currently Spike has two pending patents and recently submitted a third for consideration. Part of the ongoing development is to improve sidelobe performance to insure greater frequency reuse and to adapt to higher modulation techniques (QAM64, QAM256). In order to achieve this goal two new labs are being constructed at Spike's Nashua NH facility. One lab is strictly used for materials research and study of tolerance issues. The other lab will consist of two shielded antenna chambers; one is a tapered chamber and the other is a near field chamber for higher frequency measurements. Spike currently operates a symmetrical chamber that allows for measurements up to 6GHZ. Improved facilities will allow measurement of much lower energy levels.

System Test

Initial system tests with the CDMA modem have revealed the ability to simultaneously operate adjacent sectors (that continue to utilize our QAM 4 modems) without interference. Further evaluation of mixed modulation and access methods needs to be conducted. Evaluation of the CDMA modem has led to demonstration of Internet Protocol (IP) based telephony service. Calls originating on the wireless network in Nashua were successfully interfaced to the Public Switched Telephone Network (PSTN) and forwarded to international destinations.

System Operations

We continue to add sites in Nashua for our market test. Additional sites allow us to gather information on sector to sector isolation and gauge the impact of any added interference on the rest of the system. Results continue to be positive and are proving the viability of our sectored approach.

We have completed testing a software-based approach that will allow our system to function as a backbone for a variety of telephone services and in May 1998 we received certification as a Competitive Local Exchange Carrier (CLEC). We feel that if wireless cable operators are to effectively serve the public interest by providing advanced communications services, they will need to understand CLEC issues and technologies. We have begun to bridge this gap in the industry by incorporating these capabilities into our system.

In June 1998, the successful operation and unique capability of Spike's PRIZM Broadband Delivery System (BDS) was recognized by the presentation of two SuperQuest awards at the SuperComm98 communications conference. The SuperQuest awards program honors service providers and enterprise end users for their innovative use of technology in communications networks and services. SuperComm is presented jointly by the Telecommunications Industry Association, Arlington, Va., and the United States Telephone Association, Washington, D.C.
Third-Rail Wireless Services, Inc., a wholly-owned subsidiary of Spike, received an award for the "Most Innovative Public Network of 1997 – Local Access Category." Third-Rail operates the PRIZM BDS in Nashua, New Hampshire, offering High-Speed Internet Access, WAN Connectivity, Video IP Broadcasting, Videoconferencing, IP Telephony, and Remote Outsourcing of IS Services. Third-Rail's VLAN Service provides secure Virtual LAN connections over the combined broadband wireless and terrestrial network.

International

Our South American system is being used extensively for data transfer, video conferencing and Internet access. Phase two to expand the system has started which brings an Emergency Management organization and hundreds of subscribers onto the system network.

The SuperQuest award for the "Most Innovative Enterprise Network of 1997 – Remote Access Category" was presented to the Fundación para el Manejo de Emergencias (FUNDEM), a government agency in Merida, Venezuela. Spike installed a PRIZM BDS for the FUNDEM, providing point-to-multipoint "last mile" connectivity over distances up to 30 miles.
The FUNDEM's PRIZM BDS provides high speed wireless connectivity linking government offices, business facilities, scientific foundations and schools within 30 miles of the Base Station. Included in the system architecture is a wireless backbone link to the city of Tovar, approximately 50 miles from the PRIZM Base Station in Merida. The backbone utilizes Spike's PRIZM Digital Repeater 25 miles from the Base Station. Applications currently in use include IP telephony, videoconferencing, IP video broadcast, wide area network (WAN) connectivity and Internet access.
Videoconferencing over the PRIZM System is used for court arraignments between the Superior Courthouse and the Merida Federal Penitentiary. This system provides full screen video, with audio, and reduces the need to transport prisoners over rough terrain between the two locations. The FUNDEM and the Governor's Palace are also equipped with videoconferencing to be used in the event of an emergency. Later this year, the local school system will also be equipped with videoconferencing for distance learning applications.
IP video broadcasts are used mainly for civil defense. The headquarters of the FUNDEM houses a variety of agencies, including Forestry officials and several police agencies. They can distribute IP video streams to any authorized users on the PRIZM System for purposes including monitoring of forest fires, mudslides and other natural disasters that occur frequently in the Andes. The Merida System is remotely managed by Third-Rail Wireless Services in Nashua, treating Merida as a virtual LAN, and connecting the two locations by using IP Tunneling through the Internet. Every device in Merida is monitored remotely in Nashua.

In accepting the award, Diego Cardona, representing the FUNDEM, had it right when he said:

> "The important thing is that we are not talking about bits, bytes and megabits and how many images you can transmit on the wireless system. The more important thing here is that there is nothing more beautiful than to see the smile of a child in your computer at a long distance, or when you give class in a local town from very far away, or when you save the life of one person with telemedicine, so you have to see what you are really doing. Its not a matter of whether it's 10 megabits, 12 megabits, or 100 megabits, its what you are doing for your society, and how can you change that"

This installation is an example of the benefit our technology can bring to the public, and could certainly be realized here in the United States, as soon as the two-way rulemaking is complete. We thank the Commission for granting our experimental license, and making these accomplishments possible.

FCC Regulatory Matters

As we have a strong desire to move aggressively toward launching PRIZM based communication systems in the United States, we have placed considerable focus on regulatory issues. In May 1998, we received a grant of equipment authorization (type acceptance) for our initial transceiver design from the FCC. The identifier for this equipment is MXM-PRIZM100. We have gained invaluable experience in this area, which will allow us to bring our next generation transceiver quickly through the authorization process.

On October 10, 1997 the Commission released a Notice of Proposed RuleMaking ("NPRM" MM docket 97-217) to substantially amend its rules and enhance the ability of MDS and ITFS licensees to provide two-way communication services. We have become involved in this proceeding and submitted comments and reply comments to offer some of the insight and perspective we have gained. As first outlined in our July 1997 report, we believe that an important feature of a point-to-multipoint broadband data system is the ability to interconnect the subscribers so that they can communicate with one another at high speeds. We have the ability to create an "Intranet" for our system users. An operator who is solely concerned with providing Internet access may not be as concerned with interconnecting the subscribers. With our comments, we have introduced ideas relating to subscriber interconnection, reduced interference through multiple access techniques, and a demonstrated ability to create long distance non-interfering wireless backbone links. As evidenced by recent ex-parte filings from Petitioners in this proceeding, many of our ideas have been incorporated in the latest rule revision proposals. We are anxiously awaiting the Commission's ruling and we look forward to providing any assistance necessary during this critical rulemaking.

On June 1, 1998 we filed an application to renew the experimental license at our Nashua station WA2XCV.

Future Activity

The work we have done at MMDS has served as the basis for designs in other frequency bands. Given the limited frequency resources an operator may have, we believe developing flexibility to operate a system in multiple frequency bands will promote viability of the wireless operator and ultimately competition in the communications industry. For example, a licensee with limited MMDS channels may be able to use that frequency spectrum for downstream transmission, and another frequency block, perhaps WCS, for upstream transmission. Of course, this would require equipment authorized under the appropriate rule parts. We look forward to developing equipment for WCS, GWCS and other services.
With modification to our existing hardware, we are developing a system for use in the European market. We have received an order to supply such systems to Germany. These are based on use of the CDMA modem and operate at 3.5 GHz. Initial use will be for telephony and data services.

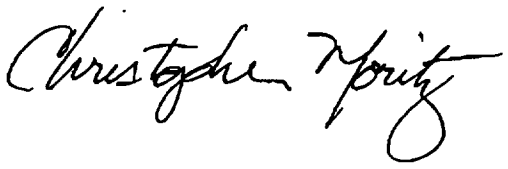
We are currently working with the New Hampshire Office of Emergency Management (NHOEM) and the NH National Guard to define a system for use in an emergency communications network. We plan to jointly propose a solution to the Federal Emergency Management Agency for deployment in FEMA region 1 (New England).

The technical efforts we have discussed will be explored both domestically and internationally. We must continue adding market test sites to the Nashua system and continue identifying multi-user system capacity and interference issues. Further evaluation of different modulation methods and system architectures will prove invaluable.

We applaud the Commission's two-way rulemaking efforts, and hope that the process can be concluded soon.

If any Commission member has questions, please feel free to contact me or Spike's President, Douglas Carey at (212) 924-5000.

Sincerely,



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