SigFX LLC Experimental License Application
Additional Information
FCC Form 402
Call Sign WC2XVO
File Nos: 0020-EX-PL-2002, 0032-EX-ML-2003, 0036-EX-ML-2003

MAIN FORM FIELD 7:

SigFX seeks to extend its experimental license to continue testing its wireless digital communications technology, which carries voice and data messages on the vertical blanking interval ("VBI") of a broadcast signal.

SigFX initiated its testing in 2002. However, due to the economic weakness in the telecommunications sector during the last three years, SigFX was unable to secure the venture capital necessary to complete testing within the three-year authorization period it initially requested for its experimental license. Consequently, in accordance with the Commission's rules allowing experimental licensees to extend or renew their experimental licenses, SigFX hereby seeks to renew or extend the authorization effective date for Experimental License Call Sign WC2XVO from April 1, 2005 to April 1, 2008. SigFX is prepared to meet with Commission Staff to discuss the status of its prior testing or address any questions related to its request for extension.

Under the experimental license, SigFX intends to continue its performance testing to verify its ability to:

1. operate a complete communications system, using broadcast spectrum, that is capable of two-way data and/or voice communications in the VBI;
2. improve signal quality, particularly in the return path;
3. deliver unique communications calls to and from mobile subscriber units that are operating simultaneously;
4. implement a communications network using fixed and mobile subscriber units;
5. test new proprietary modulation schemes that improve on the current direct sequence spread spectrum technology that SigFX uses currently;
6. expand the radius of the SigFX communications network without causing interference or reducing call reliability;
7. operate the SigFX communications network from a higher power broadcast station;
8. expand from testing the outbound and return path scenario on the same channel to testing variations (*i.e.,* outbound on one channel, inbound on a different channel); and
9. communicate between mobile and fixed subscriber units served by different broadcast stations.

More specifically, in the testing covered by the experimental license, SigFX will deliver telecommunications data over WMPN-TV Channel 29 broadcast spectrum. Channel 29 is an analog PBS broadcast station. SigFX will test its subscriber units within WMPN-TV Channel 29

station's entire coverage area (within the Grade B contour). The testing will involve no more than 50 subscriber units, each with a power level of .6 watts. The testing will be designed so that no more than 50 subscriber units will be operating simultaneously.

SigFX will ensure that its testing is in compliance with the Commission's rules for delivering telecommunications services in the VBI and is conducted only with the consent of the broadcaster. SigFX testing to date demonstrates that it is highly unlikely that its technology will create interference issues with Channel 29's broadcast signal, or with other licensed communications transmissions in the testing area. It is SigFX's belief, based on the testing it has conducted to date, that its technology generates communications signals at such low power and emissions levels relative to the broadcast signal that interference during testing under the requested experimental license will not become an issue. However, SigFX agrees to curtail testing in instances where its service causes interference to Channel 29.

Description of the Equipment

Under the experimental license, SigFX is testing two equipment components used in its wireless communications system – a software defined, intelligent wireless radio device and return signal processor.

SigFX's wireless communications system consists of an intelligent subscriber wireless device that constantly measures the characteristics of the wireless spectrum. SigFX's intelligent communication devices have the ability to seamlessly modify their operating frequency, coding schemes, and compression algorithms. These patented technologies have been incorporated into the two primary equipment components that SigFX has tested under its existing experimental license and intends to continue testing pursuant to the extended experimental license – a software defined, intelligent wireless radio device and return signal processor ("RSP").

SigFX's intelligent wireless device is a hand-held radio unit with a consumer function akin to that used currently with cellular, personal communications and specialized mobile radio systems. However, SigFX's software defined radio may be adapted to support multiple standards and add new service features through software, as opposed to hardware, modifications.

SigFX's RSP is the network component deployed at or near the broadcast station's antenna location. The RSP operates as a multi-mode/multi-frequency call-processing device capable of discerning communications signals embedded in the VBI of a broadcast signal, regardless of the coding scheme or frequency used. SigFX believes that the RSP and its software-defined radio can support a variety of coding schemes including:

GSM
HSCSD
GPRS
TDMA
EDGE
1XRTT
CMDA
CDMA 2000
CDMA 1xEV

W-CDMA
TD-SCDMA

Finally, SigFX has developed a frequency-agile, intelligent antenna that has the ability to electronically direct a signal at the appropriate transmitter. This results in increased coverage and improved overall signal quality.

The Specific Objectives

SigFX seeks to extend its experimental license to continue testing its two-way VBI communications technology so that it may ultimately secure equipment authorizations from the Commission for all transmitting equipment associated with its system and so that it may work with broadcasters to deploy PCS-like communications systems as part of their service offerings.

Theory of Operation

SigFX has created a means for deploying a PCS-like communications system using television broadcast spectrum. This is achieved by encoding and delivering communications messages in the VBI of a television broadcast signal. Using SigFX technology, subscribers are assigned a universal personal telecommunications number that correlates to a mobile or stationary communications device. This allows the user to send and receive communications calls (*e.g.*, voice or data) just as they would with a wireless telephone. However, rather than construct a separate wireless network to receive and deliver communications signals between a subscriber and other communications entities (*e.g.*, wireline and other wireless subscribers, host computers, etc.), SigFX has invented a technology that allows communications signals to be transmitted and received by subscribers over the television broadcast network.

SigFX's technology has the potential to fulfill a long-felt need for two-way VBI communications that allows both the transmit and receive portion of a call to be delivered over the same or different broadcast carriers on a point-to-point basis. This is an improvement over past VBI communications technologies that required that the communications signals be sent on different carriers within the broadcast system, or that delivered and received signals via a hybrid system of communications paths (*e.g.,* signals carried on the VBI in one direction and on a wireless, wireline or satellite path in the other direction), as well as solutions that only supported point-to-multipoint information delivery.

Using SigFX's approach, an outgoing signal with an embedded VBI message is received by a low power VBI transceiver or, alternatively, a VBI/PCS composite transceiver for receiving and transmitting messages for VBI and/or PCS communications. The transceiver includes an antenna capable of transmitting a return signal or message on the same VBI carrier at low power and relatively low frequencies. The return signal is detected by the RSP housed at the broadcast location. The RSP extracts the low power communications return signal from the VBI, processes the message and transmits the message to its ultimate address via an interface with the public telecommunications network (*e.g.*, wireline, wireless or satellite).

SigFX has developed a wireless digital communication system with a broadcast interface that encodes communications message information on the VBI. The broadcasting system receives the signal with the encoded communications message from the broadcast interface and

transmits the encoded communications message on a carrier of the outgoing broadcast signal. A mobile or fixed subscriber unit that includes a transceiver detects and receives the outgoing signal. When the subscriber unit receives a signal, the transceiver uses its decoding function to separate the communications message from the remainder of the broadcast signal so that the subscriber can listen to or see the communications message. The transceiver also includes input, encoding and VBI modulating capabilities that allow the subscriber to respond with return message information, encoding the return message information and inserting the VBI-modulated return message signal on the out-going signal of the broadcast. The return signal can be transmitted on the same channel used for the outgoing signal or on a different channel.

An antenna associated with the RSP allows the RSP to detect the return signal from the carrier of the outgoing signal of the broadcast and a message processor ("MESP") decodes the message information from the return signal. The MESP is adapted to transmit the message information to public or private communications networks or public switches.

Based on its testing to date, SigFX believes that it can implement such a network without interfering with the television broadcast content and ancillary features and functions, such as closed captioning or electronic program guides, and without increasing appreciably the emissions associated with the broadcast station. More specifically, SigFX has not witnessed any interference to the carrier broadcast station – UHF Channel 46 in Ridgeland Mississippi – when SigFX inserts and delivers communications signals in the VBI. There is no interference from the downlink voice data in the broadcast signal. Moreover, SigFX has not been made aware that its testing has caused interference to other neighboring broadcast or wireless services.

How the Program of Experimentation has a Reasonable Promise of Contributing to the Development, Extension, Expansion or Utilization of the Radio Art

SigFX believes that its technology has the potential of contributing to the radio arts in four ways.

Value-Added Spectrum Use – SigFX's technology will give television broadcasters the option of expanding their service offerings to include voice and data communications services. This opportunity will provide local broadcasters with the ability to enhance their market position in the face of competition from cable television, satellite television and the Internet without interfering with existing broadcast services.

Spectrum Efficiency – SigFX's technology helps to address spectrum shortages for wireless voice and data communications applications and improves spectrum efficiency by putting available broadcast spectrum capability to additional use.

Resource Efficient Deployment – When compared with traditional wireless networks, the voice and data communications networks possible with SigFX technology may be constructed quickly and at low cost. Unlike cellular, SMR or PCS, where multiple antennas must be deployed over a large geographic area to achieve satisfactory signal coverage, SigFX's technology allows a large geographic area to be served by a single or smaller number of antennas, because the communications coverage area mirrors or approximates that of the broadcast signal. For example, if a broadcast signal coverage area has a radius of 100 miles, SigFX's wireless communications network would have the same or similar signal coverage area. A PCS operator could be required to deploy a larger number of antennas to achieve the same

coverage. Moreover, because SigFX's technology can be implemented through already deployed broadcast systems, little or no additional construction or permitting will be needed to launch the communications service. The signal coverage and deployment efficiencies associated with SigFX's solution means that wireless communications services can be launched quickly and at a reduced cost.

Bridging the Digital Divide – Because of the resource and spectrum efficiencies associated with building a wireless communications network that relies on broadcast systems, SigFX's technology represents a tool for bringing wireless communications services to rural and economically-challenged areas. Cost is a key barrier to wireless service deployment in these areas. Service providers tend to build wireless communications systems in areas with population size and density levels, as well as income levels, that are large enough to generate the subscription and call volumes needed to allow a provider to recover the costs associated with securing spectrum and building and serving the network. Rural and economically-challenged areas do not always present enough business opportunity to justify the high cost of deploying service. SigFX's technology helps to solve this problem because it allows a broadcaster or its business partner to avoid the costs associated with securing spectrum at auction, constructing multiple cell sites,[1] obtaining zoning permits, and deploying the necessary technology. Thus, the financial model used to determine whether a wireless communications system can be cost-justified is altered significantly because fewer subscribers and less revenue generation are needed to ensure that costs are recovered and profits are possible. SigFX expects that these benefits will provide incentive for companies to bring wireless communications systems to rural and economically-challenged areas that are being left behind currently in the digital revolution.

MAIN FORM FIELD 10:

SigFX's communications messages will be transmitted to SigFX's experimental subscriber devices through WMPN-TV Channel 29 broadcast antennas. SigFX may use receive-only antenna arrays to receive the return signal from the subscriber units. Consequently, SigFX will not be adding any new transmitting antennas other than those associated with its subscriber units. SigFX is not providing information concerning the WMPN-TV Channel 29 transmitting antennas because SigFX is relying on Channel 29's broadcast authorization to deliver communications signals over their broadcast systems. The information regarding these broadcast antennas is already included in WMPN-TV Channel 29's FCC and FAA authorization applications on file with these agencies. SigFX is willing to provide this information to the Commission if it will help the Commission staff process SigFX's request to extend its experimental license.

MAIN FORM FIELD 11:

SigFX understands that the broadcast station on which it is testing its communications technology comply with Section 5.152.

ANTENNA REGISTRATION FORM FIELD 2d:

[1] The ability of SigFX's technology to leverage the larger geographic coverage areas associated with television broadcast signals is particularly beneficial when trying to serve rural areas with dispersed populations.

Radius of operation is approximated from the Grade B contour from WMPN-TV Channel 29 contour map on file with the Commission. SigFX intends to test its equipment using a radius of operation that mirrors the boundary of WMPN-TV Channel 29's grade B contour.