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January 30, 2002

Via E-Mail

Mr. Carl Huie
Experimental Licensing Branch
Federal Communications Commission
445 12th Street, S.W.
Mail Stop 1300E1
Washington, DC 20554

RE: SigFX, LLC Progress Report; Special Temporary Authorization (File No. 0280-EX-ST-2001)

Dear Carl:

Pursuant to a Special Temporary Authorization ("STA") (File No. 0280-EX-ST-2001), SigFX has been testing a wireless digital communications system that carries voice and data messages on the vertical blanking interval ("VBI") of a broadcast signal of television station Channel 46 in Ridgeland, Mississippi. The STA includes a special condition Number 4 that requires SigFX to file a progress report describing the results of its testing. Now that SigFX is completing the first phase of performance testing of its wireless communications method and associated equipment, it is submitting the required progress report.

SigFX also would like to alert the Commission that, in the near future, it will be filing an experimental license application so that SigFX may continue to test 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;

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2. improve signal quality, particularly in the return path, based on what SigFX learned during the first testing phase;
3. deliver unique communications calls to and from mobile subscriber units that are operating simultaneously;

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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.

The Technology

Description of the Equipment

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 is testing under the STA – 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

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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

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

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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.

Test Results

SigFX's initial round of testing focused on two component parts of the communications system: 1) the downlink path in which an incoming communications signal from the public telephone network ("PTN") is delivered to a SigFX mobile subscriber unit; and 2) the return path in which a communications signal is sent from a SigFX mobile subscriber unit to the PTN. Exhibit A depicts the test area and general test results.

Broadcast Station Interference

Based on the testing it has conducted thus far, 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. Exhibit B shows color bars received at the SigFX mobile subscriber unit when voice communications are transmitted on lines 10 and 11 of 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.

The Downlink Path

In order to deliver two-way voice or data services using the SigFX network, SigFX must be able to deliver incoming communications to its mobile subscriber units. SigFX tested its ability to take an incoming call from a wireline or wireless telephone on the PTN, route the

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incoming call to SigFX's transmit/receive board, encode, digitize and insert the incoming communications into the VBI of Channel 46 and deliver a reliable communications signal to a SigFX mobile subscriber unit operating within a one mile radius of the television station. This chain of events represents the downlink path. It occurs when a communications call is first initiated from a wireline or wireless PTN user to the SigFX subscriber and repeatedly during the course of a typical two-way conversation. SigFX is attempting to perfect its technology so that it can establish and maintain communications on the downlink path with low bit loss and high content clarity that allows the recipient to comprehend the communications message without unreasonable strain.

During its testing, SigFX found that it had little difficulty delivering a reliable signal to a single SigFX mobile subscriber unit. However, SigFX encountered some challenges when it attempted to encode two unrelated communications signals that had to be delivered simultaneously to the correct unique mobile subscriber units. SigFX expended a significant amount of time under the STA resolving this problem. SigFX has determined how to eliminate the encoding problem and intends to further test, pursuant to an experimental license, its ability to encode, insert and deliver simultaneously more than two communications signals to the correct mobile subscriber unit.

The Return Path

The second aspect of SigFX's first round of testing involved the return path. The return path consists of a communications link from the SigFX mobile subscriber unit to the PTN. The RSP detects and extracts the communications return signal from the VBI, processes the message and transmits the message to its ultimate address via an interface with the PTN. SigFX began its field testing of the return path in December 2001.

After the first phase of testing, SigFX learned that it was facing signal propagation issues that appear to be tied to factors specifically related to Channel 46's station location and configuration. For example, Channel 46 is a low power UHF station that uses a relatively short tower. The tower is located in hilly terrain and is surrounded by business and residential buildings. SigFX believes that it will not encounter the same degree of signal propagation issues if it is sending communications signals on the VBI of a broadcast station with a taller tower and/or better siting. Moreover, SigFX intends to test and modify its technology to mitigate the signal propagation issues at its current location.

SigFX also has learned that its prototype transmitter needs better filtering to reduce communications noise. In the next testing phase, SigFX anticipates that it will further test its filtering technology, as well as modify gain in an attempt to reduce noise.

Multipath Affects

When testing SigFX's ability to carry communications data on the VBI, SigFX

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encountered multipath issues created when the broadcast signal bounces off physical structures in the Channel 46 broadcast area (see Exhibit A). Multipath creates time-delayed copies of the SigFX communications signal in the VBI that must be eliminated. Now that its testing has alerted SigFX to the negative impact of multipath on the communications signal, it is investigating ways to mitigate the problem through algorithm and equipment improvements. SigFX intends to test its solutions as part of any additional testing under an experimental license.

* * *

SigFX would be happy to provide the Commission with additional information about its communications technology and testing, including through field demonstrations. Please contact me at (202) 756-8235 if you would like to set up a meeting with SigFX.

Very truly yours,

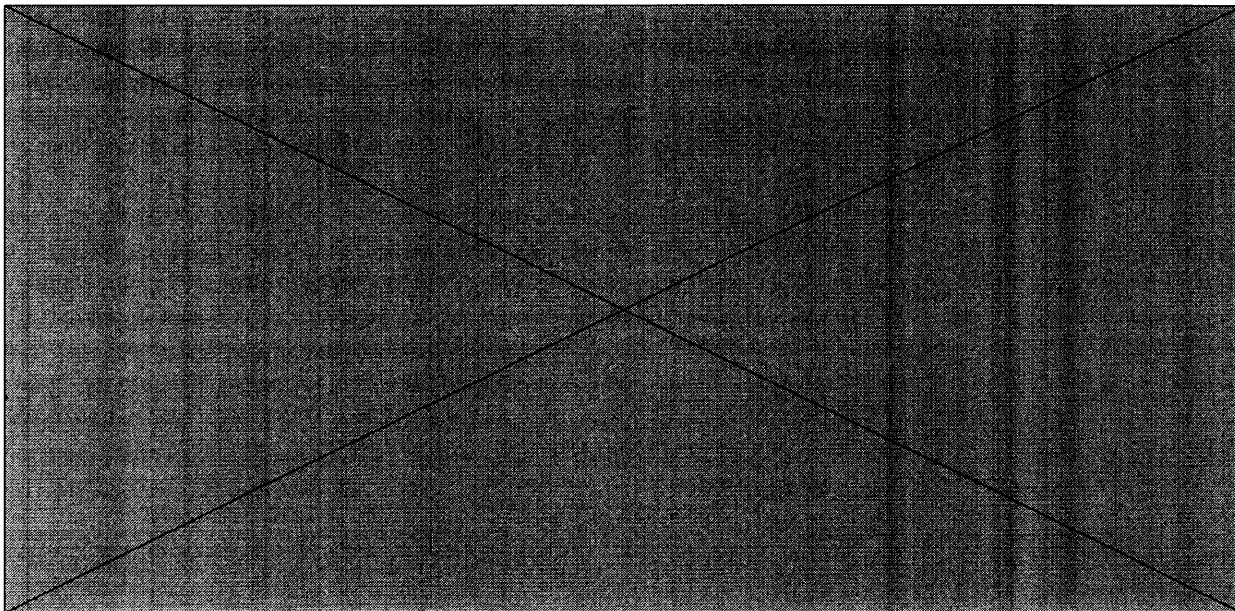
/s/ Catherine M. Krupka

Catherine M. Krupka

Counsel for SigFX, LLC

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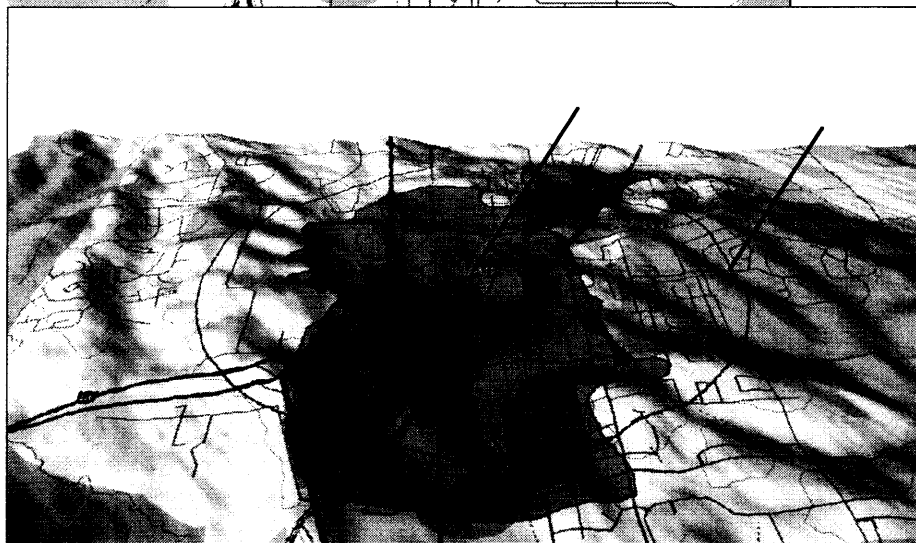
Exhibit A



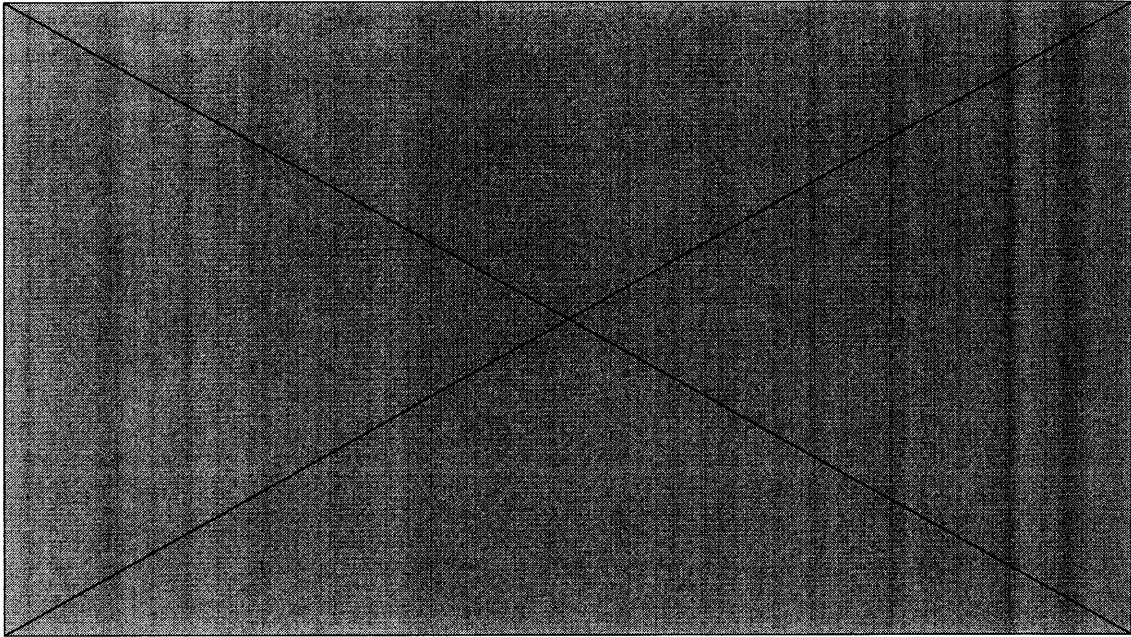
Notes:

1. Voice is intelligible with error rates up to 60%.
2. Due to multipath caused by metal buildings and topography, there are areas within the "good" area where reception can be poor.

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SigFX

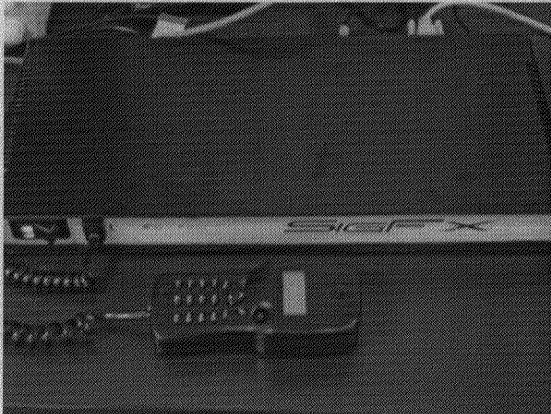
VBI Handset and Mobile Unit

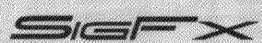
PSI

VBI Handset



Mobile Unit

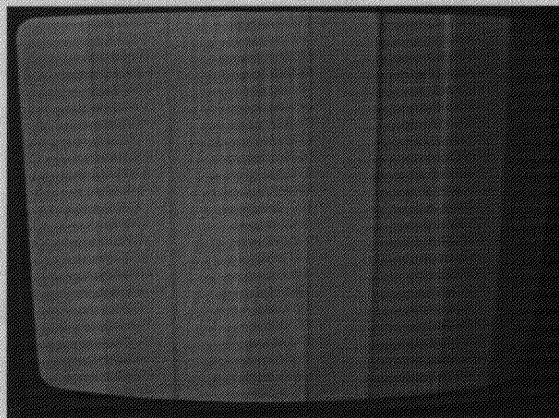




Color Bars with Inserted Data



Color Bars received at Mobile Unit with Voice transmitted on lines 10 and 11 of the Vertical Blanking Interval from the broadcast station.



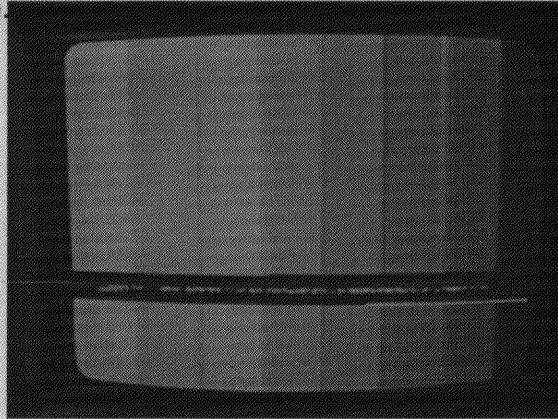
SigFX

Digital Picture of VBI Data

PSI

Color Bars received at Mobile Unit with Voice transmitted on lines 10 and 11 of the Vertical Blanking Interval from the broadcast station with the vertical blanking interval visible.

Voice Data in
the VBI only



No interference
from the downlink
voice data in the
broadcast signal.

SIGFX

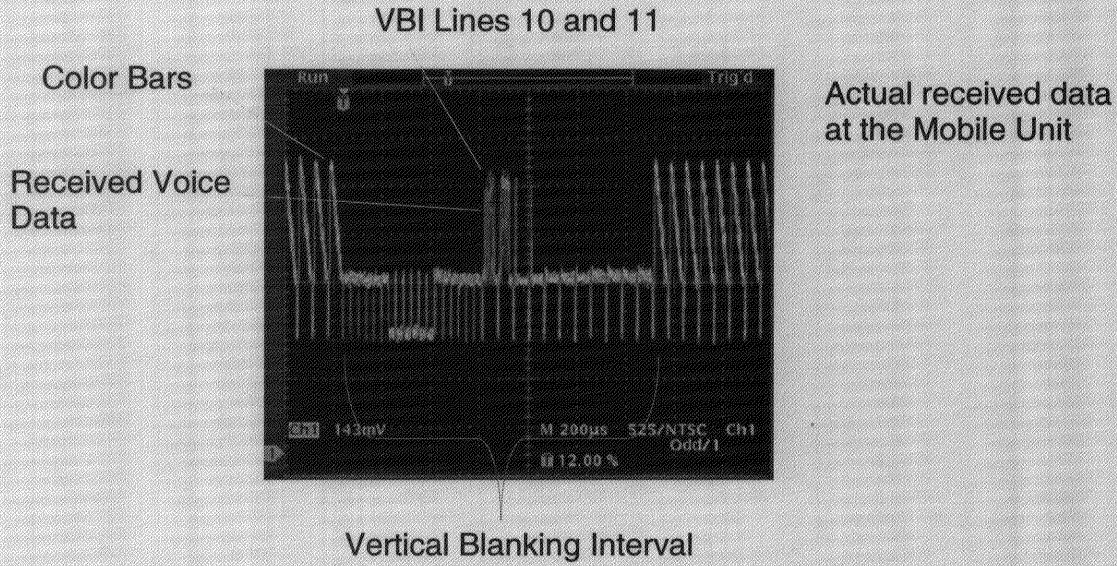
Color Bars with No Data

PSI

Color Bars received at Mobile Unit with no data present and the vertical blanking interval visible.

No data in
the VBI



SIGFX**VBI Data at Mobile Unit****PSI**

SIGFX

Video of Mobile Unit

PSI

Video of received voice at Mobile Unit

