COMSEARCH

Electronic Filing

January 29, 2002

FEDERAL COMMUNICATIONS COMMISSION
Experimental Radio Service
P.O. Box 358320
Pittsburgh, PA 15251-5320

Dear Sir or Madam:

This letter is to request an Special Temporary Authority (STA) to operate a transmitter in certain selected bands between 2.0 GHz to 3.0 GHz in Loudon County, Virginia, as described below. In accordance with 47 CFR chapter 1, (10-1-00 edition), section 5.61, the attached Exhibit A – System Description is being provided to support the application.

Saraband Wireless and Comsearch are working on an existing grant from the National Science Foundation, which began on January 1, 2002 and will run until June 2002. Since all outdoor work under this grant must be finished by June 2002, Comsearch respectfully requests the FCC to expedite the approval of this STA request. If you have any questions please call.

Sincerely,
COMSEARCH

Kenneth G. Ryan
Director, Spectrum Management Services
(703) 726-5685
kryan@comsearch.com

Exhibit A– System Description

A.1 - Name, address, phone number of the applicant.

Ken Ryan
Comsearch a Division of Allen Telecom, Inc.
19700 Janelia Farm Blvd.
Ashburn, VA 20147
Voice: (703) 726-5685
Fax: (703) 726-5593
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A.2 - Description of why a Special Temporary Authority (STA) is needed.

Comsearch, Inc., in conjunction with Saraband Wireless, Inc., of Fairfax Virginia, is carrying out a National Science Foundation research project to develop a channel calibration device for use initially in the MMDS/ITFS bands, and later for use in other licensed and unlicensed bands under 5 GHz. The NSF award grant number is 0128515, a description of this award can found at the following web site: http://www.fastlane.nsf.gov/servlet/showaward?award=0128515. When operational, the device will be useful for wireless LANs and long-range wireless Internet delivery systems.

The reason for the STA request is to perform outdoor experiments between the Comsearch location in Ashburn Virginia and selected locations up to 20 miles away. In particular, the test needs to determine if the measurement technique works in a variety of path environments such as wooded, hills, blockage by buildings, stationary versus low-speed mobile, line of sight versus beyond line of sight.

Figure A.1 shows the electronics configuration to be used during this test. Numbered items are described later in section A.7, Table A.1.

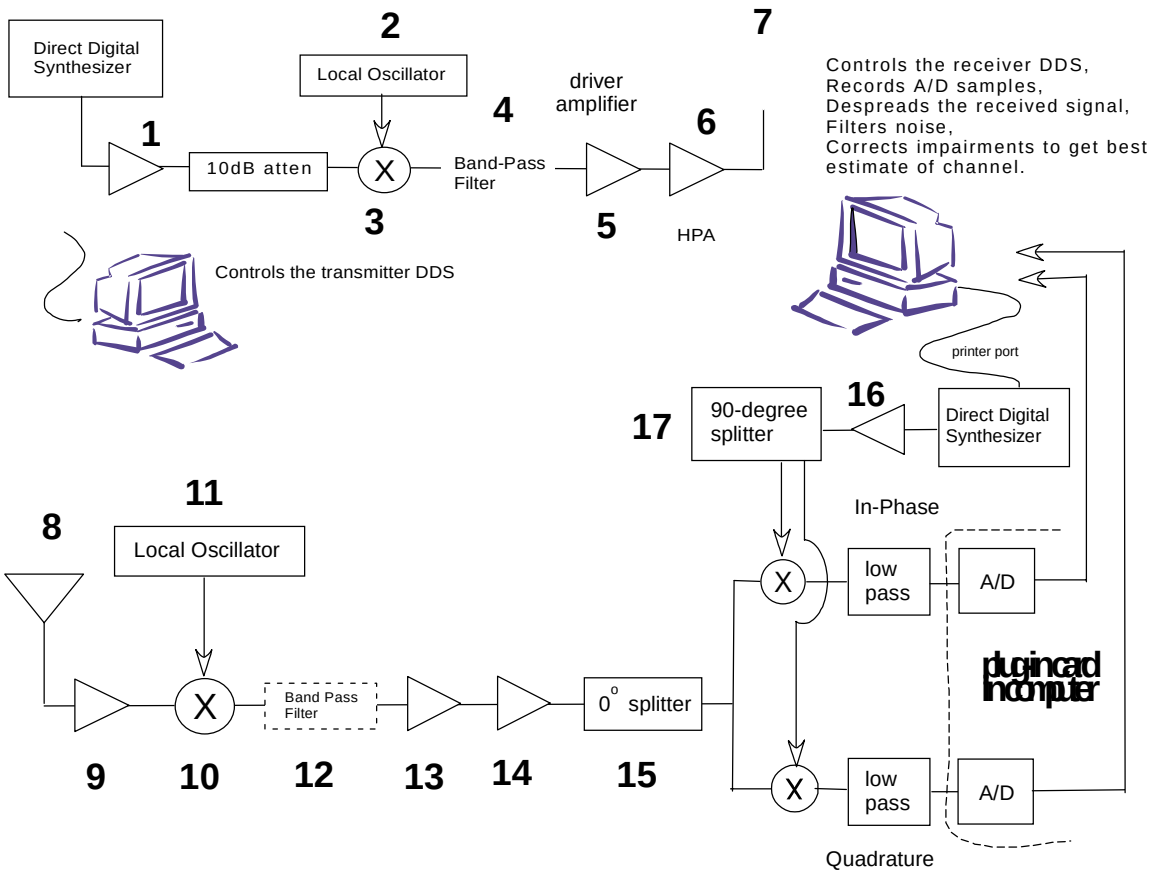
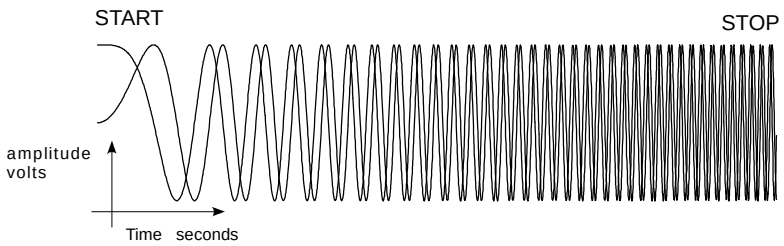


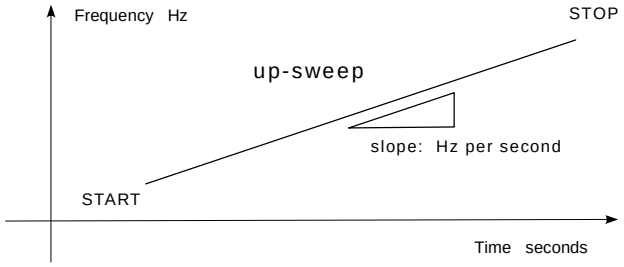
Figure A.1 - Configuration of Transmitter and Receiver Electronics to be Used During the Testing Period

It is planned to have the transmit portion located on the roof of the Comsearch building in Ashburn Virginia with the receive portion located in a van. The transmitter will be a directional antenna, the receive antenna in the van to be will be an omni antenna positioned on the roof of the van or on a tripod on the ground.

The signal to be transmitted is made up of segments as shown here in Figure A.2.



(a) Time Domain Plot of Linear FM Signal's In-Phase and Quadrature Components



(b) Frequency Domain Plot of Linear FM Signal

Figure A.2 - Signal to be Used During The Testing Period is Made Up of Linear FM Sweep Segments

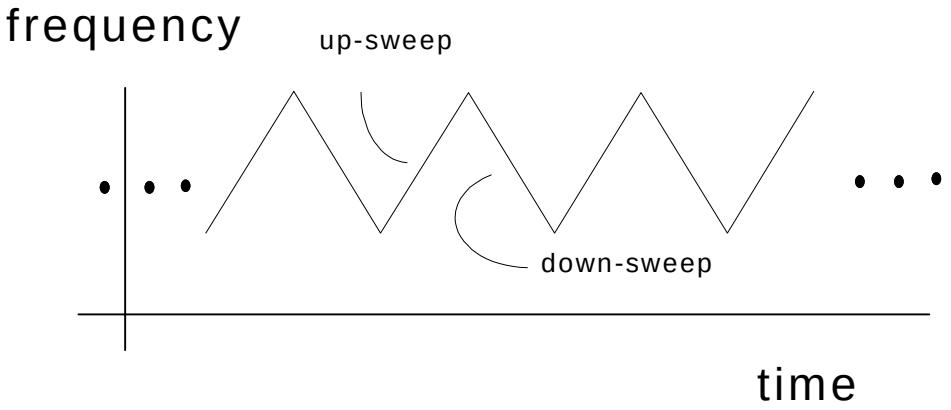


Figure A.3 - Actual Signal is Continuous Constant-Envelope Repetitive Linear FM Sweep Signal Having Rectangular Power Spectrum

The actual transmitted signal is a repetitive constant envelope linear FM signal with equal up-going and down-going frequency sweeps, as shown in the sawtooth

pattern, Figure A.3. The signal will always have continuous phase at the transitions from UP to DOWN.

This type of signal has a rectangular power density spectrum (uniform energy dispersal) with very low spill-over outside the band due to the continuous phase nature of the signal. A functional description of the device is given next.

The channel calibrator, shown in Figure A.1, will be sending out FM modulated signals from the rooftop of the Comsearch building and received in a van. Since these two locations may be up to 20 miles separation, and since both transmitter and receiver start from a power-off condition, the receiver does not have any pre-knowledge of the waveform's timing epoch or exact center frequency, but does know the extent of the triangular sweep. Also, the period of the waveform is precisely known at the receive end. Hence, the receiver needs to go through a "training" period, called *acquisition*, where it must "discover" the start-stop times of the transmit signal, and must learn when the signal is going "UP" and when it is going "DOWN". Once acquisition is achieved, the receiver must fine-tune to follow the transmit signal precisely in time sync and frequency sync. The fine tuning phase is called *tracking*.

In summary, the STA is needed to carry out final design, debugging, and validation of acquisition and tracking processing software in a wireless channel calibrator. A typical run will take about 10 minutes and will collect about 26 M-bytes of data from the A/D converter in the receiver. These files are processed off-line to obtain additional characteristics of the channel. The STA will permit Saraband Wireless to develop the correct acquisition and tracking modes of its device and will permit compliance with the terms of the National Science Foundation grant which runs from January 2002 to June, 2002.

Figure A.4 is a map showing the location of the transmitter at the Comsearch Ashburn Facility.

The receiver will be driven in a van to various locations within a 20 mile radius of the transmitter allowing propagation through a variety of environments including trees and foliage, around obstructions such as buildings, and to the outer limits of the signal handling capability of the receiver.

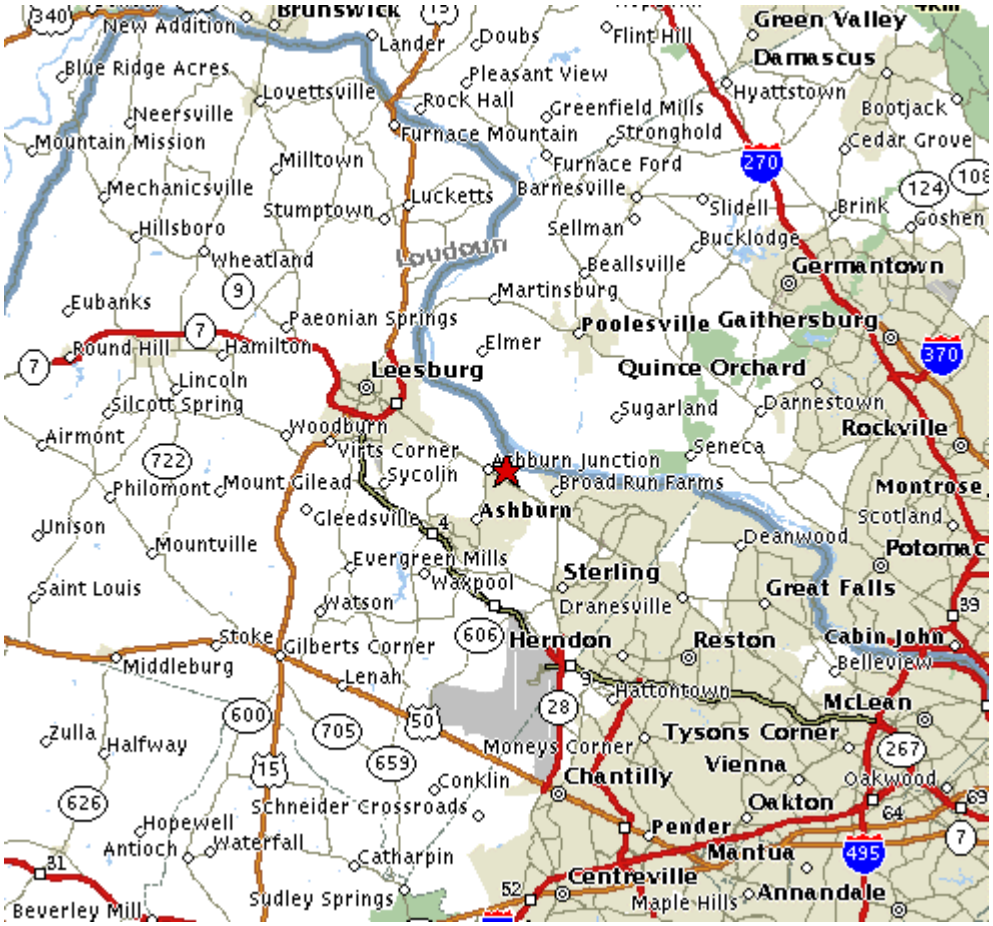


Figure A.4 – Location of transmitter at Comsearch headquarters in Ashburn, VA.

A.3 Description of the operation to be conducted and its purpose

A measurement and software verification session will require about two hours of outdoor activity followed by one hour of indoor activity. Coordination between outdoor and indoor locations will take place by cell phone. Initial outdoor testing will be done right in the vicinity of the Comsearch office location. At each location, a range of system parameters need to be tested, including the period of the triangular sweep signal, the transmit power, and the frequency sweep range. The outdoor unit will be run off the van's car battery and a 120v 60 Hz inverter. Generally, the van will be stationary for the duration of the test. Some limited van motion studies are planned if preliminary data gathering runs smoothly.

A.4 Time and dates of proposed operation.

There will be time in one day for about three independent sessions of testing, each from a different location. It is anticipated that tests will be run during business hours and on weekends during daylight, beginning around February 1, 2002, and extending until about June 30, 2002.

A.5 Class of station

The transmitter will be fixed all of the time. Once software has been debugged to insure proper acquisition and tracking from a powered-off to powered-on situation, some limited off-street motion studies (van moving at about 5 mph in a parking lot, for example) may be done to see if the receiver can track changes in the link.

A.6 Description of the location and, if applicable, geographic coordinates of the proposed operation.

All transmit signals will be from rooftop locations from the Comsearch facility, as shown in Figure 4. Coordinates are 39° 04' 11.6" north latitude and 77° 27' 58.2" west longitude.

A.7 Equipment to be used, including name of manufacturer, model and number of units.

Equipment shown numbered in Figure A.1 is described in the Table A.1 below.

Item Number in Figure 1	Description of Item	Manufacturer and Part Number
1	amplifier	Q-Bit 262
2	frequency synthesizer	HP 83630L 10 MHz to 26.5 GHz
3	mixer	Mini-Circuits ZFM-15
4	band pass filter	K & L 033F8
5	driver amplifier	Mini-Circuits ZKL-2R7
6	high power amplifier	Stealth Microwave SM2527-50L 2.5-2.7 GHz 100 watts
7	Directional antenna	Mobile Mark SCR14-mod, corner reflector antenna
8	omni antenna	OD6-2500 Mobile Mark IMAG5-TBD
9	low noise amplifier	Mini-Circuits ZJL-3g
10	mixer	Mini-Circuits ZFM-15
11	frequency synthesizer	HP ESG-D400A 250 kHz to 4000 MHz
12	band pass filter	Mini-Circuits SBP-70
13	amplifier	Q-Bit 500-2
14	amplifier	Q-Bit 262 26 dB
15	zero degree splitter	Mini-Circuits ZFSC-2-1WB
16	amplifier	Q-Bit 500-2
17	ninety degree splitter	Mini-Circuits ZMSCQ-2-90

Table A.1 – Summary of test link equipment

The same transmit unit will be used to run all of the tests, so only one transmission will ever be on the air at one time.

A.8 Frequencies Desired

This STA request is for a six MHz contiguous slice of frequencies as shown in the Table A.2 below. The frequency sweep waveform is completely settable by the Analog Devices direct digital synthesizer. The transmit waveform will always be contained in the 6 MHz slice being requested.

Request Priority	Frequency Slice	Description: Current Owner-Licensee, Radio Regulations Designator, Reason for STA Request
1	MMDS, only one channel to be specified by Worldcom D1 2554-2560 MHz or D2 2566-2572 MHz or E1 2596-2602 MHz or E2 2608-2614 MHz or E3 2620-2626 MHz or E4 2632-2638 MHz	According to Worldcom Channels D1, D2, and all Es are unused at this time. As of 1/28/02 we have coordinated this test with incumbents and expect to receive clearances to use the band shortly.

The MMDS spectrum in this area is controlled by Worldcom. Comsearch has been in contact with Worldcom and has forwarded technical parameters regarding the operation of this test. As a concession to Worldcom's customer's existing use of the adjacent channels in the MMDS band, Saraband has agreed to limit the transmit bandwidth to 5.7 MHz or more if necessary.

A.9 Maximum effective radiated power (ERP) or equivalent isotropically radiated power (EIRP)

A transmit antenna of the type listed in the above table has a gain in the horizontal direction of about 14 dB. The high powered amplifier is rated for 100 watts maximum. The maximum EIRP of the transmitter will not exceed 34 dBW.

A.10 Emission designator and description of emission (bandwidth, modulation, etc.)

The signal transmitted will be a repetitive FM energy dispersal function with linear frequency up-ramp and down-ramp having continuous phase at the transitions. The period of the FM signal may vary during the outdoor testing from 0.5 seconds to one second long.

According to paragraph 2.201 of 47 CFR Chapter 1 (10-1-99 Edition), this signal has emission designator **F3N**, F for frequency modulation, 3 for single channel containing analog information (the sawtooth shown in Figure 4), and **N** for no information transmitted since no additional information is carried other than the sawtooth.

A.11 Overall height of antenna structure above the ground

The transmitter will be roof mounted no higher than 6' above roof top level.