



GEOPHONE COMPANY, L.L.C.
180 Admiral Cochrane Dr.
Suite 310
Annapolis, MD 21401 USA
Phone: 410-571-9090
FAX: 410-571-0022
E-mail: mktg@geophone.com

S-3130-EX-97
WA2XPD

11/6/97

To Douglas Young, Staff Engineer
Federal Communications Commission
~~Satellite and Radiocommunications Division~~ OFFICE OF ENGINEERING & TECHNOLOGY
~~International Bureau~~
2000 M Street, NW, Room 800 SUITE 230
Washington, DC, 20554
TELEPHONE 202-418-2440, FAX 202-418-1918

From: Steven W. Sweeney
Theodore L. Battle/ Richard Lilly

Re: Request for Special Temporary Authorization

GeoPhone Company L.L.C. hereby requests Special Temporary Authorization for two fixed C-Band Transmit / Receive VSAT Earth Stations for experimental service operation in the Domestic Fixed Satellite Service at a prior coordinated location in Annapolis MD. An application for Experimental Radio Service Authorization under CFR 47, Part 5 has been filed (dated November 5, 1997 for these same Earth Stations.

GeoPhone has completed much of the initial experimental program using our Ku Band terminals and has developed and built complete C-Band terminals and radios. GeoPhone urgently needs to undertake testing and validation of these terminals and components and demonstrate performance by the end of 1997. Several prospective international customers require demonstration of operation over satellites in the immediate future. The normal processing time for license application, combined with year end holidays, means that to compete for these contracts we must begin testing in November. Failure to perform these satellite tests on a timely basis would severely impact on trade and employment.

Another factor in the requirement for immediate transmission authorization is that in order to achieve objectives 2 and 3 of our experimental program we require acquisition of data and operation during wet Fall / Winter weather as well as Spring / Summer because of the effects of atmospheric propagation on our testing.

Granted 5930-EX-PL-97
instead.
DJF 12/5/97



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F a c s i m i l e

Fax: 202-418-1918

Pages: 26

Phone: 202-418-2440

Date: December 2, 1997

Re: STA approval

CC:

Message:

To: Douglas Young
Staff Engineer FCC

Please find attached a copy of the request for STA approval submitted to the FCC in Pittsburg, I have sent you the entire package again, although you already have the information. Thank you for your cooperation, and support, Anything that I can do in assisting your processing of this request, please dont hesitate to contact me.

Sincerely Yours

Ted Battle



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180 Admiral Cochrane Dr.
Suite 310
Annapolis, MD 21401 USA
Phone: 410-571-9090
FAX: 410-571-0022
E-mail: mktg@geophone.com

12/2/97

To Federal Communications Commission
Experimental Radio Service
PO Box 35320
Pittsburg, Pennsylvania 1525-5320

From: Steven W. Sweeney
Theodore L. Battle/ Richard Lilly

Re: Request for Special Temporary Authorization

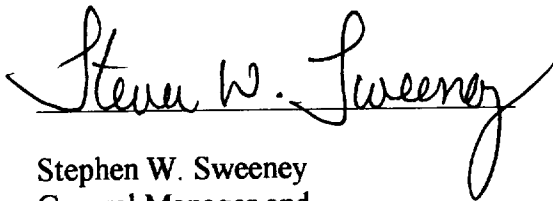
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Another factor in the requirement for immediate transmission authorization is that in order to achieve objectives 2 and 3 of our experimental program we require acquisition of data and operation during wet Fall / Winter weather as well as Spring / Summer because of the effects of atmospheric propagation on our testing.

Attached is a copy of form 442 including excerpts from Exhibits 1, 2, and 4 and a check for the application fee. If you require any further technical information or have any questions, please do not hesitate to contact Theodore Battle or Richard Lilly at GeoPhone Ph: 410-571-9090 or Fax: 410-571-0022. Thanking you in advance, we remain.

Sincerely,



Stephen W. Sweeney
General Manager and
Chief Operation Officer
GeoPhone Company L.L.C.



Theodore L. Battle
Operations Manager
GeoPhone L.L.C.

APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION UNDER PART 5
OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

1. Applicant's Name and Post Office address (Street address, city, state, and ZIP Code. See instruction No. 4) GeoPhone Company, L.L.C. 180 Admiral Cochrane Drive Suite 310 Annapolis, MD 21401	DO NOT WRITE IN THIS BLOCK File No. EXHIBIT 97
--	--

2(a). Application for (check only one box)
☒ New station ☐ Modification of existing authorization

2(b). For Modification indicate below:
File No: _____ Call Sign: _____

3. Application for Modification: Check the box beside all particulars to be modified. Check either addition or replacement to indicate whether the change is an addition or a replacement of parameters in the current authorization.

☐ **FREQUENCY** - ☐ **EMISSION** - ☐ **POWER** - ☐ **LOCATION** -
☐ addition or ☐ replacement? ☐ addition or ☐ replacement? ☐ addition or ☐ replacement? ☐ addition or ☐ replacement?

☐ **OTHER PARTICULARS** - addition or replacement? (Describe below or in attached EXHIBIT No. _____)

4. Particulars of Operation (see instruction below)						
Frequency (State whether MHz or MHz)	POWER			EMISSION	MODULATING SIGNAL	NECESSARY BANDWIDTH (kHz)
(A)	(B)	(C)	(D)	(E)	(F)	(G)
5925-6425 MHz	7dBW	44.3dBW	PEAK	XXC, XXD, XXE (See Exhibit 1 attached)	(See Exhibit 1 attached)	1300 KHz
(See Exhibit 1 attached)						

- (A) List each frequency or frequency band separately. (If more space is required, attach as EXHIBIT No. 4)
- (B) Insert maximum RF. output power at the transmitter terminals. Specify units.
- (C) Insert maximum effective radiated power from the antenna (if pulsed emission, specify peak power). Specify units.
- (D) Insert "MEAN" or "PEAK" (See definitions in Part 5).
- (E) List each type of emission separately for each frequency. (See Section 2201 of FCC Rules)
- (F) Insert as appropriate for the type of modulation:
(1) the maximum speed of keying in bands;
(2) maximum audio modulating frequency;
(3) frequency deviation of carrier;
(4) pulse duration and repetition rate.
For complex emissions, describe in detail in the space provided below.
- (G) Describe how the necessary bandwidth was determined in space provided below.
(See Exhibit 1 attached)

5(a). Proposed location of transmitter and transmitting antenna (check only one box to indicate type of operation):

☒ FIXED/BASE

☐ MOBILE

☐ BASE AND MOBILE

5(b). If permanently located at a FIXED location, give below:

State	County	City or Town
MD	Anne Arundel	Annapolis
Number and street (or other indication of location)		

905 Commerce

5(c). If mobile, describe the exact area of operation

5(d)(1). Enter geographical coordinates exact to the nearest second (see instruction 10)

North Latitude (DD-MM-SS)

38° 59' 37"

West Longitude (DD-MM-SS)

76° 32' 47"

5(e)(1) Enter geographical coordinates of the approximate center of mobile operation (see instruction 10)

North Latitude

0

West Longitude

0

5(d). Datum (see instruction 10): ☐ NAD 27 ☒ NAD 83

6. Is a directional antenna (other than radar) used? ☒ YES ☐ NO (See exhibit 4)

If "YES", give the following information:

(a) Width of beam in degrees at the half-power point 1.4 deg (transmit)

(b) Orientation in horizontal plane 176.0 to 219.5 deg Orientation in vertical plane 36.6 to 44.8 deg

7. Is this authorization to be used for fulfilling the requirement of a government contract with an agency of the United States Government? ☐ YES ☒ NO

If "YES", attach as EXHIBIT No. _____ a narrative statement describing the government project, agency and contact number.

8. Is this authorization to be used for the exclusive purpose of developing radio equipment for export to be employed by stations under the jurisdiction of a foreign government? ☐ YES ☒ NO

If "YES", attach as EXHIBIT No. _____ the following information: Provide the contract number and the name of the foreign government concerned.

9. Is this authorization to be used for providing communications essential to a research project? (The radio communication is not the objective of the research project). ☐ YES ☒ NO

If "YES", attach as EXHIBIT No. _____ a narrative statement providing the following information:

(a) A description of the nature of the research project being conducted.

(b) A showing that the communications facilities requested are necessary for the research project involved.

(c) A showing that existing communications facilities are inadequate.

11. If all the answers to Items 7, 8, and 9, are "NO", attach as EXHIBIT No. 2 a narrative statement describing in detail the following:

(a) The complete program of research and experimentation proposed including description of equipment and theory of operation.

(b) The specific objectives sought to be accomplished.

(c) 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.

11(a). Give an estimate of the length of time that will be required to complete the program of experimentation proposed in this application: 2 years

(b) If less than 2 years, give the length of time in months that the authorization requested in this application will be required: _____

12. Would a Commission grant of this application come within Section 11807 of the FCC Rules, such that it may have a significant environmental impact (see instruction 11)? ☐ YES ☒ NO (See exhibit 3)

If "YES", attach as EXHIBIT No. _____ an Environmental Assessment as required by Section 11811.

13. List below transmitting equipment to be installed (if experimental, so state):

MANUFACTURER

MODEL NUMBER

NO. OF UNITS

Terrasat, Inc

MUC 5865-040

2

Is the equipment listed in Item 18 capable of station identification pursuant to Section 5152? ☐ YES ☐ NO

Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? ☐ YES ☒ NO

If "YES", give the following (see instruction 9):

(a) Overall height above ground to tip of antenna is _____ meters.

(b) Elevation of ground at antenna site above mean sea level is _____ meters.

(c) Distance to nearest aircraft landing area is _____ kilometers.

(d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc) which, in the opinion of the applicant, would tend to shield the antenna from aircraft and thereby minimize the aeronautical hazard of the antenna.

(e) Submit as EXHIBIT No. _____, a vertical profile sketch of total structure including supporting building, if any, giving heights in meters above ground for all significant features. Clearly indicate existing portion, noting particulars of aviation obstruction lighting already available.

13. Applicant is (check only one box)

☐ INDIVIDUAL ☐ ASSOCIATION ☐ PARTNERSHIP ☐ CORPORATION

☒ OTHER (describe in space provided below)

Limited Liability Company (Delaware)

17. Is applicant a foreign government or a representative of a foreign government? ☐ YES ☒ NO

15. Has applicant or any party to this application had any FCC station license or permit revoked or had any application for permit, license or renewal denied by this Commission? ☐ YES ☒ NO

If "YES", attach as EXHIBIT No. _____, a statement giving call sign of license or permit revoked and relate circumstances.

16. Will applicant be owner and operator of the station? ☒ YES ☐ NO

18. Give name, title, and telephone number (include area code), and Internet e-mail address (if applicable) of person who can best handle inquiries pertaining to this application.

Theodore L. Battle, Manager Operations (410) 571-9090 Ext 130 (Or Richard Lilly)
e-mail: tbattle@geophone.com

19. APPLICANT ANTI-DRUG ABUSE CERTIFICATION:

By checking "YES", the individual applicant certifies that he or she is eligible for this license. This requires that he or she is not subject to a denial of federal benefits, including FCC benefits, as a result of a drug offense conviction pursuant to Section 802 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 802. A non-individual applicant, e.g., corporation, partnership or other unincorporated association, certifies that no party to the application is subject to a denial of federal benefits pursuant to that section. For definition of a "party" for these purposes, see 47 CFR 1.9002(b).

☒ YES ☐ NO

21. List below all exhibits in numerical sequence and the item number of form requiring the exhibit identified.

EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM
1	4(e)-(g)				
2	10(a)-(c)				
3	12 [1.1307 showing and radiation hazard study]				
4	4(a)-(c) [Frequency Coordination Report]				

23 CERTIFICATION:

Attention: Read this certification carefully before signing this application.

THE APPLICANT CERTIFIES THAT:

- (a) Copies of FCC Rule Parts 2 and 5 are on hand; and
- (b) Adequate financial appropriations have been made to carry on the program of experimentation which will be conducted by qualified personnel; and
- (c) All operations will be on an experimental basis in accordance with Part 5 and other applicable rules, and will be conducted in such a manner and at such a time as to preclude harmful interference to any authorized station; and
- (d) Grant of the authorization requested herein will not be construed as a finding on the part of the Commission:
 - (1) that the frequencies and other technical parameters specified in the authorization are the best suited for the proposed program of experimentation, and
 - (2) that the applicant will be authorized to operate on any basis other than experimental, and
 - (3) that the Commission is obligated by the results of the experimental program to make provision in its rules including its table of frequency allocations for applicant's type of operation on a regularly licensed basis

APPLICANT CERTIFIES FURTHER THAT:

- (e) All the statements in the application and attached exhibits are true, complete and correct to the best of the applicant's knowledge; and
- (f) The applicant is willing to finance and conduct the experimental program with full knowledge and understanding of the above limitations; and
- (g) The applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the USA.

Signed and dated this _____ day of _____, 19 _____

Name of Applicant GeoPhone Company L.L.C

(must correspond with name given on page 1)

By Steven W. Sweeney
(print)

Steven W. Sweeney
(signature)

Title General Manager and Chief Operating Officer

Check appropriate classification:

- ☐ Individual applicant ☐ Member of applicant partnership
- ☐ Authorized employee ☒ Office of applicant corporation or association

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

**NOTIFICATION TO INDIVIDUALS UNDER PRIVACY ACT OF 1974
AND THE PAPERWORK REDUCTION ACT OF 1980**

Information requested through this form is authorized by the Communications Act of 1934, as amended, and specified by Section 808 therein. The information will be used by Federal Communications Commission staff to determine eligibility for issuing authorizations in the use of the frequency spectrum and to effect the provisions of regulatory responsibilities rendered by the Commission by the Act. Information requested by this form will be available to the public unless otherwise requested pursuant to 47 CFR 0.459 of the FCC Rules and Regulations. Your response is required to obtain this authorization.

Public reporting burden for this collection of information is estimated to average four (4) hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0065), Washington, DC 20554. DO NOT send completed applications to this address. Individuals are not required to respond to this collection unless it displays a currently valid OMB control number.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-570, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(8), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3607.

Exhibit 1: " Particulars of Operation"

GeoPhone's VSAT terminals use a new type of spread spectrum modulation which is not accommodated by the normal emission and modulation designators listed in Section 2.201 of the FCC Rules. This attachment explains the new emission and modulation types used for transmission of low rate digital data, compressed digital voice data, or facsimile data between GeoPhone Terminals.

The VSAT terminals use GeoPhone's new multiple access technology called CAMA (Patent # 5557637). CAMA is a type of code assigned multiple access transmission system which maps a unique fixed spread spectrum code for each terminal into a fast frequency hopped spread spectrum waveform that is transmitted in a nominal 1.3MHz bandwidth sub-band of a standard commercial Geostationary Ku or C-Band Satellite transponder.

Each terminal in the GeoPhone network has a unique 16 digit code which assigns a sequence of sixteen frequencies (sixteen "chips") in a unique order of transmission within a selected transponder sub-band. This 16-chip sequence is used on each transmitted symbol, therefore it is a "very fast" frequency-hopping signal. The signal as transmitted is a spread spectrum signal having uniform power spectral density over the selected subband and having very well behaved spectral characteristics. Digital techniques are used to generate the waveforms that are transmitted by each terminal. The design provides that generation of the waveforms is done in such a way so to insure that each frequency chip starts and stops at peak voltage so that hopping rate artifacts do not appear in the transmitted spectrum. Partially orthogonal codes are used so that multiple users can operate in the same subband simultaneously.

Data Types Transferred:

- Compressed Digital Voice at 5.33 kbps
- Standard Commercial Facsimile at 4.8 kbps
- Digital Data at 4.8 kbps from/to customer equipment
- Standard Computer Modems at 4.8 kbps
- 800 bps terminal to terminal overhead channel

Maximum Data Transfer Rate per channel:

The **7.2 kbps data rate per channel** is the same for all data types but is processed differently for Voice or for Data / Fax to provide additional Forward Error Correction gain and BER performance for both Data and Fax. (27, 21) Reed-Solomon Forward Error Correction is applied to the combined 4.8 Kbps data/fax and 800 bps overhead channel (for packet framing, frequency/power control) for a total rate of **7.2 kbps per data/fax channel**. (27, 23) Reed-Solomon Forward Error Correction is applied to the combined 5.33 Kbps voice and 800 bps overhead channel (for packet framing, frequency/power control) for a total rate of **7.2 kbps per voice channel**.

Maximum Data Transfer Rate per Terminal:

The data from each channel is buffered into the transmitter at 7.2 kbps to accommodate up to four time division multiplexed channels which can be provided simultaneously from each terminal. The maximum transmit rate for the terminal would be four times the maximum channel data transfer rate of 7.2 kbps, or **28,800 bits per second**.

Modulation Characteristics (Complex):

The system uses 8 - Bit modulation such that the symbol rate = $28,800/8 = 3,600$ Symbols per second for all four channels or 900 Symbols per second per channel. Modulation is imparted onto the spread spectrum frequency hopped transmitted signal by adjusting the timing of the chips in the assigned sequence. By varying the leading chip in the transmitted sequence, a symbol having 8 bits is transmitted during each set of 16 chips transmitted between two terminals. **In this way, no other modulation type, such as FSK or PSK is required to be added to the fast frequency hopped carrier.**

Exhibit 2: Statement of Proposed Experiment

INTRODUCTION

GeoPhone Company, L.L.C. is developing a new type of low cost Very Small Aperture Terminal (VSAT) for use with existing and planned Geo-Stationary Satellites to provide low data rate voice, fax and data services for rural customers not currently served by public telephone infrastructure. Much of GeoPhone's projected markets are in developing countries, but certain private low rate data network applications that are available in the U.S. domestic market can also be served by this product. GeoPhone is developing this new VSAT terminal to provide services comparable to wired telephone infrastructure but at a very low competitive cost of \$1,500.00 to \$ 2,000.00 per telephone line.

STATEMENT OF THE PROPOSED EXPERIMENTS

GeoPhone Company, L.L.C. is requesting an experimental license to operate two (2) of its C-Band prototype GeoPhone VSAT terminals at GeoPhone facilities at N 38:59:37 , W 076:32:47 in Annapolis, Maryland. This site is fully coordinated (see attached Exhibit 4, Frequency Coordination Report). These terminals will be production prototypes of the GeoPhone VSAT terminal at C Band, manufactured by GeoPhone for use in communications of low data rate voice, facsimile and computer data at 5333 bps and 4,800 bits per second between the two GeoPhone terminals in a full mesh configuration. Each terminal will have four (4) telephony RJ-11 input ports capable of interface to a standard telephone handset, standard facsimile machines, selected two wire PABX or standard personal computer data modems.

More extensive Ku band tests have been conducted since April 1997 using the first of twelve planned terminals in GeoPhone's Experimental Ku Band network (WA2XBI). These tests have provided initial validation of the new signaling concept, modem performance, frequency and power control validation, RF hardware and initial network operation. Testing with this Ku-Band experimental network is continuing.

The current request for a C-Band license is required to complete development of GeoPhone's companion C-Band product line. Experimentation will be less extensive than for the Ku band network and will consist primarily of validating repeatability of system, software, and hardware performance results obtained at Ku band. Various over the air experiments will test voice, fax, and personal computer data transmission and the combination of all three types of transmissions simultaneously at C Band. Frequency and power calibration and control performance will also be verified. All transmissions will originate from and be received in the United States of America, all transmissions will be over existing, domestic, commercial satellites (Hughes Galaxy and GE Americom) and there will be **no services provided to the general public** as part of these experiments.

SPECIFIC OBJECTIVES OF THE EXPERIMENTS

The specific objectives of these experiments will be to verify and validate through careful measurement the following items:

1. The technical parameters of individual components, terminals, network, and terminal to terminal setup protocol's under realistic operating conditions using a Domestic, Commercial C Band Geo-Stationary Satellite.
2. The behavior of the network during extremes of weather and temperature.

3. The operation of active uplink power control systems including both Hardware and Software components
4. Network behavior with typical video and/or communications traffic on adjacent cross-polarized transponders at the same frequency or on adjacent co-polarized transponders of different frequency.
5. The achievable bit error rates, voice quality and data transfer quality for practical applications of the terminals in their intended markets.
6. The ability of the distributed network management software to detect and isolate remote terminal faults, and to reliably shut down terminals which are not within designated operational boundaries.
7. Behavior and operations of the distributed network management software system, the billing software system, the call handshake and terminal link management software system, and the administrative terminal automatic terminal diagnostic software management system.

CONTRIBUTION OF THE EXPERIMENT TO THE DEVELOPMENT OF THE RADIO ART

The GeoPhone terminals represent an entirely new type of radio communications system using typical geostationary communications satellites. In order to meet the increasing needs of rural markets for telephony, facsimile and low rate data services, particularly in developing countries or in economically depressed regions, GeoPhone uses new technologies that optimize the number of simultaneous conversations per transponder subband and allow for very low cost operations from multiple fixed locations. The experiments proposed by GeoPhone will validate and optimize the design of this new VSAT technology and will demonstrate the new and advanced features of system operations including:

- Use of advanced CAMA (Convolution Ambiguity Multiple Access) technology – a type of CDMA technique that is asynchronous and has very high spectrum reuse capabilities.
- Development of an affordable very well behaved fast frequency hopping spread spectrum transmitter and receiver that is low enough in cost for use in rural telephony applications, thereby providing unique transponder frequency spectrum reuse capabilities.
- Use of a "hub-less" distributed network management system
- Use of advanced monolithic transmitter and receiver components
- Use of a completely software programmable transmitter and receiver system that can be reconfigured over the air through network wide broadcasts
- Deployment of a system that can have voice, data and facsimile transmissions in the same subband at the same time with high spectral reuse.

Exhibit 3: " 1.1307 Statement and Radiation Hazard Study"

It has been determined that an Environmental Impact Statement is not required for the site at 905 Commerce Rd. This is supported by the following data:

- a)
 - (1) 905 Commerce is not located in a designated Wilderness Area.
 - (2) 905 Commerce is not located in a designated Wildlife Preserve.
 - (3) No known endangered species are present and 905 Commerce is not in the designated Critical Areas. (Ref. 50 CFR, U.S. Fish and Wildlife Service, AA Co. Critical Area Map)
 - (4) 905 Commerce is not on, or under consideration for inclusion in the National Register of Historic Places (Ref. 36 CFR 60, 800 and Md. State).
 - (5) 905 Commerce is not a known or claimed Indian Religious Site.
 - (6) 905 Commerce is not located in a 100 Yr. Flood Plain (Ref. NEMA Flood Map 24008-0033C).
 - (7) 905 Commerce is not located in a wetland or Critical Area (Ref. AA Co. PCE)
 - (8) Anne Arundle Planning and Code Enforcement issued a approved Building Permit (#B02118402)
- b) The operation of the transmitters on the roof of 905 Commerce will not expose workers or the general public to levels of radiofrequency radiation in excess of the "Radio Frequency Protection Guides" recommended in "American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz", ANSI/IEEE C95.1-1992). See appended "Radiation Hazard Study" .

Exhibit 4: " Frequency Coordination Report"

GeoPhone C-Band Earth Station at 905 Commerce Rd.



SATELLITE • MICROWAVE • LIGHTWAVE • RADIO • CABLE

MULTICOMM SCIENCES INTERNATIONAL, INC.

MARKET INFORMATION • FIELD SURVEYS • SYSTEM DESIGN
FEASIBILITY STUDIES • FREQUENCY COORDINATION • PROJECT MANAGEMENT

SINCE 1952

FREQUENCY COORDINATION REPORT

4 and 6 GHz TRANSMIT-RECEIVE EARTH STATION

GEOPHONE COMPANY LLC

ANNAPOLIS, MD

October 27, 1997

1. CONCLUSIONS

An Interference Study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed Earth Station demonstrates that this site will operate satisfactorily with the Common Carrier Microwave Environment as defined on the frequency coordination data sheet.

2. SUMMARY OF RESULTS

There were no potential great circle interference cases at 4 GHz. All of the potential great circle interference cases at 6 GHz were found to be acceptable on the basis that harmful interference will not likely result from the proposed operation, considering the criteria, the potential interference receive levels, and the total propagation losses.

There were no reported cases of rain scatter beam intersections.

3. **SUPPLEMENTAL SHOWING**

The Satellite Earth Station proposed in this Application was coordinated by Multicomm Sciences International, Inc., Frequency Coordinators Group, using computer techniques and in accordance with Parts 25 of the FCC Rules and Regulations.

4. **FREQUENCY COORDINATION DATA**

Frequency Coordination Data which is attached, contains the following:

- Technical Characteristics of Proposed Earth Station
- Horizon Antenna Gain Plot
- Discrimination Angle Plot
- Local Horizon Plot
- Satellite Elevation Plot
- 4 and 6 GHz Coordination Contour
- 4 and 6 GHz Rain Scatter

5. **FREQUENCY COORDINATION STATEMENT (FCC Section 21.100 (d))**

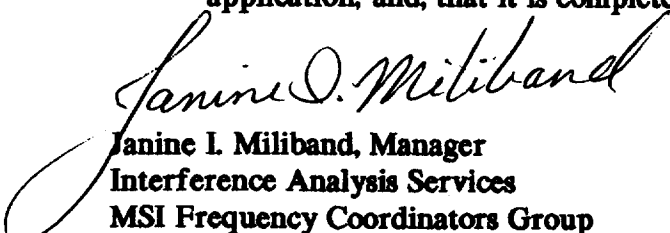
Holders of licenses, permittees, prior filed applicants or planners of 6 GHz transmitting stations were notified on September 17, 1997 of the proposed Earth Station technical details in accordance with Section 25.203 (c-2) of the FCC Rules and Regulations. Satisfactory coordination was achieved on the basis that harmful interference would not occur, or that sufficient terrestrial blocking exists.

AT&T
Ellis Thompson Corp
Wilm Cell Tele Co (Amcell/Cell One)
Intermedia Communications
Bell Atlantic Mobile Communications
Cellco Partnership - CT, W-MA, W-NY
Cellco Partnership - MD, NJ, PA Region
Comcast Cable Communications (Mid-Atlan)

C-SW Cellular Partnership
Dobson Cellular of MD, Inc. dba Cell One
Hardy Cellular Telephone Co
Atlantic States Microwave Trans Co
Bell Atlantic - Pennsylvania
Bell Atlantic - Maryland
GTE North Inc Pennsylvania Operations
Harrisburg Cellular Telephone Co
Local Area Telecommunications
MCI Telecommunications
Overseas Telecommunications
Pennsylvania Cellular Telephone
Reading Cellular Telephone
Susquehanna Cellular Comm LP
Virginia Cellular LP
PBS Satellite Operations Center
Qwest Transmission
PECO Energy Co
Virginia Electric & Power Co
Winstar Locate
Wash/Balt Cellular LP
Washington DC SMSA LP
Micronet Communications
Microwave Planning
Comsearch

6. Certification of Person Responsible for Preparing Frequency Coordination Information Submitted in this Application

I hereby certify that I am the technically qualified person responsible for preparation of the frequency coordination information contained in this application; that I am familiar with Parts 21 and 25 of the Commission's Rules; that I have either prepared or reviewed the frequency coordination information submitted in this application; and, that it is complete and accurate to the best of my knowledge.


Janine I. Miliband, Manager
Interference Analysis Services
MSI Frequency Coordinators Group
Multicomm Sciences International, Inc.
October 27, 1997