

S-2889-EX-97



1501 Moran Road
Dulles, VA 20166
Telephone 703 450 5680
Fax 703 450 4706

WAZXHS

Granted 5609-EX-PL-97
instead. DY 5/30/97

April 4, 1997

need 4/16/97

Mr. Paul Marrangoni
Chief
Experimental Licensing Branch
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W.
Room 230
Washington, DC 20554

via R&S Courier
through Pittsburgh, PA

care of:

Mellon Bank
Three Mellon Bank Center
525 William Penn Way
P. O. Box 358320
27th Floor
Pittsburgh, PA 15251-5320

via R&S Courier

Attn: Federal Communications Commission
Wholesale Lockbox Shift Supervisor

Re: COMSAT RSI, Inc.
Request for Special Temporary Authorization
Office of Engineering and Technology

Dear Mr. Marrangoni:

Pursuant to Section 5.56 of the Commission's Rules, 47 C.F.R. § 5.56 (1995),
COMSAT RSI, Inc., ("COMSAT RSI") requests special temporary authorization to operate

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as described below. In accordance with the FCC's Fee Schedule (Fee Code EAE), a check for \$45.00 is enclosed. Certification pursuant to 47 C.F.R. § 1.2002 is herein incorporated.

COMSAT RSI requests authorization to cover operations -- specifically, the activities related to the testing of a customer's Gateway Earth Stations -- pending the grant of an application which was filed on December 20, 1996, for an experimental license in Ashburn, Virginia (copy attached).

In support of this request, the following is shown:

1) Applicant's Name and Address:

COMSAT RSI, Inc.
1501 Moran Road
Sterling, VA 20166

Contact: Bill Klimczak
703-450-5680

2) Need for Special Action:

The rapid approval of a Special Temporary Authorization for 148-150.05 Mhz is needed in order to commence and maintain scheduled production deliveries of the Gateway Earth Station System to ORBCOMM. The functionality of the system is described in Exhibit 1. In order for us to test reliably and deliver these systems to ORBCOMM in a timely manner, we will need to test each system on site at the COMSAT RSI facility. This testing will complement testing pursuant to existing lower power authority in this frequency band. The authority requested will permit testing consisting of transmitting to and receiving from a Low Earth Orbit Satellite. Exercising the system in an "as installed" configuration at COMSAT RSI will demonstrate to the customer the complete functionality of each system.

COMSAT RSI sought approval for these operations in a "permanent" application which was filed on December 20, 1996, and which has not yet been acted upon. A rapid approval of special temporary authority

will enable COMSAT RSI to meet customer requirements and avoid costly delays related to fabrication, assembly, and testing of the systems. The prohibitively large size of each system makes it imperative that COMSAT RSI deliver each system as it comes off the production line. A long approval process will require COMSAT RSI to slow or stop production. A significant amount of capital equipment and personnel at COMSAT RSI have been dedicated to delivering the ORBCOMM systems on schedule in an effort to provide the highest quality system to ORBCOMM.

3) Type of Operation:

See Exhibit 1.

4) Purpose of Operation:

See Exhibit 1.

5) Date of Operation:

April 16, 1997, through October 16, 1997

6) Class of Station:

Experimental

7) Location of Operation:

Arcola (38° 59' 40" N; 77° 31' 00" W), Virginia

8) Equipment to be Used:

2 radome-enclosed VHF antennas. Manufacturer is Powers Systems Technology. Model No. BHED147157-1000/307A.

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9) Frequencies Desired:

148-150.05 MHz. 149.61 +/- 0.050 MHz is particularly vital. If 149.61 +/- 0.050 is not available, we request a 100 kHz band anywhere within 148-150.05 MHz.

suggested 148.85 MHz

10) Power:

500 W (cw) maximum ERP at transmitter terminals. 40 dBW (PEAK) maximum ERP from the antenna.

11) Type of Emission:

50K0GQN (QPSK)

12) Overall Height of Antenna Above Ground:

7.95 m

13) 47 C.F.R. § 1.2002 Certification:

COMSAT RSI hereby certifies that it, its officers and directors, and any party with a five percent or greater interest in this request for special temporary authorization is not subject to a denial of the Federal benefits requested herein pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 853(a).

If there are any questions about the foregoing, please contact the undersigned at 703-450-5680 or Chip Yorkgitis at 202-955-9668.

Respectfully submitted,



Harold Aryai Siegel
Vice President -- Legal

EXHIBIT 1

COMSAT RSI ("CRSI") has recently been awarded a contract to produce a 16 element crossed-dipole array which will operate in a 28 foot radome. This antenna will be used in the ground segment in a communications system developed by ORBCOMM to provide wireless packet data services optimized for short message transfer via satellite links. The space segment will consist of 28 to 36 satellites referred to as ORBCOMM Space Vehicles in polar orbits of about 730 km. These orbits are considered 'low Earth Orbits' making the system a LEO based system (in this case a little LEO based system).

The role of the ground segment is to process messages within a specific geographic territory (such as a country or region), and to provide interconnection between the system and the various public and/or private data networks within the territory. The ground segment will consist of a number of ORBCOMM Gateways, to be located strategically throughout the world. The Gateway Earth stations (GES) consists of medium gain tracking antennas, RF and modem equipment, and communications hardware to send and receive packets. The GES are fully redundant and designed for unattended operation. The GES use two (separate) radome-enclosed, VHF antennas which will be supplied by CRSI (see Exhibit 1). The system is designed to operate in the 137-138 MHz and 148-150.05 MHz frequency bands. The downlink from the satellites to the GES is in the 137-138 MHz band. The transmissions to the satellites occur within the 148-150.05 MHz band with a 50 kHz bandwidth using QPSK modulation. Authority is sought throughout this entire 2.05 MHz band, although authority to operate is particularly important at 149.61 ± 0.050 MHz to meet ORBCOMM's requirements. The pedestal mounted antennas are capable of full hemispheric coverage and will be designed to operate with the LEO satellites.

Two separate radome enclosed antennas will be installed at the Ashburn, Virginia test site and will be used to verify the system components before shipment of each system to ORBCOMM. The installation will be operated similar to an actual GES in order to check out all of the major subsystem components. For this reason we require operation on at least a single frequency within the 148-150.05 MHz band. Typical communication times to the satellite will be approximately 10 minutes and this time will be a function of the geometry of the position of the satellite relative to the Ashburn, Virginia location. The position of the radomes at the Ashburn site is shown in the attached drawing.

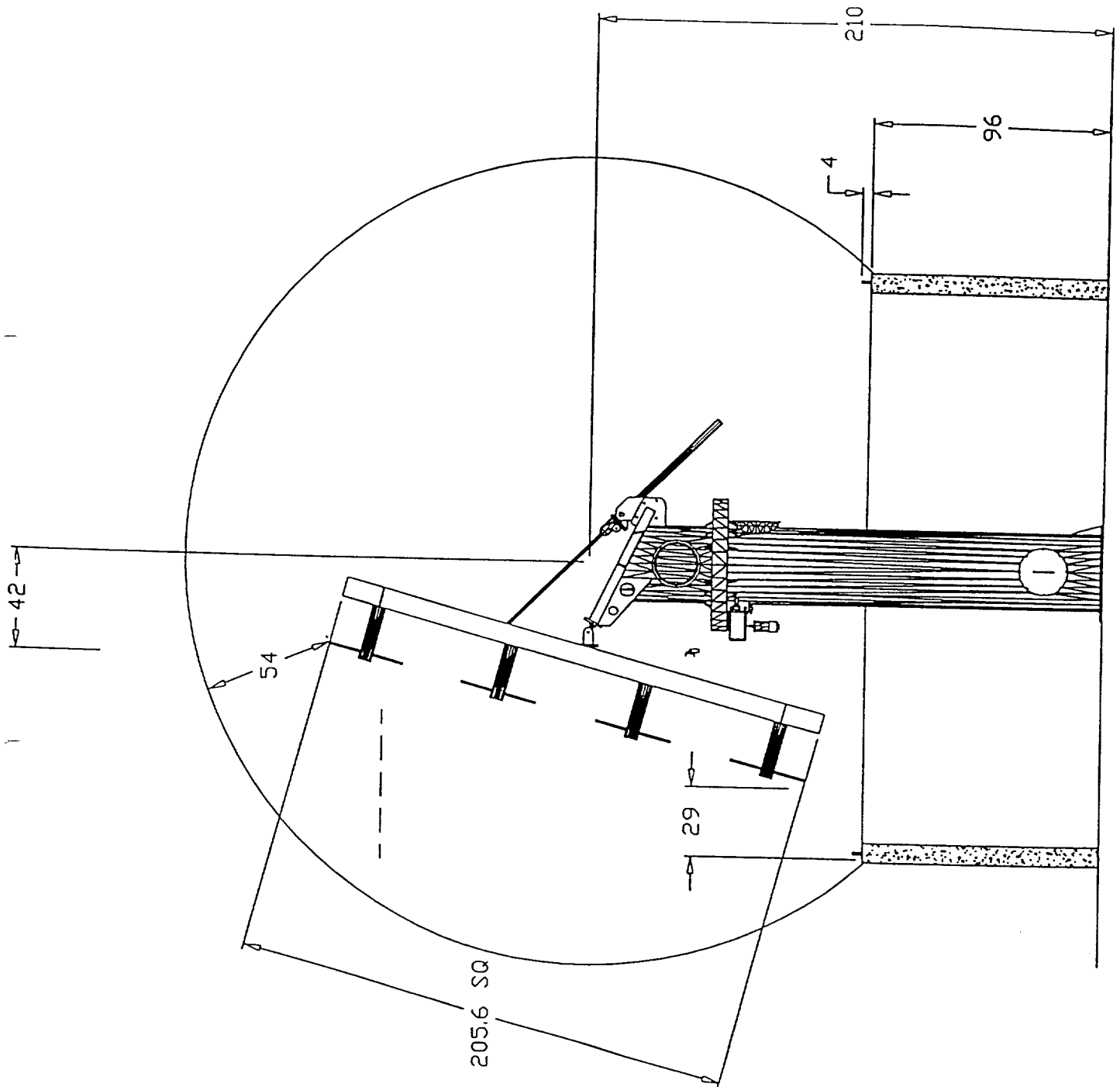


EXHIBIT 3

Radiation Hazard Analysis:

The proposed antenna was analyzed using the Mininec Computer Software program which is a Method of Moments analysis, with 500 watts at the input to the antenna. The power density in miliwatts per square centimeter versus distance from the antenna is shown in the Figure 1. The field strength in volts per meter versus distance from the antenna is shown in Figure 2. The field strength in volts squared per meter squared versus distance from the antenna is shown in Figure 3. The assumption here is that the curves are calculated for the peak gain of the antenna. The levels from the sidelobes will be much less. Since the antenna is capable of full hemispherical coverage, there is a possibility that the mainbeam of the antenna could be pointed at a zero degree elevation angle as referenced to the horizon. However, in practice the antenna will generally be operated at elevation angles of about 10 degrees or more. As a precaution the worst case levels caused by the peak of the beam will be used in the analysis. In addition the 'Controlled Environment' is assumed to be the test range and the 'Uncontrolled Environment' is assumed to be any region outside of the test range. It is well over 200 feet from the proposed ORBCOMM Antenna location to any point outside of the test range property.

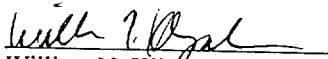
During operation no CRSI or other authorized personnel will be closer than 60 feet to the antenna which will meet the requirement for Maximum Permissible Exposure for Controlled Environments. This occurs at approximately 50 feet as can be seen in Figures 1 and 2. For both the Uncontrolled Environment and General Public Exposure the acceptable limits are achieved at approximately 120 feet in Figures 1 and 2 and also Figure 3.

The requirements from FCC 96-326 are as follows:

Power Density Levels (P, mW/cm ²) or Field Strength (V/m or V ² /m ²)	Requirement/Reference
61.4 (V/m) or 1.0 (mW/cm ²)	Table 2 Appendix B: FCC 96-326, MAXIMUM PERMISSIBLE EXPOSURE (MPE) : CONTROLLED ENVIRONMENTS
27.5 (V/m) or 0.2 (mW/cm ²)	Table 2 Appendix B: FCC 96-326, MAXIMUM PERMISSIBLE EXPOSURE (MPE) FOR UNCONTROLLED ENVIRONMENTS
800 (V ² /m ²) or 0.2 (mW/cm ²)	Table 3 Appendix B: FCC 96-326, GENERAL PUBLIC EXPOSURE

CERTIFICATION

I hereby certify that I am the technically qualified person responsible for the preparation of the radiation hazard assessment, that I have reviewed this radiation hazard assessment, and that it is complete and accurate to the best of my information, knowledge, and belief.


William N. Klimczak
Manager of Electrical Engineering
COMSAT RSI, Inc.

Dated: December 18, 1996

Figure 1 Power Density versus Distance in feet from ORBCOMM Antenna

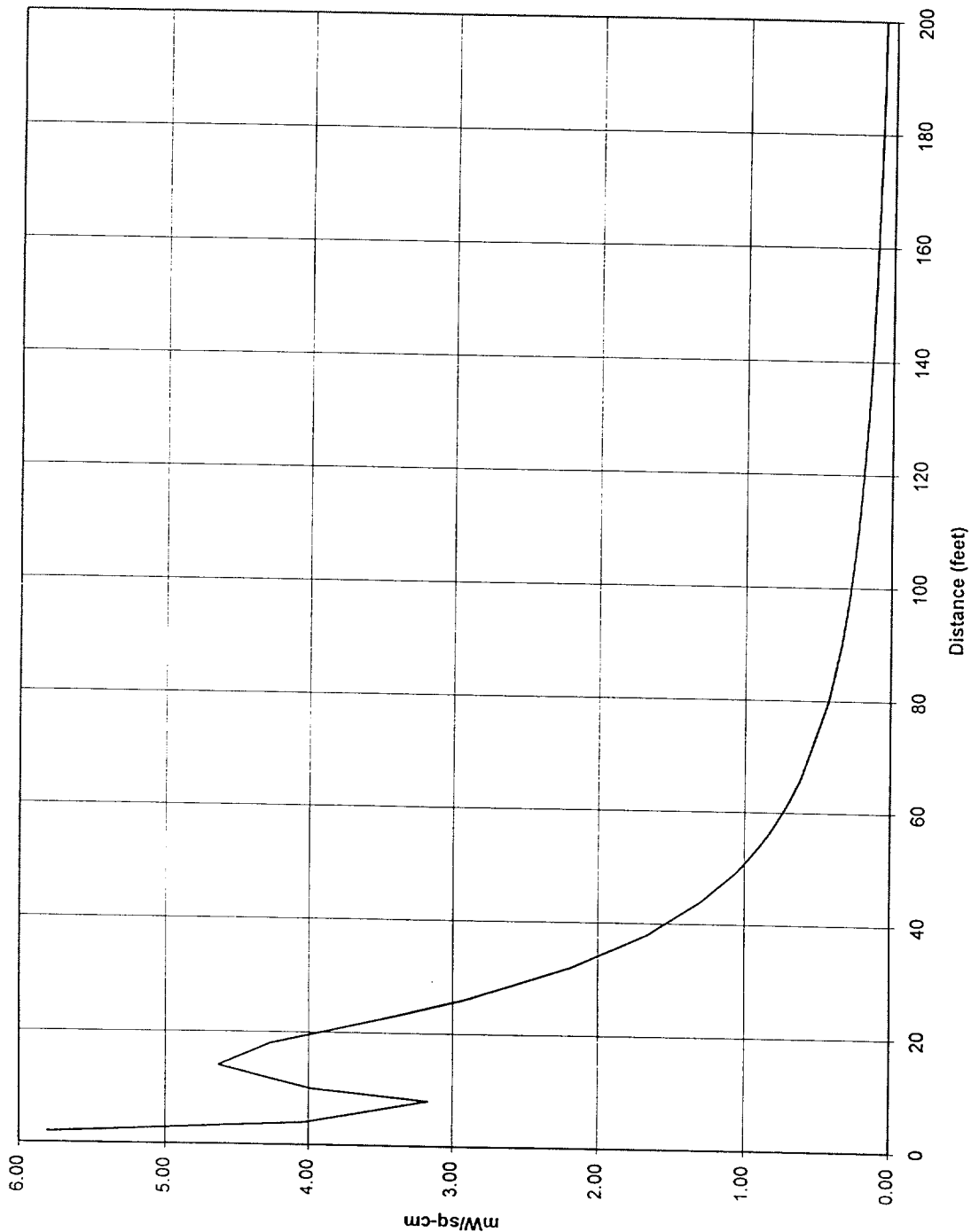


Figure 2 Field Strength versus Distance in feet from ORBCOMM Antenna

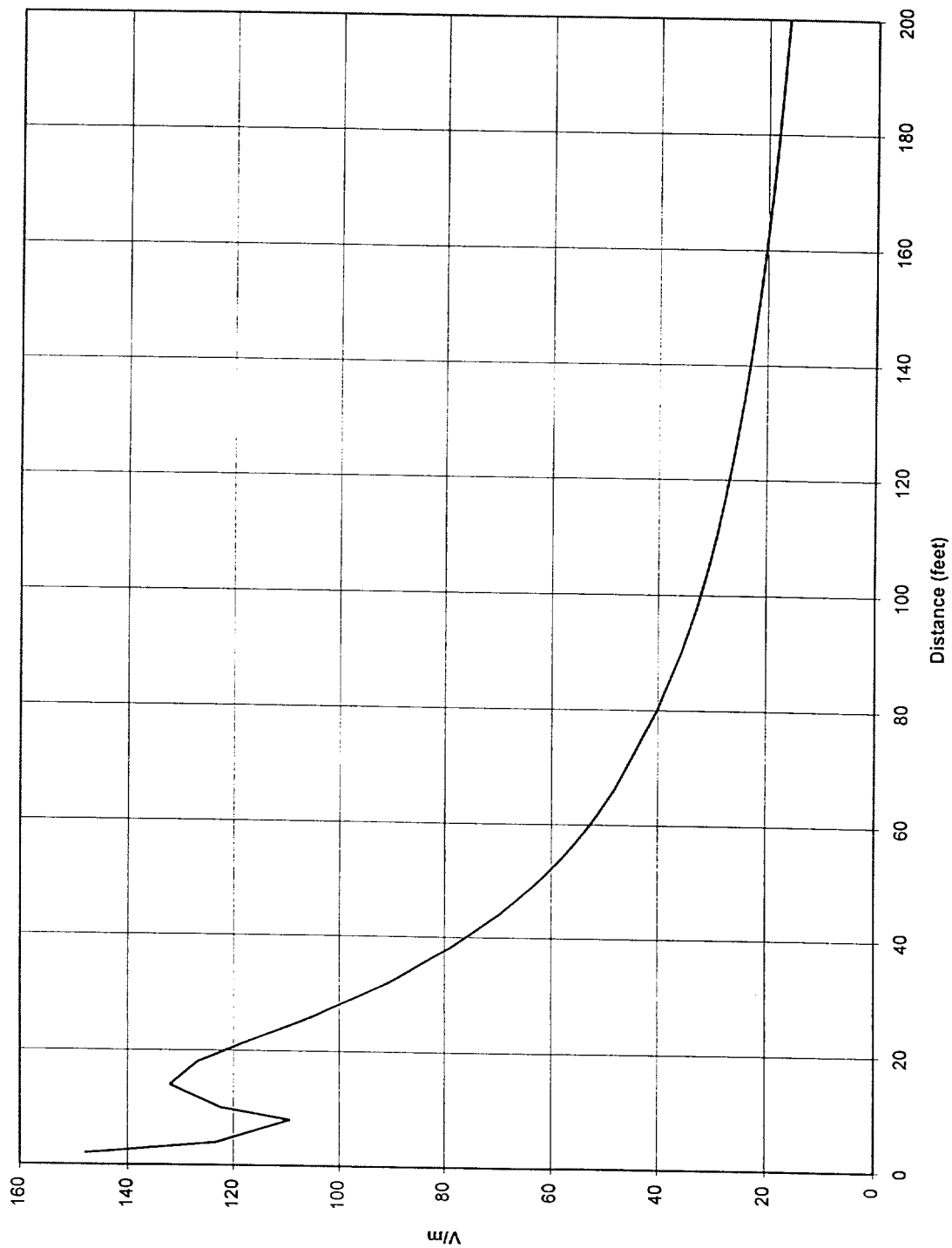
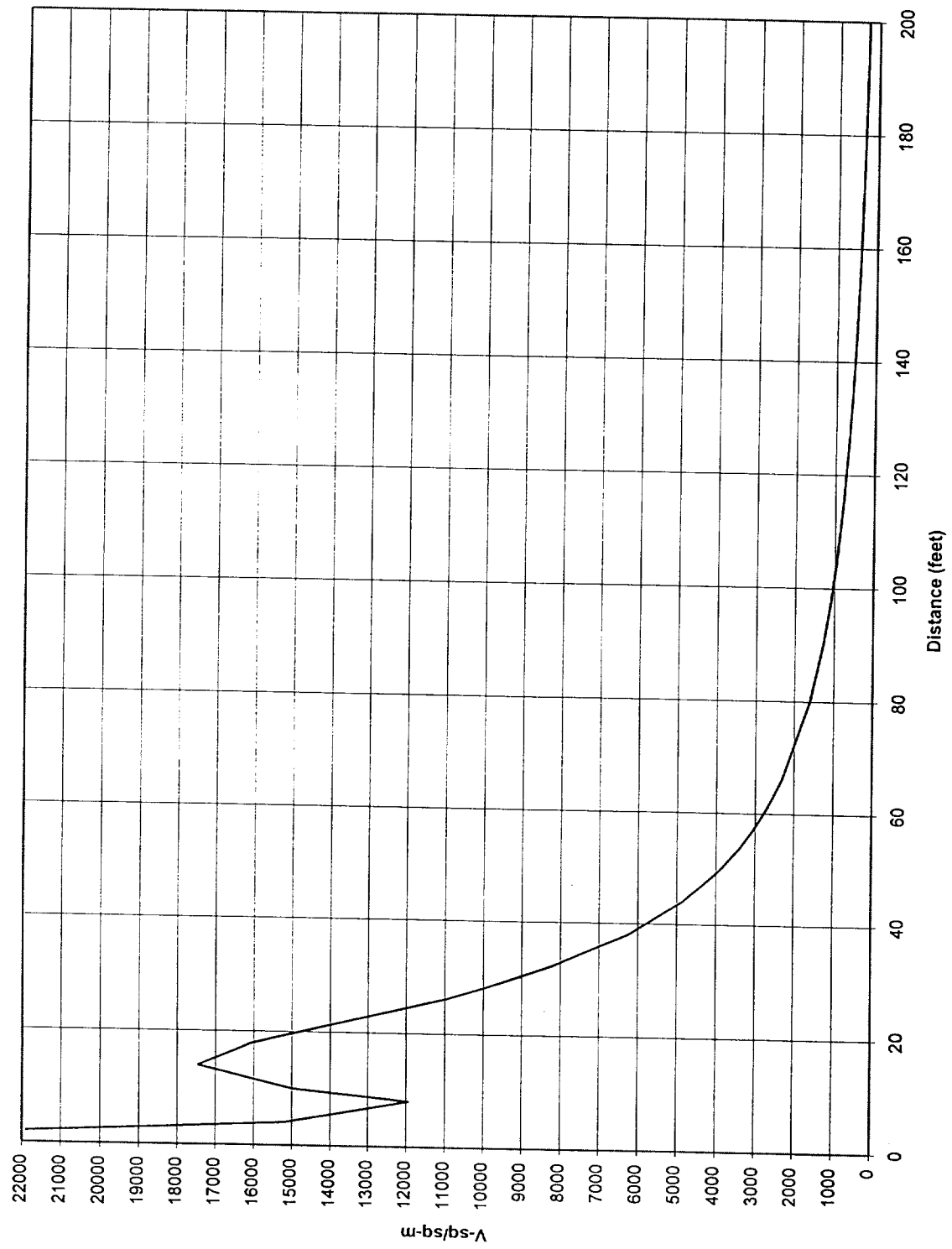
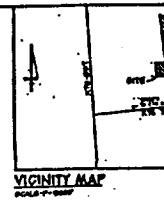


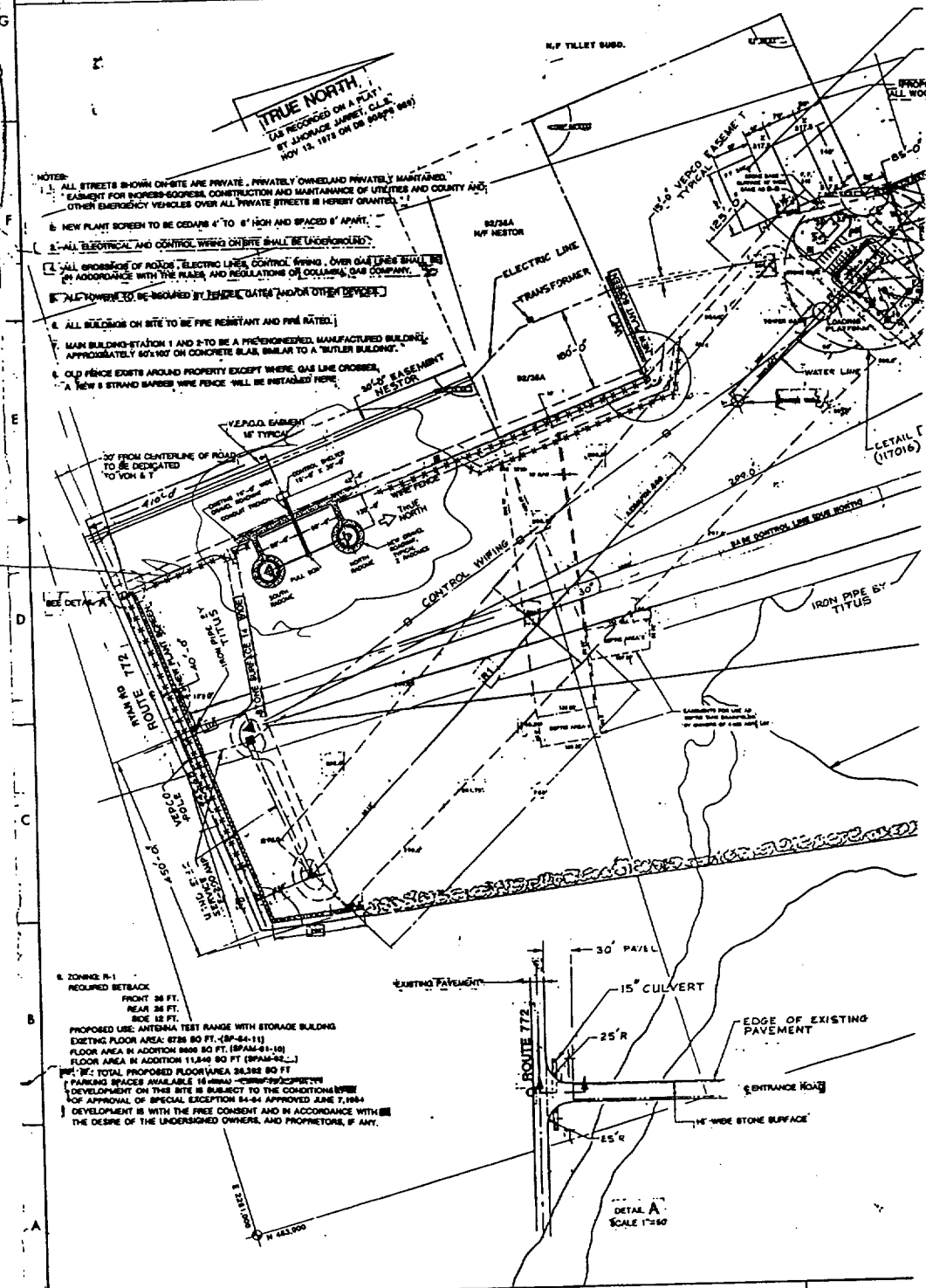
Figure 3 Field Strength versus Distance in feet from ORBCOMM Antenna



RANGE AND STATION SCHEDULE			
RANGE NO.	ITEM	STATION NO.	ITEM
R1	FAA RANGE	STA 1	STORAGE BUILDING
R2	LARGE DIAMETER ANTENNA RANGE	STA 2	OFFICE AREA
R3	MEDIUM DIAMETER RANGE	STA 3	FAA TOWER
R4	SMALL DIAMETER RANGE	STA 4	FAA SOURCE
R5	MODEL TOWER RANGE	STA 5	50 MULTIPLE SOURCE TOWER
R6	FEED RANGE	STA 6	LARGE DIAMETER ANTENNA TOWER
		STA 7	MODEL TOWER
		STA 8	MODEL TOWER SOURCE
		STA 9	FEED TESTING PEDESTAL
		STA 10	FEED SOURCE
		STA 11	SMALL DIAMETER ANTENNA TOWER
		STA 12	MEDIUM DIAMETER ANTENNA TOWER
		STA 13	SATELLITE TRANSMIT FACILITY



NOTES:
 1. THE PROPERTY DELINEATED ON THIS PLAN
 IS LOCATED IN LONDON COUNTY ADDRESS
 MAP OF 12, APRIL 1910



CERTIFICATION

I hereby certify that I am the technically qualified person responsible for the preparation of the radiation hazard assessment dated December 18, 1996, attached hereto. I have reviewed this radiation hazard assessment, and certify that it continues to be complete and accurate to the best of my information, knowledge, and belief.



William N. Klimczak
COMSAT RSI, Inc.

Dated: April 4, 1997

KELLEY DRYE & WARREN LLP

A PARTNERSHIP INCLUDING PROFESSIONAL ASSOCIATIONS

1200 19TH STREET, N.W.

SUITE 500

WASHINGTON, D. C. 20036

(202) 955-9600

FACSIMILE

(202) 955-9792

WRITER'S DIRECT LINE

(202) 955-9776

NEW YORK, N.Y.
LOS ANGELES, CA.
MIAMI, FL.
CHICAGO, IL.
STAMFORD, CT.
PARSIPPANY, N.J.
BRUSSELS, BELGIUM
HONG KONG
AFFILIATED OFFICES
NEW DELHI, INDIA
TOKYO, JAPAN

April 4, 1997

**Federal Communications Commission
Experimental Radio Service
P.O. Box 358320
Pittsburgh, PA 15251-5320**

via R&S Courier

**Re: Application of COMSAT RSI, Inc.
 for Part 5 Experimental License**

Dear Sir or Madam:

Enclosed herewith for filing on behalf of COMSAT RSI, Inc., is a request (the "Request") for special temporary authority covering operations related to the testing of Gateway Earth Stations in Ashburn, VA, beginning on April 16, 1997. Attached to the Request please find Exhibits and Form 159. The filing fee of \$45.00 is enclosed herewith.

Please date stamp the attached duplicate of the Request and return it to the courier.

KELLEY DRYE & WARREN LLP

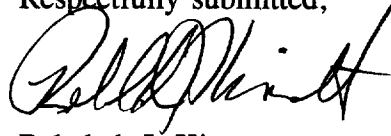
Federal Communications Commission

Page 2

April 4, 1997

If there are any questions regarding this Request, please do not hesitate to contact the undersigned.

Respectfully submitted,



Rebekah J. Kinnett
Counsel for COMSAT, RSI Inc.

Enclosures

cc: Douglas Young
Experimental Licensing Branch
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, Suite 230
Washington, DC

KELLEY DRYE & WARREN LLP

A PARTNERSHIP INCLUDING PROFESSIONAL ASSOCIATIONS

1200 19TH STREET, N.W.

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WASHINGTON, D. C. 20036

(202) 955-9600

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HONG KONG

AFFILIATED OFFICES

NEW DELHI, INDIA

TOKYO, JAPAN

May 16, 1997

EDWARD A. YORKGITS, JR.

DIRECT LINE (202) 955-9668

Mr. H. Franklin Wright
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W., Room 276
Washington, DC 20036

**Re: April 4, 1997, COMSTAT RSI Request for STA to Utilize
149.61 MHz for Antenna Testing Purposes**

Dear Mr. Wright:

Pursuant to our earlier discussions, I am attaching herewith a more detailed explanation of COMSAT RSI's proposed operations on 149.61 MHz which the company has provided me. As explained in the attachment, COMSAT RSI needs to have access to enough of the sky as the non-geostationary ORBCOMM satellites pass overhead so that COMSAT RSI has the opportunity to communicate with the satellites for sufficient periods (approximately 10 minutes) to support the testing. It is our hope that this information will assist NTIA and the DOD in resolving any coordination difficulties. COMSAT RSI is willing to compromise and agree to reasonable conditions to allow the testing to proceed.

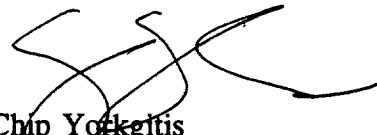
As explained in COMSAT RSI's application, its testing for ORBCOMM is rapidly entering into a phase where authority to complete this portion of the testing is vital. An expeditious response from NTIA and DOD would be appreciated. To that end, COMSAT RSI would welcome a meeting with NTIA and DOD representatives to discuss the proposed

KELLEY DRYE & WARREN LLP

H. Franklin Wright
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operations. I will be calling you Monday to discuss the prospects of such a meeting. At that time, I would be glad to address any further questions regarding the attached or additional information you would find useful.

Respectfully submitted,



Chip Yorkgitis
Attorney for COMSAT RSI, Inc.

Attachment

cc: Douglas Young
Stephen L. Goodman (*via facsimile*)

**Discussion of Proposed COMSAT RSI Testing at 149.61 MHz
(May 16, 1997)**

COMSAT RSI (CRSI) has been awarded a contract to produce a total of 20 (for the present contract) of sixteen-element crossed-dipole arrays. Under CRSI's contract, CRSI must also test the entire complement of deliverable hardware with an existing satellite to demonstrate compliance to specifications. The antennas, once delivered, will be used in the ground segment in a Low Earth Orbit satellite communications (*i.e.*, Little LEO) system developed by ORBCOMM to provide wireless packet data services optimized for short message transfer. The space segment ultimately will consist of 28 to 36 satellites referred to as ORBCOMM Space Vehicles in polar orbits of about 730 km.

The role of the ground segment is to process message traffic within a specific geographic territory (such as a country or region), and to provide interconnection between the system and the various public and/or private data networks within the territory. The ground segment will consist of a number of ORBCOMM Gateways, to be located strategically throughout the world. The Gateway Earth stations (GES) consists of medium gain tracking antennas, RF and modem equipment, and communications hardware to send and receive packets. The GES are fully redundant and designed for unattended operation. The GES use two (separate) radome-enclosed VHF antennas which are those to be supplied by CRSI. The system is designed to operate in the 137-138 MHz and 148-149.90 MHz frequency bands. The downlink from the satellites to the GES is in the 137-138 MHz band. The transmissions to the

satellites occur within the 148-149.90 MHz band with a 50 kHz bandwidth using QPSK modulation at an EIRP of 40 dBW. The pedestal-mounted antennas are capable of full hemispheric coverage and will be designed to operate with the Little LEO satellites.

The authority to conduct its tests at 149.61 MHz¹ is necessary to enable CRSI to check out the complete complement of deliverable hardware, and to ensure satisfactory operation after installation at the respective host country. Some of the parameters that can be checked in this fashion are:

- The received signal level from the satellite.
- The tracking performance of the antenna and the associated control electronics.
- The received Bit-Error-Rate (BER).
- The compatibility of CRSI equipment/software with ORBCOMM equipment/software.
- Certification that the system as delivered will function properly.

Two separate radome-enclosed antennas are in the process of installation at the Ashburn, Virginia test site and will be used to verify the system components before shipment of each system to ORBCOMM. The installations will be operated similar to an actual GES in order to check out all of the major subsystem components. For this reason CRSI requires operation at 149.61 MHz, for which CRSI has sought both special temporary and a "permanent" license under Part 5 of the Rules. The radome

¹ At the present time, there are two operational satellites in ORBCOMM's system and both satellites are tuned to 149.61 MHz. In order to change this frequency, ORBCOMM would be required to take its system off line and re-tune the satellite receivers to another frequency in the 148-149.90 MHz band. Service for existing customers would be seriously interrupted.

installation will be complete in the next few weeks. This will establish the antenna heights and positions at the present locations. The antenna heights when installed in the radomes will be approximately 16.5 feet above ground level. The emissions designator of the signals is 50K0GQN (QPSK). Typical communication times to a satellite during testing will be approximately 10 minutes. However, this time will be a function of the orientation of the current satellite orbital path relative to the Ashburn, Virginia location. With each orbit, the satellite's path through the sky will change from the vantage point of the GES. The GES antenna is capable of a software-controlled beam pointing to essentially any angle from about $+ 5.0^{\circ}$ elevation to zenith and any azimuth angle. (The GES antenna will have approximately a 24-degree half power beamwidth.) If *small* areas of the sky were restricted, due to potential interference, the system could still be operated such that the antenna would not radiate in those specified areas. However, in order for the tests to be conducted appropriately, the GES must be capable of communicating with the satellite for at least 10 consecutive minutes.

In the past, CRSI has performed high power testing of radar antennas under a special license obtained by the Air Force (for CRSI) where advance notice to the local airport control tower (Dulles) was given before each test, due to the perceived potential for interference. Arrangements such as a requirement for CRSI to provide reasonable advance notice of planned testing not less than 48 hours to an authorized representative of the DOD, can easily be made if necessary. In addition, specific areas in space can be excluded from transmit testing to avoid any potential interference.

FEDERAL COMMUNICATIONS COMMISSION
FCC REMITTANCE ADVICE

Approved by: JMB
 0660-0589
 Expires 2/28/97

(RESERVED)

PAGE NO. 1 OF

SPECIAL USE

FCC USE ONLY

(Read instructions carefully BEFORE proceeding.)

(1) FCC ACCOUNT NUMBER

0 1 3 5 3 3 5 1 0 7

PAYOR INFORMATION

Did you have a number prior to this? Enter it.

(2) TOTAL AMOUNT PAID (dollars and cents)

\$ 45 • 00

(3) PAYOR NAME (If paying by credit card, enter name exactly as it appears on your card)

Kelley Drye & Warren LLP

(4) STREET ADDRESS LINE NO. 1

1200 19th Street, N.W., Suite 500

(5) STREET ADDRESS LINE NO. 2

(6) CITY
 Washington

(7) STATE
 DC

(8) ZIP CODE
 20036

(9) DAYTIME TELEPHONE NUMBER (Include area code)
 202-955-9600

(10) COUNTRY CODE (if not U.S.A.)

ITEM #1 INFORMATION

(11A) NAME OF APPLICANT, LICENSEE, REGULATEE, OR DEBTOR

COMSAT RSI, Inc.

FCC USE ONLY

(12A) FCC CALL SIGN/OTHER ID

(13A) ZIP CODE

20166

(14A) PAYMENT TYPE CODE

E A E

(15A) QUANTITY

1

(16A) FEE DUE FOR
 PAYMENT TYPE CODE
 IN BLOCK 14
 \$ 45.00

(17A) FCC CODE 1

(18A) FCC CODE 2

(19A) ADDRESS LINE NO. 1

15 Moran Road

(20A) ADDRESS LINE NO. 2

(21A) CITY/STATE OR COUNTRY CODE

Sterling, VA

ITEM #2 INFORMATION

(11B) NAME OF APPLICANT, LICENSEE, REGULATEE, OR DEBTOR

FCC USE ONLY

(12B) FCC CALL SIGN/OTHER ID

(13B) ZIP CODE

(14B) PAYMENT TYPE CODE

(15B) QUANTITY

(16B) FEE DUE FOR
 PAYMENT TYPE CODE
 IN BLOCK 14
 \$

(17B) FCC CODE 1

(18B) FCC CODE 2

(19B) ADDRESS LINE NO. 1

(20B) ADDRESS LINE NO. 2

(21B) CITY/STATE OR COUNTRY CODE

CREDIT CARD PAYMENT INFORMATION

(22) MASTERCARD/VISA ACCOUNT NUMBER:

☐ Mastercard ☐ Visa

EXPIRATION DATE:

Month Year

(23) I hereby authorize the FCC to charge my VISA or Mastercard for the service(s)/authorization(s) herein describe.

AUTHORIZED SIGNATURE

DATE