READ INSTRUCTIONS CAREFULLY
BEFORE PROCEEDING

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

Approved by OMB
3060-0589
Page No 1 of 1

(1) LOCKBOX # 358160

NOV 07 2001

SPECIAL USE

FCC USE ONLY

A PAYER INFORMATION

(2) PAYER NAME (if paying by credit card, enter name exactly as it appears on your card): COMSAT CORP./COMSAT WORLD SYSTEMS

(3) TOTAL AMOUNT PAID (U.S. Dollars and cents): $145.00

(4) STREET ADDRESS LINE NO. 1: 6560 ROCK SPRING DRIVE

(5) STREET ADDRESS LINE NO. 2:

(6) CITY: BETHESDA

(7) STATE: MD

(8) ZIP CODE: 20817

(9) DAYTIME TELEPHONE NUMBER (include area code): 301-214-3459

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

FCC REGISTRATION NUMBER (FRN) AND TAX IDENTIFICATION NUMBER (TIN) REQUIRED

(11) PAYER (FRN): 0004-1337-91-60

(12) PAYER (TIN): 522256227

IF PAYER NAME AND THE APPLICANT NAME ARE DIFFERENT, COMPLETE SECTION B
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159 C)

(13) APPLICANT NAME

(14) STREET ADDRESS LINE NO. 1

(15) STREET ADDRESS LINE NO. 2

(16) CITY

(17) STATE

(18) ZIP CODE

(19) DAYTIME TELEPHONE NUMBER (include area code)

(20) COUNTRY CODE (if not in U.S.A.)

FCC REGISTRATION NUMBER (FRN) AND TAX IDENTIFICATION NUMBER (TIN) REQUIRED

(21) APPLICANT (FRN)

(22) APPLICANT (TIN)

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET

(23A) CALL SIGN/OTHER ID: KA-1271

(24A) PAYMENT TYPE CODE: CGX

(25A) QUANTITY: 1

(26A) FEE DUE FOR (PTC): $145.00

(27A) TOTAL FEE: $145.00

FCC USE ONLY

(28A) FCC CODE 1

(29A) FCC CODE 2

(23B) CALL SIGN/OTHER ID

(24B) PAYMENT TYPE CODE

(25B) QUANTITY

(26B) FEE DUE FOR (PTC)

(27B) TOTAL FEE

FCC USE ONLY

(28B) FCC CODE 1

(29B) FCC CODE 2

SECTION D CERTIFICATION

(30) CERTIFICATION STATEMENT

I, ROBERT A. MANSBACH, certify under penalty of perjury that the foregoing and supporting information is true and correct to the best of my knowledge, information and belief.

SIGNATURE [signature] DATE 11/6/01

SECTION E CREDIT CARD PAYMENT INFORMATION

(31)

☐ MASTERCARD

☐ VISA

MASTERCARD/VISA ACCOUNT NUMBER:

EXPIRATION

I hereby authorize the FCC to charge my VISA or MASTERCARD for the service(s)/authorization herein described.

SIGNATURE ______ DATE ______

COMSAT World Systems

Robert A. Mansbach
Senior Counsel

6560 Rock Spring Drive
Bethesda, Maryland 20817
Telephone 301 2 14 3459
Fax 301 214 7145
Internet robert.mansbach@comsat.com

Received
NOV 2 0 2001
Satellite and Radiocommunication Division
Satellite Engineering Branch

November 6, 2001

KA275 SES-STA-20011107-02088
COMSAT CORPORATION

Ms. Magalie Salas
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RE: Request for Special Temporary Authority
Clarksburg, Maryland earth station
Call Sign: KA-275

Dear Ms. Salas:

COMSAT Corporation (COMSAT) herein requests a grant of Special Temporary Authority from March 6, 2002 through April 5, 2002, to provide LEOP (launch and early orbit phase) services by the above-referenced earth station in support of the upcoming launch of the INTELSAT 903 satellite, currently scheduled for March 6, 2002. In support of its request, COMSAT submits the following information.

COMSAT uses this earth station in conjunction with its other licensed earth stations at Clarksburg, Maryland and Paumalu, Hawaii to support certain satellite launches. COMSAT herein requests a grant of Special Temporary Authority to permit it to provide LEOP services in support of the INTELSAT 903 launch via the above-referenced earth station.

COMSAT is attaching hereto detailed technical information which demonstrates that the provision of LEOP services by the above-referenced earth station will be compatible with its electromagnetic environment and will not cause harmful interference into any lawfully operated earth station. In the extremely unlikely event that such interference is caused, COMSAT will take all reasonable steps to eliminate the interference.

COMSAT will coordinate the frequency and power usage with all existing satellites in orbit, which use the same frequency bands, and are in the INTELSAT 903's path. COMSAT will also provide all other satellite operators in that path with an emergency phone number where the licensee or its operators can be immediately contacted in the event that harmful interference occurs. Again, in the extremely unlikely event that such interference is caused, COMSAT will take all reasonable steps to eliminate the interference.

A request of Special Temporary Authority will enable COMSAT to provide LEOP services that are critical to placing and maintaining the INTELSAT 903 spacecraft in its proper orbit at 34.5 degrees W.L. and will thereby promote the public interest.

Respectfully submitted,
COMSAT Corporation

By [signature]
Robert A. Mansbach

cc: R. Repasi, S. Lam, S. Crandall

CERTIFICATION

I hereby certify that COMSAT.'Corporation is 'not subject to 'a denial of Federal bene-fits pursuant to 'Section 5301 of the Anti-drug Abuse Act of 1988, 21:U.S. C. Section 853a.

Robert A. Mansbach
COMSAT Corporation
6560 Rock Spring Drive
Bethesda, Maryland 20817
Its Attorney

EXHIBIT A

FREQUENCY COORDINATION AND JNTERFERENCE ANALYSIS REPORT

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

PREPARED FOR

COMSAT CORPORATION
CLARKSBURG, MARYLAND

SATELLITE EARTH STATION

PREPARED BY
COMSEARCH
19700 Janelia Farm Blvd.
Ashburn, Virginia 20147
June 6, 2001

TABLE OF CONTENTS

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. FURTHER, THERE WILL BE NO RESTRICTIONS OF ITS OPERATION DUE TO INTERFERENCE CONSIDERATIONS.

2. SUMMARY OF RESULTS

A NUMBER OF GREAT CIRCLE INTERFERENCE CASES WERE IDENTIFIED DURING THE INTERFERENCE STUDY OF THE PROPOSED EARTH STATION. EACH OF THE CASES WHICH EXCEEDED THE INTERFERENCE OBJECTIVE ON A LINE-OF-SIGHT BASIS WAS PROFILED AND THE PROPAGATION LOSSES ESTIMATED USING NBS TN101 (REVISED) TECHNIQUES. THE LOSSES WERE FOUND TO BE SUFFICIENT TO REDUCE THE SIGNAL LEVELS TO ACCEPTABLE MAGNITUDES IN EVERY CASE.

THE FOLLOWING COMPANIES REPORTED POTENTIAL GREAT CIRCLE INTERFERENCE CONFLICTS WHICH DID NOT MEET THE OBJECTIVES ON A LINE-OF-SIGHT BASIS. WHEN OVER-THE-HORIZON LOSSES ARE CONSIDERED ON THE INTERFERING PATHS, SUFFICIENT BLOCKAGE EXISTS TO NEGATE HARMFUL INTERFERENCE FROM OCCURRING WITH THE PROPOSED TRANSMIT AND RECEIVE EARTH STATION.

COMPANY

INTERMEDIA COMMUNICATIONS, INC
CELLCO PARTNERSHIP - NEWARK - DALLAS ROUTE
STATE OF MARYLAND

NO OTHER CARRIERS REPORTED POTENTIAL INTERFERENCE CASES.

3. SUPPLEMENTAL SHOWING
RE: PART 25.203(C)

PURSUANT TO PART 25.203(C) OF THE FCC RULES AND REGULATIONS, THE SATELLITE EARTH STATION PROPOSED IN THIS APPLICATION WAS COORDINATE-D BY COMSEARCH USING COMPUTER TECHNIQUES AND IN ACCORDANCE WITH PART 25 OF THE FCC RULES AND REGULATIONS.

EXPEDITED COORDINATION DATA FOR THIS EARTH STATION WAS FAXED TO BELOW LISTED CARRIERS WITH A LETTER DATED MAY 9, 2001. REVISED COORDINATIONS WERE FAXED ON MAY 17, AND JUNE 5, 2001.

360 DEGREE COMM CO OF CHARLOTTESVILLE
360 DEGREE COMM CO OF LYNCHBURG
360 DEGREE COMM COMPANY OF VIRGINIA
360 DEGREE COMM OF NORTH CAROLINA #1
ALLTEL CORPORATION
AMERICAN CELLULAR NETWORK CORE'
AMERICAN TELEVISION & COMMUNICATIONS
AT&T COMMUNICATIONS
AT&T COMMUNICATIONS OF MARYLAND INC
AT&T COMMUNICATIONS OF PENNSYLVANIA, INC
AT&T COMMUNICATIONS OF VIRGINIA INC
AT&T COMMUNICATIONS OF WEST VIRGINIA
ATLANTIC CITY ELECTRIC COMPANY
BACKLINK LLC
BELL ATLANTIC - MARYLAND
BELL ATLANTIC PENNSYLVANIA INC.
CAROLINA POWER & LIGHT COMPANY
CELLCO PARTNERSHIP - MD-NJ-PA Region
CELLCO PARTNERSHIP - Newark-Dallas Route
CELLCO PARTNERSHIP - RICHMOND, VA
CHARLOTTESVILLE CELLULAR PARTNERSHIP
CHARTER COMMUNICATIONS VI, LLC.
CLIFTON FORGE - WAYNESBORO TELEPHONE CO
COMCAST CABLE COMMUNICATIONS (MID-ATLAN)
COMCAST LCI HOLDINGS INC
CORBAN COMMUNICATIONS INC.
DELMARVA POWER & LIGHT COMPANY
DOBSON CELLULAR OF MD, INC. dba CELL ONE
DynCorp

FIRST TELEVISION CORP.(MID-ATLANTIC)
HANOVER COUNTY
HARDY CELLULAR TELEPHONE COMPANY
INTERMEDIA COMMUNICATIONS, INC.
LB Tower Company LLC
LOUDOUN COUNTY VIRGINIA
MARYLAND STATE OF
MCI WORLDCOM NETWORK SERVICES INC
NATIONAL CABLE SATELLITE CORPORATION
NORFOLK & WESTERN RAILWAY CO
NORTHEAST PENNSYLVANIA SMSA LTD PRTNRSH
OHIO STATE CELLULAR PHONE COMPANY INC
PECO ENERGY COMPANY
PENN SERVICE MICROWAVE CO. INC.
PENNSYLVANIA CELLULAR TELEPHONE CORP.
PENNSYLVANIA TURNPIKE COMMISSION
PETERSBURG CELLULAR PARTNERSHIP
PRINCE WILLIAM COUNTY
RCTC WHOLESALE CORPORATION
TELIGENT LICENSE COMPANY II LLC
UNITED TELEPHONE OF PENNSYLVANIA
USCOC OF CUMBERLAND, INC.
USCOC OF NORTH CAROLINA RSA #7, INC.
VERESTAR, INC
VERIZON NORTH INC.
VIRGINIA CELLULAR INC./CELLULAR ONE
VIRGINIA CELLULAR LIMITED PARTNERSHIP
VIRGINIA ELECTRIC & POWER COMPANY
VIRGINIA METRONET, INC.
VIRGINIA PCS ALLIANCE, L.C.
VIRGINIA RSA #7, INC.
WASH/BALT CELLULAR LTD PARTNERSHIP, INC.
WASHINGTON D.C. SMSA L.P.
WEST VIRGINIA EMS TSN,INC.
WILMINGTON CELLULAR TELEPHONE COMPANY
WINSTAR WIRELESS FIBER CORPORATION

4. EARTH STATION COORDINATION DATA

THIS SECTION PRESENTS THE DATA PERTINENT TO FREQUENCY COORDINATION OF THE PROPOSED EARTH STATION WHICH WAS CIRCULATED TO ALL COMMON CARRIERS WITHIN ITS COOR-DINATION CONTOURS.

SATELLITE EARTH STATION FREQUENCY COORDINATION DATA
06/05/2001

Company	COMSAT CORPORATION
Earth Station Name, State	CLARKSBURG, MD
Call Sign	KA.275
Latitude (DMS) (NAD83)	39 13 7.4 N
Longitude (DMS) (NAD83)	77 16 10.9 W
Ground Elevation AMSL (Ft/m)	462.0 / 140.82
Antenna Centerline AGL (Ft/m)	42.0 / 12.80
Receive Antenna Type:	TIW 19 METER
4.0 GHz Gain (dBi) / Diameter (m)	55.6 / 19.0
3 dB / 15 dB Half Beamwidth	0.10 / 0.30
Transmit Antenna Type:	TIW 19 METER
6 .O GHz Gain (dBi) / Diameter (m)	59.1 / 19.0
3 dB / 15 dB Half Beamwidth	0.10 / 0.20
Operating Mode	TRANSMIT AND RECEIVE
Modulation	ANALOG
Emission / Receive Band (MHz)	800KFXD / 3625.0000 - 4200.0000
Emission / Transmit Band (MHz)	800KFXD / 6172.0000 - 6178.0000
Max. Available RF Power (dBW)/4 kHz	10.90
(dBW)/MHz	34.90
Max. EIRP (dBW)/4 kHz	70.00
(dBW)/MHz	94.00
Max permissible Interference Power	
4.0 GHz, 20% (dBW/1 MHz)	-165.0
4.0 GHz, 0.0100% (dBW/1 MHz)	-144.0
6.0 GHz, 20% (dBW/4 kHz)	-154.0
6.0 GHz, 0.0025% (dBW/4 kHz)	-131.0

Leops Earth Station Operations for New Geostationary Satellite Launches

Leops Azimuth Range (Min/Max) Degrees	0.0 / 360.0
Minimum Elevation Angle Degrees	5.0
Radio Climate	A
Rain Zone	2
Max Great Circle Coordination Distance (Mi/Km)	
4.0 GHz	281.3 / 452.7
6.0 GHz	217.6 / 350.2
Precipitation Scatter Contour Radius (Mi/Km)	
4.0 GHz	62.1 / 100.0
6.0 GHz	62.1 / 100.0

Table of Earth Station Coordination Values

06/05/2001

Earth Station Name **CLARKSBURG MD**
Owner **COMSAT CORPORATION**
Latitude (DMS) (NAD83) 39 13 7.4 N
Longitude (DMS) (NAD83) **77 16 10.9 W**
Ground Elevation (Ft/m) 462.0 / 140.82 AMSL
Antenna Centerline (Ft/m) 42.0 / 12.80 **AGL**
Antenna Model **TIW 19 METER**
Objectives: Receive **-165.0** (dBW /1 MHz)
Transmit **-154.0** (dBW /4 kHz) **TX Power** **10.9** (dBW/4 kHz)

Azimuth (Deg)	Horizon Elevation Angle (Deg)	'Antenna Disc. Angle (Deg)	Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	Antenna Gain (dBi)	6.0 GHz Coordinatior Distance (Km)
0	1.06	98.13	4.50	313.1	4.50	198.3
5	1.06	93.13	4.50	313.1	4.50	198.3
10	0.98	88.13	4.50	317.8	4.50	203.2
15	1.14	83.13	4.50	308.7	4.50	193.7
20	1.26	78.13	4.50	302.4	4.50	187.2
25	1.26	73.13	4.50	302.9	4.50	187.8
30	1.03	68.13	4.50	314.8	4.50	200.1
35	1.33	63.13	4.50	299.0	4.50	183.7
40	1.64	58.13	4.50	285.2	4.50	169.3
45	1.42	53.13	4.50	294.8	4.50	179.3
50	1.13	48.13	4.50	309.2	4.50	193.3
55	0.83	43.13	4.50	327.4	4.50	213.9
60	0.76	38.13	4.50	332.3	4.50	218.3
65	0.75	33.13	4.50	333.1	4.50	219.1
70	0.93	28.13	4.50	320.8	4.50	206.4
75	0.79	23.13	4.50	330.2	4.50	216.1
80	0.77	18.14	4.50	330.9	4.50	216.8
85	0.76	13.14	4.50	332.3	4.50	218.3
90	0.72	8.14	4.50	335.3	4.50	221.4
95	0.68	3.16	4.50	338.4	4.50	224.6
100	0.69	1.92	4.50	337.6	4.50	223.8
105	0.81	6.88	4.50	328.8	4.50	214.6
110	0.75	11.87	4.50	333.1	4.50	219.1
115	0.69	16.87	4.50	337.6	4.50	223.8
120	0.80	21.87	4.50	329.5	4.50	215.3
125	0.88	26.87	4.50	324.0	4.50	209.7
130	0.86	31.87	4.50	325.4	4.50	211.1
135	0.62	36.87	4.50	343.3	4.50	229.8
140	0.48	41.87	4.50	356.4	4.50	243.4
145	0.41	46.87	4.50	364.0	4.50	251.4
150	0.29	51.87	4.50	379.6	4.50	267.8
155	0.29	56.87	4.50	379.6	4.50	267.8
160	0.29	61.87	4.50	379.6	4.50	267.8
165	0.36	66.87	4.50	370.0	4.50	257.7
170	0.00	71.87	4.50	452.7	4.50	350.2
175	0.00	76.87	4.50	452.7	4.50	350.2
180	0.00	81.87	4.50	452.7	4.50	350.2

Table of Earth Station Coordination Values
06/05/2001

Earth Station Name **CLARKSBURG MD**
Owner **COMSAT CORPORATION**
Latitude (DMS) (NAD83) **39 13 7.4 N**
Longitude (DMS) (NAD83) 77 16 10.9 W
Ground Elevation (Ft/m) 462.0 / 140.82 **AMSL**
Antenna Centerline (Ft/m) 42.0 / 12.80 **AGL**
Antenna Model **TIW 19 METER**
Objectives: Receive **-165.0** (dBW /1 MHz)
Transmit **-154.0** (dBW /4 kHz) **TX Power** **10.9** (dBW/4 kHz)

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Antenna Disc. Angle (Deg)	4.0 GHz Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	6.0 GHz Antenna Gain (dBi)	6.0 GHz Coordination Distance (Km)
la5	0.00	86.87	4.50	452.7	4.50	350.2
190	0.00	91.87	4.50	452.7	4.50	350.2
195	0.00	96.87	4.50	452.7	4.50	350.2
200	0.00	101.87	4.50	452.7	4.50	350.2
205	0.00	106.86	4.50	452.7	4.50	350.2
210	0.34	111.87	4.50	372.6	4.50	260.5
215	0.48	116.87	4.50	356.4	4.50	243.4
220	0.77	121.87	4.50	331.6	4.50	217.6
225	0.89	126.87	4.50	323.4	4.50	209.0
230	1.04	131.87	4.50	314.2	4.50	199.5
235	1.12	136.87	4.50	309.7	4.50	194.8
240	1.15	141.87	4.50	308.1	4.50	193.2
245	1.16	146.87	4.50	307.6	4.50	192.6
250	0.99	151.87	4.50	317.2	4.50	202.6
255	1.24	156.87	4.50	303.4	4.50	188.3
260	1.47	161.87	4.50	292.5	4.50	176.9
265	1.69	166.86	4.50	283.2	4.50	167.2
270	1.91	171.83	4.50	274.7	4.50	158.2
275	2.22	176.69	4.50	263.6	4.50	146.8
280	2.51	177.68	4.50	254.7	4.50	137.3
285	2.68	172.96	4.50	249.3	4.50	131.6
290	2.79	168.02	4.50	246.0	4.50	128.2
295	2.81	163.05	4.50	245.5	4.50	127.6
300	2.72	158.08	4.50	248.1	4.50	130.3
305	2.48	153.10	4.50	255.3	4.50	138.0
310	2.04	148.12	4.50	269.9	4.50	153.3
315	1.60	143.13	4.50	286.9	4.50	171.0
320	1.35	138.13	4.50	298.1	4.50	182.7
325	1.36	133.13	4.50	297.6	4.50	182.2
330	1.22	128.13	4.50	304.5	4.50	184.2
335	1.25	123.13	4.50	302.9	4.50	187.8
340	1.32	118.13	4.50	299.5	4.50	184.2
345	1.29	113.13	4.50	300.9	4.50	185.7
350	1.21	108.13	4.50	305.0	4.50	189.9
355	1.16	103.13	4.50	307.6	4.50	192.6

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: ______________________

JEFFREY E. COWLES
SENIOR FREQUENCY COORDINATOR
COMSEARCH
19700 Janelia Farm Blvd.
Ashburn, Virginia 20147

DATED: June 6, 2001

EXHIBIT B

RADIATION HAZARD STUDY

Analysis of Non-Ionizing Radiation for a 19.0 Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 19.0 meter earth station system. The analysis and calculations performed in this report are in compliance with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance' with the FCC R&O 96-326. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/ Uncontrolled environment are shown in Table 1. The General Population/ Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure(MPE)

Frequency Range (MHz)	Power Density (mWatts/cm**2)
30-300	0.2
300-1500	Frequency(MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure(MPE)

Frequency Range (MHz)	Power Density (mWatts/cm**2)
30-300	1.0
300-1500	Frequency(MHz)*(4.0/1200)
1500-100,000	5.0

Table 3 contains the parameters that are used to calculate the various power densities for the earth stations.

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Abbreviation	Value	Units
Antenna Diameter	D	19.0	meters
Antenna Surface Area	Sa	II * D**2/4	meters**2
Subreflector Diameter	Ds	251.0	cm
Area of Subreflector	As	II * Ds**2/4	cm**2
Frequency	Frequency	6 1 7 5	MHz
Wavelength	lambda	300/frequency(MHz)	meters
Transmit Power	P	2455.00	Watts
Antenna Gain	Ges	59.1	dBi
Pi	II	3.1415927	n/a
Antenna Efficiency	n	0.55	n/a

1. <u>Far Field Distance Calculation</u>

The distance to the beginning of the far field can be determined from the following equation:(l)

Distance to the Far Field Region, (Rf) = 0.60 * D**2 / lambda (
= 4458.3 meters

The maximum main beam power density in the Far Field can be determined from the following equation:(2)

On-Axis Power Density in the Far Field, (Wf) = Ges * P / 4 * II * Rf**2 (
= 7.989 Watts/meters**2
= 0.799 mWatts/cm**2

2. <u>Near Field Calculation</u>

Power flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region the power density from the antenna decreases linearly with respect to increasing distance.

The distance to the end of the Near Field can be determined from the following equation:(3)

Extent of the Near Field,(Rn) = D**2 / (4 * lambda)
= 1857.6 meters

The maximum power density in the Near Field can be determined from the following equation: (4)

Near Field Power Density,(Wn) = 16.0 * n * P / II * D**2
= 19.049 Watts/meters**2
= 1.905 mWatts/cm**2

3 Transition Region Calculations

The Transition region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The maximum power density in the Transition region will not exceed that calculated for the Near Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance Rt can be determined from the following equation:(S)

Transition region Power Density, (Tt) = Wn * Rn / Rt (5
= 1.905 mWatts/cm**2

4. Region between Main Reflector and Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:(6)

Power Density at Feed Flange, (Ws) = 4 * P / As (
= 198.461 mWatts/cm**2

5. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the subreflector. The area is now the area of the main reflector aperture and can be determined from the following equation:(7)

Power Density at the Main Reflector Surface, (Wm) = 4 * P / Sa
= 34.635 Watts/meters**2
= 3.463 mWatts/cm**2

6. Region between Main Reflector and Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and ground can be determined from the following equation:(8)

Power Density between Reflector and Ground, (Wg) = P / Sa
= 8.659 Watts/meters*
= 0.866 mWatts/cm**2

Table 4. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Calculated Maximum Radiation Power Density Level (mWatts/cm**2)	Hazard Assessment
1. Far Field (Rf) = 4458.3 meters	0.799	Satisfies FCC MPE
2. Near Field (Rn) = 1857.6 meters	1.905	Potential Hazard
3. Transition Region Rn < Rt < Rf, (Rt)	1.905	Potential Hazard
4. Between Main Reflector and Subreflector	198.461	Potential Hazard
5. Main Reflector	3.463	Potential Hazard
6. Between Main Reflector and Ground	0.866	Satisfies FCC MPE

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region	Calculated Maximum Radiation Power Density Level (mWatts/cm**2)	Hazard Assessment
1. Far Field (Rf) = 4458.3 meters	0.799	Satisfies FCC MPE
2. Near Field (Rn) = 1857.6 meters	1.905	Satisfies FCC MPE
3. Transition Region Rn < Rt < Rf, (Rt)	1.905	Satisfies FCC MPE
4. Between Main Reflector and Subreflector	198.461	Potential Hazard
5. Main Reflector	3.463	Satisfies FCC MPE
6. Between Main Reflector and Ground	0.866	Satisfies FCC MPI

It is the applicant's responsibility to ensure that the public an operational personnel are not exposed to harmful levels of radiation

7. Conclusions

Based upon the above analysis, it is concluded that during TT&C or IOT (In Orbit Transponder Testing) operations harmful levels of radiation may exist in those regions noted for the Uncontrolled (Table 4) and Controlled-(Table 5) Environments.

The transmissions are operational only short periods of time during emergency or testing situations. Those operational periods include TT&C functions, a transponder failure, or for transponder testing purposes.

The earth station is installed at COMSAT Corporation's Clarksburg, Maryland Teleport facility. This complex is surrounded by a fence, which will restrict any public access. The earth station will be marked with the standard radiation hazard warnings, as well as the area in the vicinity of the earth station to inform those in the general population, who might be working or otherwise present in or near the direct path of the main beam.

COMSAT Corporation will ensure that the main beam of the antenna will be pointed at least one diameter away from any building, or other obstacles in those areas that exceed the MPE levels.

Finally, the earth station's operating personnel will not have access to areas that exceed the MPE levels, while the earth station is in operation. The transmitter will be turned off during periods of maintenance, so that the MPE standard of 5.0 mw/cm**2 will be complied with for those regions in close proximity to the main reflector, which could be occupied by operating personnel.

EXHIBIT C

FAA NOTIFICATION

FAA Notification Not Required

Per PART 17[17.14(a)] of the FCC rules, FAA notification is not required, as the proposed antenna structure will be located in an area with structures of equal or greater height.

EXHIBIT D

ELECTROMAGNETIC COMPATABILITY STUDY

Interference Analysis Report

An Assessment of the Impact of Radiolocation Systems Operating in 3.1-3.7 GHz Band on Fixed Satellite Services Earth Station Receiver

Prepared for

LOCKEED-MARTIN GLOBAL TELECOMMUNICATIONS

TRANSMIT-RECEIVE EARTH STATION (19.0 METER)

FCC CALL SIGN: KA275

Site Name: Clarksburg, MD

Prepared By

COMSEARCH

October 18, 2001

19700 Janelia Farm Blvd. • Ashburn, VA 20147 USA • 703.7265500

1.0 Introduction

Interference calculations were performed to determine the potential for in-band and out-of-band interference from Radiolocation Systems operating in the 3.1 to 3.7 GHz band[1]. The geographical positions and operating parameters of these systems was derived from NTIA Document TR-99-361[2].

2.0 Radiolocation Systems in the 3.1 – 3.7 GHz Band

High-powered mobile and fixed radar systems operated by the Federal Government operate in the 3.1 – 3.7 GHz band. These radars are used to search for and track near-surface and high-altitude airborne projectiles, sea surveillance, and airborne objects. The NTIA report referenced above has identified the locations for two types of systems: land-based and shipboard based. Also included in the report are the operating characteristics of these radars. There are two prevalent types of shipboard radars, denoted as type A and Type B, and one type of ground-based radar. An Airborne System radar is also specified. This analysis will concern itself with interference from the ground based and shipboard based radars based upon the relative operating positions and parameters specified in the NTIA report.

A summary of the operating parameters for the shipboard and ground based radar systems is shown below:

Table 1 – Technical Characteristics of 3.1-3.7 GHz Radiolocation Systems

Characteristic	Shipboard System A	Shipboard System B	Ground Based System
Modulation	P0N	Q7N	P0N
Tuning Range (GHz)	3.5-3.7	3.1-3.5	3.1-3.4
Peak transmit Power (MW)	1	4	0.12
Pulse Width (μsec.)	1.0	3.5-51.2	10.75
Pulse Repetition Rate (kHz)	1.125	0.152-6.0	2793.3-5050.51
Duty Cycle (%)	0.001	0.8-2.0	0.041
Transmit 3-dB Bandwidth (MHz)	4,16.6	4	1,10
Antenna Type	Reflector	Phased Array	Phase Scan Array
Antenna Mainbeam Gain (dBi)	32	42	36
Antenna Centerline (m)	46	20	46

[1] This report is being provided as required under Footnote US 245.

[2] National Telecommunications and Information Administration, U.S. DEPARTMENT OF COMMERCE. NTIA Report TR 99-361. *TECHNICAL CHARACTERISTICS OF RADIOLOCATION SYSTEMS OPERATING IN THE 3.1-3.7 GHz BAND AND PROCEDURES FOR ASSESSING EMC WITH FIXED EARTH STATION RECEIVERS*, (December 1999).

3.0 Earth Station System Parameters

The Fixed Satellite Service Earth Station's operational parameters are shown in the Tables 2 and 3 below:

TABLE 2 - SATELLITE EARTH STATION PARAMETERS AND COORDINATION DATA

Company	COMSAT CORPORATION
Earth Station Name, State	CLARKSBURG, MD
Call Sign	KA275
Latitude (DMS) (NAD83)	39 13 7.4 N
Longitude (DMS) (NAD83)	77 16 10.9 W
Ground Elevation AMSL (Ft/m)	462.0 / 140.82
Antenna Centerline AGL (Ft/m)	42.0 / 12.80
Receive Antenna Type:	TIW 19 METER
4.0 GHz Gain (dBi) / Diameter (m)	55.6 / 19.0
3 dB / 15 dB Half Beamwidth	0.10 / 0.30
Transmit Antenna Type:	TIW 19 METER
6.0 GHz Gain (dBi) / Diameter (m)	59.1 / 19.0
3 dB / 15 dB Half Beamwidth	0.10 / 0.20
Operating Mode	TRANSMIT AND RECEIVE
Modulation	ANALOG
Emission / Receive Band (MHz)	800KFXD / 3625.0000 - 4200.0000
Emission / Transmit Band (MHz)	EOOKFXD / 6172.0000 - 6178.0000
Max. Available RF Power (dBW)/4 kHz)	10.90
(dBW)/MHz)	34.90
Max. EIR!? (dBW)/4 kHz)	70.00
(dBW)/MHz)	94.00
Max permissible Interference Power	
4.0 GHz, 20% (dBW/1 MHz)	-165.0
4.0 GHz, 0.0100% (dBW/1 MHz)	-144.0
6.0 GHz, 20% (dBW/4 kHz)	-154.0
6.0 GHz, 0.0025% (dBW/4 kHz)	-131.0
LEOPS Earth Station Operations for New Geostationary Satellite Launches	
PS Azimuth Range (Min/Max) Degrees	0.0 / 360.0
Minimum Elevation Angle Degrees	5.0
Radio Climate	A
Rain Zone	2

TABLE 2 – SATELLITE EARTH STATION PARAMETERS AND COORDINATION DATA (cont.)

Max Great Circle Coordination Distance (Mi/Km)	
4.0 GHz	281.3 / 452.7
6.0 GHz	217.6 / 350.2

Precipitation Scatter Contour Radius (Mi/Km)	
4.0 GHz	62.1 / 100.0
6.0 GHz	62.1 / 100.0

TABLE 3 ~ Table of Earth Station Coordination Values

Azimuth (Deg)	Horizon Elevation Angle (Deg)	Antenna Disc. Angle (Deg)	4.0 GHz Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	6.0 GHz Antenna Gain (dBi)	6.0 GHz Coordination Distance (Km)
0	1.06	98.13	4.50	313.1	4.50	198.3
5	1.06	93.13	4.50	313.1	4.50	198.3
10	0.98	88.13	4.50	317.8	4.50	203.2
15	1.14	83.13	4.50	308.7	4.50	193.7
20	1.26	78.13	4.50	302.4	4.50	187.2
25	1.26	73.13	4.50	302.9	4.50	187.8
30	1.03	68.13	4.50	314.8	4.50	200.1
35	1.33	63.13	4.50	299.0	4.50	183.7
40	1.64	58.13	4.50	285.2	4.50	169.3
45	1.42	53.13	4.50	294.8	4.50	179.3
50	1.13	48.13	4.50	309.2	4.50	193.3
55	0.83	43.13	4.50	327.4	4.50	213.9
60	0.76	38.13	4.50	332.3	4.50	218.3
65	0.75	33.13	4.50	333.1	4.50	219.1
70	0.93	28.13	4.50	320.8	4.50	206.4
75	0.79	23.13	4.50	330.2	4.50	216.1
80	0.77	18.14	4.50	330.9	4.50	216.8
85	0.76	13.14	4.50	332.3	4.50	218.3
90	0.72	8.14	4.50	335.3	4.50	221.4
95	0.68	3.16	4.50	338.4	4.50	224.6
100	0.69	1.92	4.50	337.6	4.50	223.8
105	0.81	6.88	4.50	328.8	4.50	214.6
110	0.75	11.87	4.50	333.1	4.50	219.1
115	0.69	16.87	4.50	337.6	4.50	223.8
120	0.80	21.87	4.50	329.5	4.50	215.3
125	0.88	26.87	4.50	324.0	4.50	209.7
130	0.86	31.87	4.50	325.4	4.50	211.1
135	0.62	36.87	4.50	343.3	4.50	229.8
140	0.48	41.87	4.50	356.4	4.50	243.4
145	0.41	46.87	4.50	364.0	4.50	251.4
150	0.29	51.87	4.50	379.6	4.50	267.8
155	0.29	56.87	4.50	379.6	4.50	267.8
160	0.29	61.87	4.50	379.6	4.50	267.8
165	0.36	66.87	4.50	370.0	4.50	257.7
170	0.00	71.87	4.50	452.7	4.50	350.2
175	0.00	76.87	4.50	452.7	4.50	350.2
180	0.00	81.87	4.50	452.7	4.50	350.2

Table 3 - Table of Earth- Station Coordination Values (cont.)

Azimuth' (Deg)	Horizon Elevation Angle (Deg)	Antenna Disc. Angle (Deg)	4.0 GHz Antenna Gain (dBi)	4.0 GHz Coordination Distance (Km)	6.0 GHz Antenna Gain (dBi)	6.0 GHz Coordination Distance (Km)
185	0.00	86.87	4.50	452.7	4.50	350.2
190	0.00	91.87	4.50	452.7	4.50	350.2
195	0.00	96.87	4.50	452.7	4.50	350.2
200	0.00	101.87	4.50	452.7	4.50	350.2
205	0.00	106.86	4.50	452.7	4.50	350.2
210	0.34	111.87	4.50	372.6	4.50	260.5
215	0.48	116.87	4.50	356.4	4.50	243.4
220	0.77	121.87	4.50	331.6	4.50	217.6
225	0.89	126.87	4.50	323.4	4.50	209.0
230	1.04	131.87	4.50	314.2	4.50	199.5
235	1.12	136.87	4.50	309.7	4.50	194.8
240	1.15	141.87	4.50	308.1	4.50	193.2
245	1.16	146.87	4.50	307.6	4.50	192.6
250	0.99	151.87	4.50	317.2	4.50	202.6
255	1.24	156.87	4.50	303.4	4.50	188.3
260	1.47	161.87	4.50	292.5	4.50	176.9
265	1.69	166.86	4.50	283.2	4.50	167.2
270	1.91	171.83	4.50	274.7	4.50	158.2
275	2.22	176.69	4.50	263.6	4.50	146.8
280	2.51	177.68	4.50	254.7	4.50	137.3
285	2.68	172.96	4.50	249.3	4.50	131.6
290	2.79	168.02	4.50	246.0	4.50	128.2
295	2.81	163.05	4.50	245.5	4.50	127.6
300	2.72	158.08	4.50	248.1	4.50	130.3
305	2.48	153.10	4.50	255.3	4.50	138.0
310	2.04	148.12	4.50	269.9	4.50	153.3
315	1.60	143.13	4.50	286.9	4.50	171.0
320	1.35	138.13	4.50	298.1	4.50	182.7
325	1.36	133.13	4.50	297.6	4.50	182.2
330	1.22	128.13	4.50	304.5	4.50	184.2
335	1.25	123.13	4.50	302.9	4.50	187.8
340	1.32	118.13	4.50	299.5	4.50	184.2
345	1.29	113.13	4.50	300.9	4.50	185.7
350	1.21	108.13	4.50	305.0	4.50	189.9
355	1.16	103.13	4.50	307.6	4.50	192.6

4.0 Interference Calculations

The interference was calculated into the earth station receive system for both in-band and out-of-band interference. The interference power level was calculated using the formula below:

$$P_r = P_t + G_t - FSL - OHLOSS + G_{es} - LL_t - LL_{,,}$$

Where:

P_r : Interference power level received at victim earth station, in dBW
P_t: Transmitter power of Radiolocation system, in dB W
G_t: Gain of Radiolocation transmit system, in dBi
FSL: Free Space Loss between radiolocation system and earth station, in dB
OHLOSS: Over-the-Horizon losses between radiolocation system and earth station, in dB
G_{es}: Horizon gain of the earth station toward radiolocation transmitter, in dBi
LL_t: Line losses of the radiolocation system, in dB (assume 2dB per NTIA report)
LL,,: Line losses of the earth station system, in dB (assume 0 dB unless known)

This interference power level was then compared to in-band and out-of-band interference criteria. The in-band criteria was developed using ITU and FCC recommendations[3]. The out-of-band interference criteria was developed using the following:

The earth station's low -noise amplifier front-end overload criteria of was determined using the following calculations:

$$T = C - G$$

Where:

T = input threshold at which front-end overload occurs, dBW
C = output 1 dB gain compression point of the LNA, typical -20 dBW
G = Gain of the LNA, dB

For the purposes of this report it was assumed that the low-noise amplifier would not provide any out-of-band frequency rejection, thus no Frequency Dependent Rejection values based upon any RF selectivity, such as pre-LNA filtering or inherent LNA filtering, have been assumed. The maximum level of interference is the includes the input saturation threshold value minus a 10 dB output backoff value to consider in operation levels

The maximum interference power receive, P_r, allowable then becomes:

$$\text{Max } P_r \geq T - IPBO$$

For a 65 dB gain LNA this value is -95 dBW. In the absence of manufacturer LNA/LNB specifications the following typical values have been used:

---

[3] FCC Rules 47CFR25.251 by reference ITU Radio Regulations Appendix S7.

T = -95 dBW
C=-20dBW
G = 65 dB

The propagation model **to** determine **the** over-the-horizon loss is the NSMA OH-Loss model[4]. When the propagation link is very lengthy, over 250 miles, an estimated OH-loss using a rounded earth modeling value has been used.

5.0 Summary of Results

The summary calculations are shown for all shipboard based and land based systems in Tables 4 through 8 below. Whenever Radar A and B are possibly in use, the interference calculations have assumed the higher powered systems (Radar B). The antenna elevation for the Ground Based systems was assumed to be 46 m even though it was not specified in the NTIA report.

[4] National Spectrum Managers Association has developed an industry-accepted version that incorporates NBS Tech Note 101.

Table 4 Shipboard Radar A Land-Based Test and Training Sites

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Pensacola,	FL	302128	0871626	225.8	834.7	NO	-166.2	-80.2	NIA	-246.5	-182.0	NO	NO
Pascagoula,	MS	302200	0882900	229.5	882.6	NO	-166.7	-81.2	N/A	-247.9	-183.4	NO	NO
St.Inigoes,	MD	381000	0762300	146.3	87.0	YES	-146.6	-52.0	-52	-198.6	-134.1	YES	NO

Table 5 Shipboard Radar B Land-Based Test and Training Sites

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Moorestown,	NJ	395849	0745630	66.3	134.9	YES	-150.4	-61.6	-61.6	-212.0	-131.5	YES	NO
Wallops Island,	VA	375600	0752800	131.7	131.9	YES	-150.2	-59.3	-59.3	-209.5	-129.0	YES	NO

Table 6 Shipboard Radars A and B Home Ports

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Bath,	ME	435425	0694848	47.6	504.0	NO	-161.9	-71.5	N/A	-233.3	-152.8	YES.	NO
Bremerton,	WA	473324	1223811	299.7	2355.6	NO	-175.3	-98.2	N/A	-273.5	-193.0	NO	NO
Everett,	WA	475858	1221354	300.5	2335.6	NO	-175.2	-98.1	N/A	-273.3	-192.8	NO	NO
Mayport,	FL	302334	0812427	202.3	652.3	NO	-164.1	-75.9	N/A	-240.1	-159.5	YES	NO
Norfolk,	VA	365200	0762100	162.5	169.8	YES	-152.4	-62.9	-62.9	-215.3	-134.8	YES	NO
Pascagoula,	MS	302253	0882933	229.5	882.2	NO	-166.7	-81.2	N/A	-247.9	-167.4	NO	NO
Pearl Harbor,	HI	212000	1580000	276.0	4981.5	NO	-181.8	-111.3	N/A	-293.0	-212.5	NO	NO
Portland,	ME	434100	0701800	47.3	475.3	NO	-161.4	-70.4	N/A	-231.8	-151.3	YES	NO
San Diego	CA	324105	1170800	270.3	2279.7	NO	-175.0	-97.7	N/A	-272.7	-192.1	NO	NO

Table 7 Naval At-Sea Operational Areas

Operational Area	Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under250 miles?)	FSL(dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
\FWTF												
[North Range)	183000	0670000	153.9	1556.8	NO	-171.7	-91.1	N/A	-262.7	-182.2	NO	NO
	200000	0670000	152.4	1460.9	NO	-171.1	-89.9	N/A	-261.1	-180.5	NO	NO
	221000	0654800	146.9	1358.7	NO	-170.5	-88.7	N/A	-259.2	-178.7	NO	NO
	221000	0652000	145.8	1372.9	NO	-170.6	-88.9	NIA	-259.4	-178.9	NO	NO
	185000	0620000	142.9	1680.8	NO	-172.3	-92.4	N/A	-264.7	-184.2	NO	NO
	185000	0620000	142.9	1680.8	NO	-172.3	-92.4	N/A	-264.7	-184.2	NO	NO
	182500	0643000	148.5	1628.5	NO	-172.1	-91.8	N/A	-263.9	-183.4	NO	NO
	183000	0644500	149.0	1616.2	NO	-172.0	-91.7	N/A	-263.7	-183.2	NO	NO
	183000	0663800	153.1	1565.8	NO	-171.7	-91.2	N/A	-262.9	-182.3	NO	NO
\FWTF												
South Range)	180500	0675500	156.4	1562.4	NO	-171.7	-91.1	N/A	-262.8	-182.3	NO	NO
	180500	0652700	150.9	1622.9	NO	-172.0	-91.8	N/A	-263.8	-183.3	NO	NO
	181500	0651000	150.1	1620.1	NO	-172.0	-91.7	N/A	-263.8	-183.2	NO	NO
	181500	0641000	148.0	1648.6	NO	-172.2	-92.0	N/A	-264.2	-183.7	NO	NO
	170000	0641000	149.3	1726.5	NO	-172.6	-92.9	NIA	-265.4	-184.9	NO	NO
	165800	0642800	150.0	1720.2	NO	-172.5	-92.8	N/A	-265.3	-184.8	NO	NO
	153300	0660600	154.6	1768.3	NO	-172.8	-93.3	NIA	-266.0	-185.5	NO	NO
	153900	0662300	155.1	1755.2	NO	-172.7	-93.1	NIA	-265.8	-185.3	NO	NO
	163000	0662300	154.4	1700.3	NO	-172.4	-92.6	N/A	-265.0	-184.5	NO	NO
	163000	0675500	157.7	1665.7	NO	-172.3	-92.2	N/A	-264.5	-184.0	NO	NO

Table 7 Naval At-Sea Operational Areas (continued)

Operational Area	Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
AUTEC												
	252000	0780500	183.1	957.9	NO	-167.4	-82.6	N/A	-250.1	-169.5	NO	NO
	252000	0774500	181.8	957.2	NO	-167.4	-82.6	N/A	-250.0	-169.5	NO	NO
	232500	0762000	176.8	1090.0	NO	-168.6	-84.9	N/A	-253.4	-172.9	NO	NO
	232500	0771500	179.9	1088.6	NO	-168.6	-84.8	N/A	-253.4	-172.9	NO	NO
FORACS, Hawaii												
	212530	1581100	276.2	4988.4	NO	-181.8	-111.3	N/A	-293.1	-212.5	NO	NO
	212100	1581500	276.2	4995.3	NO	-181.8	-111.3	N/A	-293.1	-212.6	NO	NO
	211500	1580800	276.0	4992.6	NO	-181.8	-111.3	N/A	-293.1	-212.6	NO	NO
	211500	1580700	276.0	4991.6	NO	-181.8	-111.3	NIA	-293.1	-212.6	NO	NO
Gulf of Mexico OPAREA												
	293601	0800130	194.1	681.4	NO	-164.5	-76.7	NIA	-241.2	-160.7	YES	NO
	292521	0864800	221.6	867.7	NO	-166.6	-80.9	N/A	-247.5	-167.0	NO	NO
	284101	0864800	219.7	909.3	NO	-167.0	-81.7	NIA	-248.7	-168.2	NO	NO
	285231	0874400	223.0	932.0	NO	-167.2	-82.1	N/A	-249.3	-168.8	NO	NO
Pacific Missile Range Facility (PMRF)												
	220000	1594500	277.4	5055.7	NO	-181.9	-111.5	N/A	-293.4	-212.9	NO	NO
	220800	1620000	278.5	5180.7	NO	-182.1	-111.9	N/A	*-294.0*	-213.5	NO	NO
	224500	1614000	279.0	5136.2	NO	-182.0	-111.8	N/A	-293.8	-213.3	NO	NO
	260000	1581500	280.9	4810.2	NO	-181.5	-110.7	N/A	-292.1	-211.6	NO	NO
Pearl Harbor South OPAREA												
	190800	1591500	274.4	5144.7	NO	-182.0	-111.8	N/A	-293.9	-213.3	NO	NO
	210000	1580800	275.8	5002.8	NO	-181.8	-111.3	N/A	-293.1	-212.6	NO	NO
	210000	1573600	275.5	4971.9	NO	-181.7	-111.2	N/A	-293.0	-212.5	NO	NO
	191800	1562000	273.3	4968.2	NO	-181.7	-111.2	N/A	*-293.0*	-212.4	NO	NO
	184900	1574500	273.4	5070.5	NO	-181.9	-111.6	N/A	-293.5	-213.0	NO	NO

Table 7 Naval **At-Sea Operational Areas (continued)**

Operational Area	Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Power Level Interfering (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Southern California (SOCAL)												
	385200	1255200	284.8	2614.4	NO	-176.2	-100.1	N/A	-276.2	-195.7	NO	NO
	390000	1240000	284.4	2511.6	NO	-175.8	-99.4	N/A	-275.2	-194.7	NO	NO
	311500	1163000	267.4	2286.0	NO	-175.0	-97.7	N/A	-272.7	-192.2	NO	NO
	300000	1203000	267.8	2544.5	NO	-175.9	-99.6	NIA	-275.5	-195.0	NO	NO
Virginia Capes OPAREA												
	384500	0750000	104.1	126.4	YES	-149.9	-60.0	-60	-209.9	-129.3	YES	NO
	384500	0743000	101.4	152.6	YES	-151.5	-62.4	-62.4	-213.9	-133.4	YES	NO
	374500	0724000	110.7	269.3	NO	-156.4	-60.6	NIA	-217.0	-136.5	YES	NO
	350600	0724000	136.8	381.1	NO	-159.4	-66.6	N/A	-226.0	-145.5	YES	NO
	320000	0771200	179.5	497.7	NO	-161.8	-71.2	N/A	-233.0	-152.5	YES	NO
	342400	0773000	182.3	332.5	NO	-158.3	-64.2	N/A	-222.5	-142.0	YES	NO
	354000	0752500	156.9	265.3	NO	-156.3	-60.3	N/A	-216.6	-136.1	YES	NO
	370000	0755000	152.5	171.9	YES	-152.5	-62.6	-62.6	-215.1	-134.6	YES	NO

Table 8 Land-Based Radar Test and Training Sites

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Power Level Interfering (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Fort Lewis	WA	470525	1223510	298.8	2353.9	NO	-175.3	-98.2	N/A	-273.5	-214.2	NO	NO
Yakima Firing	WA	464018	1202135	297.9	2245.0	NO	-174.8	-97.4	N/A	-272.3	-213.0	NO	NO
Fort Carson	CO	383810	1044750	277.1	1483.8	NO	-171.2	-90.2	N/A	-261.5	-202.2	NO	NO
Fort Riley	KS	385813	0965139	275.2	1053.3	NO	-168.3	-84.3	NIA	-252.5	-193.2	NO	NO
Fort Shafter	HI	211800	1574900	275.9	4972.2	NO	-181.7	-111.2	NIA	-293.0	-233.7	NO	.NO
Hunter AAF	GA	320100	0810800	204.8	542.1	NO	-162.5	-72.7	NIA	-235.2	-175.9	NO	NO
Fort Gillem	GA	333600	0841900	227.5	551.7	NO	-162.7	-73.0	N/A	-235.7	-176.4	NO	NO

Table 8 Land-Based Radar Test and Training Sites

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Fort Benning	GA	322130	0845815	224.7	641.0	NO	-164.0	-75.6	NIA	-239.6	-180.3	NO	NO
Fort Stewart	GA	315145	0813655	207.0	563.2	NO	-162.8	-73.4	N/A	-236.2	-176.9	NO	.NO
Fort Rucker	AL	311947	0854255	223.7	723.7	NO	-165.0	-77.7	N/A	-242.8	-183.5	NO	NO
Yuma Proving	AZ	330114	1141855	269.3	2116.0	NO	-174.3	-96.4	N/A	-270.7	-211.4	NO	NO
Fort Hood	TX	310830	0974550	250.3	1286.7	NO	-170.0	-87.7	N/A	-257.8	-198.5	NO	NO
Fort Knox	KY	375350	0855655	261.7	478.8	NO	-161.4	-70.6	N/A	-232.0	-172.7	NO	NO
Fort Bragg	NC	350805	0790035	199.4	297.5	NO	-157.3	-62.3	NIA	-219.6	-160.3	YES	NO
Fort Campbell	KY	363950	0872820	255.6	584.5	NO	-163.2	-74.0	N/A	-237.2	-177.9	NO	NO
Fort Polk	LA	310343	0931226	242.7	1063.3	NO	-168.4	-84.4	N/A	-252.8	-193.5	NO	NO
Fort Leonard	MO	374430	0920737	267.4	812.0	NO	-166.0	-79.7	NIA	-245.8	-186.5	NO	NO
Fort Irwin	CA	351536	1164102	274.8	2190.2	NO	-174.6	-97.0	N/A	-271.6	-212.3	NO	NO
Fort Sill	OK	344024	0982352	261.3	1210.7	NO	-169.5	-86.7	N/A	-256.2	-196.9	NO	NO
Fort Bliss	TX	314850	1062533	261.2	1720.9	NO	-172.5	-92.8	NIA	-265.3	-206.0	NO	NO
Fort Leavenworth	KS	392115	0945500	276.2	946.1	NO	-167.3	-82.4	NIA	-249.7	-190.4	NO	NO
Fort Drum	NY	440115	0754844	12.3	339.9	NO	-158.4	-64.6	N/A	-223.1	-163.8	YES	NO
Fort Gordon	GA	332510	0820910	215.7	483.9	NO	-161.5	-70.8	N/A	-232.3	-173.0	NO	NO
Fort McCoy	WI	440636	0904127	300.4	772.3	NO	-165.6	-78.9	N/A	-244.4	-185.2	NO	NO
Fort Dix	NJ	400025	0743713	68.1	151.5	YES	-151.4	-66.5	-66.5	-217.9	-158.6	YES	NO
Parks Reserve	CA	374254	1214218	281.4	2412.0	NO	-175.5	-98.7	N/A	-274.1	-214.8	NO	NO
Aberdeen Proving	MD	392825	0760655	73.8	64.3	YES	-144.0	-56.9	-56.9	-200.9	-141.6	YES	NO
Fort Huachuca	AZ	313500	1102000	263.8	1939.1	NO	-173.6	-94.9	N/A	-268.4	-209.1	NO	NO
Fort Monmouth	NJ	401900	0740215	65.2	188.0	YES	-153.3	-70.2	-70.2	-223.5	-164.2	YES	NO
Picatinny Arsenal	NJ	405600	0743400	49.6	185.8	YES	-153.2	-257.3	-257.3	-410.5	-351.2	NO	NO

Table 8 Land-Based Radar Test and Training Sites (continued)

Radar Location		Lat (N)	Lon (w)	Bearing (deg.)	Distance (mi)	Profile (Is path under 250 miles?)	FSL (dB)	Estimated OH-Loss (dB)	Profiled OH-Loss (dB)	Total Path Loss (dB)	Interfering Power Level (dBW/MHz)	In-Band Interference?	Out-of Band Overload?
Redstone Arsenal	AL	343630	0863610	241.2	606.8	NO	-163.5	-74.7	NIA	-238.2	-178.9	NO	NO
White Sands	NM	322246	1062813	262.5	1706.6	NO	-172.5	-92.6	N/A	-265.1	-205.8	NO	NO
Army Research	MD	390000	0765800	132.7	22.2	YES	-134.7	-99.1	-99.1	-233.8	-174.6	NO	NO
Fort Hunter	CA	355756	1211404	278.1	2423.1	NO	-175.5	-98.7	NIA	-274.2	-215.0	NO	NO
Kelly Support	PA	140235	770800925	298.9	173.9	YES	-152.6	-191.9	-191.9	-344.5	-285.2	NO	NO

Table Headings

Radar Location : The site name of the radar system
Lat (N) : Radar latitude
Lon (w) : Radar Longitude
Bearing (deg.) : Azimuth from earth station toward radar.
Distance (mi) : Distance from earth station to radar
Profile (Is path under 250 miles?) : If path is over 250 miles no OH-loss profile is generated
FSL (dB) : Free Space Loss
Estimated OH-Loss (dB) : Using a rounded-earth model an estimated OH-loss is calculated for long paths
Profiled OH-Loss (dB) : Using the NSMA Tropo Loss actual OH-loss calculations are performed for shorter paths
Total Path Loss (dB) : Total of Free Space Loss plus Over-the-Horizon loss
Interfering Power Level (dBW/MHz) : Level of RF interference at the earth station's LNA input
In-Band Interference? : If the Radar is operating in-band is the max. permissible interference criteria being met?
Out-of Band Overload? : If the Radar is operating in out-of-band spectrum is the LNA overload threshold being met?

6.0 Conclusions

Calculations were perform to assess the electromagnetic compatibility (EMC) between the radars listed below and adjacent-band FSS earth station receiver at Clarksburg, MD. Interference assessment for Earth Stations Operating at 3625 - 3700 MHz at the Clarksburg, MD site identified 21potential cases of In-band interference. The applicant is aware of this potential for interference and will work with the Government Users to mitigate the problem.

Results

Site Name		Lat (N)	Lon (W)	Out-of-Band Overload?	In-Band Interference?
St.Inigoes,	MD	381000	0762300	YES	NO
Moorestown,	NJ	395849	0745630	YES	NO
Wallops Island,	VA	375600	0752800	YES	NO
Bath,	ME	435425	0694848	YES	NO
Mayport,	FL	302334	0812427	YES	NO
Norfolk,	VA	365200	0762100	YES	NO
Portland,	ME	434100	0701800	YES	NO
Gulf of Mexico OPAREA		293601	0800130	YES	NO
Virginia Capes OPAREA		384500	0750000	YES	NO
		384500	0743000	YES	NO
		374500	0724000	YES	NO
		350600	0724000	YES	NO
		320000	0771200	YES	NO
		342400	0773000	YES	NO
		354000	0752500	YES	NO
		370000	0755000	YES	NO
Fort Bragg	NC	350805	0790035	YES	NO
Fort Drum	NY	440115	0754844	YES	NO
Fort Dix	NJ	400025	0743713	YES	NO
Aberdeen Proving	MD	392825	0760655	YES	NO
Fort Monmouth	NJ	401900	0740215	YES	NO

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