BAE SYSTEMS

December 28, 2006

James R. Burtle
Chief, Office of Engineering and Technology
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: Request for Expedited Treatment
of Application for Special Temporary Authority
OET File No. 0814-EX-ST-2006

Dear Mr. Burtle:

BAE Systems ("BAE") respectfully requests expedited treatment of its application pending under File No. 0814-EX-ST-2006 so that it may meet its January 12, 2006 obligations associated with the testing of a new generation communications system for the United States Navy it is designing and developing for the USN under United States Government Contract No. N00024-03-C-2310.

BAE is a leading manufacturer of communications equipment for the military and the Federal government. It is continually engaged in designing and developing new and innovative equipment to meet the expanding and critical communications needs of the government. As an essential component of that effort, BAE must test and demonstrate equipment during various stages of design and development to evaluate its functionality, acceptability, and interoperability prior to seeking equipment authorization. For example, BAE evaluates the performance, capacity, signal quality, and data rates of such equipment. By evaluating products before obtaining FCC or other agency equipment approvals, BAE is able to identify and make needed enhancements to the equipment to ensure it meets required specifications.

BAE submitted the above-referenced application on October 31, 2006, seeking a special temporary authority (STA) to conduct design verification testing of Super High Frequency (SHF), C-Band, and X-Band Satellite Communications (SATCOM) systems at the company's land-based test facility in support of the United States Navy (USN) Littoral Combat Ship (LCS) program. The systems tested will subsequently be installed on the LCS-2, USS Independence, the lead ship of the Independence Class of Littoral Combat Ships. Attached for your reference is a copy of the application and associated supporting statement.

BAE Systems ("BAE") respectfully requests expedited treatment of its application for the following reasons:

First, BAE requires experimental authority by January 12 so that it may meet its obligations associated with the testing of a new generation communications systems for the United States Navy. Specifically, it is acting as a subcontractor responsible for the integration of communications systems being designed and developed for the USN under United States Government Contract No. N00024-03-C-2310.

Timely grant of the STA will allow BAE to install and test the SHF system at a temporary land-based test facility for verification of LCS communications system operation for the lead ship of the USN's Independence Class prior to shipboard installation. Ship production schedules were recently expedited due to an adjudication of the Navy's Build Specification requirements for the LCS. To meet these changed schedules, BAE

BAE SYSTEMS 23481 Cottonwood Parkway, California, MD 20619-9517
Telephone (301) 862-9300

BAE SYSTEMS

must commence operational testing prior to delivery to the USN. Moreover, the reduction in available shipboard test time has increased the need to perform more testing at land-based facilities than originally anticipated.

Second, BAE requires authority by January 12 so that it can complete government witnessed design verification testing of the SHF in accordance with recently approved schedules. This testing is a key deliverable under United States Government Contract No. N00024-03-C-2310.

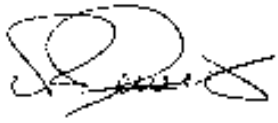
Third, USS Independence crew members are expected to report to the BAE land based facility in late January to evaluate the equipment and provide the company with needed feed-back that BAE will use to make improvements and design changes to proposed communications system. “Hands on” operation of these devices is essential to obtain useful data. Moreover, such testing will provide the USN representatives with the information they will require to train users, including members of the armed forces, regarding the key features of this new technology.

Last, expedited treatment is critical to BAE’s ability to continue its research and development of this new communications system to assist the military in meeting its national security responsibilities.

As a final matter, please be assured that BAE understands that it must conduct its demonstrations on a non-interference basis and will immediately address any interference in the unlikely event that such should occur. To that end, BAE confirms its acceptance of the operational conditions set forth in its narrative to the application (attached for your convenience) as well as those customarily imposed by the Commission.

Please call me if you have any questions about this request or would like to discuss it with me. I can be reached at 301-863-1561 (Telephone), 301-863-1569 (Facsimile) or at wayne.reeves@baeystems.com

Respectfully submitted,



Wayne R. Reeves
Director, LCS Communications Program
BAE Systems
Integrated Technical Solutions

cc: Mr. Anthony Serafini

FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR SPECIAL TEMPORARY AUTHORITY
This request for Special Temporary Authority (STA) is for a Existing STA

Applicant Name

Name of Applicant: BAE Systems

Address

Attention: Collin S. Campbell
Street Address: 1601 Research Blvd.
P.O. Box:
City: Rockville
State: MD
Zip Code: 20850
Country:
E-Mail Address: collin.s.campbell@baesystems.com

Best Contact

Give the following information of person who can best handle inquiries pertaining to this application:

Last Name: DeSoto
First Name: Kurt
Title: Counsel, Wiley Rein & Fielding LLP
Phone Number: 2027197235

Explanation

Please explain in the area below why an STA is necessary:
BAE is engaged in testing new generation communications systems for the United States Navy. Specifically, it is acting as a subcontractor responsible for the integration of communications systems being designed and developed for the USN under United States Government Contract No. N00024-03-C-2310. BAE requires an STA so that it may install and test a temporary land-based test facility for verification of LCS communications system operation for the lead ship of the USN's Independence Class prior to shipboard installation. Ship production schedules were recently expedited due to an adjudication of the Navy's Build Specification requirements for the LCS. To meet these changed schedules, BAE must commence operational testing prior to delivery to the USN. Moreover, the reduction in available shipboard test time has increased the need to perform testing at land-based facilities than originally anticipated.

Purpose of Operation

Please explain the purpose of operation: The experimental authority requested herein will allow BAE to (a) test performance of the systems, (b) demonstrate system operation and functionality, and (c) determine the acceptability of the systems. Commencing such efforts as soon as possible will significantly enhance the company's ability to ensure the systems meet the needs of USN.

Information

Callsign:
Class of Station: FX
Nature of Service: Experimental

Location of proposed operation

Operation Start Date: 01/02/2007
Operation End Date: 07/02/2007

Manufacturer

List below transmitting equipment to be installed (if experimental, so state) if additional rows are required, please submit equipment list as an exhibit:

Manufacturer	Model Number	No. Of Units	Experimental

Raytheon	RT-1672D	3	Yes
Raytheon	AM-7565/ARC	4	Yes
Rockwell-Collins	RT-1794D	1	Yes
Viasat	MD-1324B	1	Yes
Harris	AN/WSCV-6 (V)9	1	Yes

Certification

Neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. The applicant hereby waives any claim to the use of any particular frequency or electromagnetic spectrum as against the regulatory power of the United States because of the prvious use of the same, whether by license or otherwise, and requests authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.) The applicant acknowledges that all statements made in this application and attached exhibits are considered material representations, and that all the exhibits part hereof and are incorporated herein as if set out in full in this application; undersigned certifies that all statements in this application are true, complete and correct to the best of his/her knowledge and belief and are made in good faith. Applicant certifies that construction of the station would NOT be an action which is likely to have a significant environmental effect. See the Commission's Rules, 47 CFR1.1301-1.1319.

Signature of Applicant (Authorized person filing form): Wayne Reeves

Title of Applicant (if any): Program Manager

Date: Oct 31 2006 12:00AM

Station Location

City	State	Latitude	Longitude	Mobile	Radius of Operation
California	Maryland	North 38 18 38	West 76 32 27		

Datum: NAD 83

Is a directional antenna (other than radar) used? Yes

Exhibit submitted: Yes

(a) Width of beam in degrees at the half-power point:

(b) Orientation in horizontal plane:

(c) Orientation in vertical plane:

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? No

(a) Overall height above ground to tip of antenna in meters:

(b) Elevation of ground at antenna site above mean sea level in meters:

(c) Distance to nearest aircraft landing area in 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:

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	3.70000000-4.20000000 GHz	FX	800.000000 W 1.280000 MW	P		2M64G7W	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Deleted	5.85000000-6.42500000 GHz	FX	800.000000 W 1.280000 MW	P		2M00	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	5.85000000-6.42500000 GHz	FX	800.000000 W 1.280000 MW	P		2M64G7W	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	7.25000000-7.75000000 GHz	FX	1000.000000 W 2.830000 MW	P		3M98G7W	

Station	Mean	Frequency	Emission	Modulating

Action	Frequency	Class	Output Power/ERP	Peak	Tolerance (+/-)	Designator	Signal
Modified	7.90000000-8.40000000 GHz	FX	1000.000000 W 2.830000 MW	P		3M98G7W	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	249.00000000-270.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K0F1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	249.00000000-270.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K0G1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	249.00000000-270.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K9F1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	249.00000000-270.00000000 MHz	FX	125.000000 W 60.260000 W	P		5K00G1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	249.00000000-270.00000000 MHz	FX	125.000000 W 60.260000 W	P		7K20G1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	292.00000000-312.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K0F1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	292.00000000-312.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K0G1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	292.00000000-312.00000000 MHz	FX	125.000000 W 60.260000 W	P		25K9F1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	292.00000000-312.00000000 MHz	FX	125.000000 W 60.260000 W	P		5K00G1D	

Action	Frequency	Station Class	Output Power/ERP	Mean Peak	Frequency Tolerance (+/-)	Emission Designator	Modulating Signal
Modified	292.00000000-312.00000000 MHz	FX	125.000000 W 60.260000 W	P		7K20G1D	

Application for
Special Temporary Authority
0814-EX-ST-2006

SUPPORTING STATEMENT

Pursuant to Sections 5.3(b), (d), (e), (f), and (i) and 5.61 of the Federal Communications Commission ("FCC") rules, 47 C.F.R. §§ 5.3(b)(d)(e), (f) & (i), 5.61 (2005), BAE Systems ("BAE") respectfully requests special temporary authority (STA) for a limited six-month period commencing **January 2, 2007,** to conduct design verification testing of Ultra High Frequency (UHF), C-Band, and X-Band Satellite Communications (SATCOM) systems at the company's land-based test facility in support of the United States Navy (USN) Littoral Combat Ship (LCS) program. The systems tested will subsequently be installed on the LCS-2, USS Independence, the lead ship of the Independence Class of Littoral Combat Ships.

In support of this request, the following is shown:

1) Applicant's Name, Address, and FRN:

BAE Systems
1601 Research Blvd.
Rockville, MD 20850

FCC Registration Number (FRN): 0010674976

2) Need for STA:

BAE is engaged in testing new generation communications systems for the United States Navy. Specifically, it is acting as a subcontractor responsible for the integration of communications systems being designed and developed for the USN under United States Government Contract No. N00024-03-C-2310.

BAE requires an STA so that it may install and test a temporary land-based test facility for verification of LCS communications system operation for the lead ship of the USN's Independence Class prior to shipboard installation. Ship production schedules were recently expedited due to an adjudication of the Navy's Build Specification requirements for the LCS. To meet these changed schedules, BAE must commence operational testing prior to delivery to the USN. Moreover, the reduction in available shipboard test time has increased the need to perform testing at land-based facilities than originally anticipated.

3) Purpose and Description of Operation:

The experimental authority requested herein will allow BAE to (a) test performance of the systems, (b) demonstrate system operation and functionality, and (c) determine the acceptability of the systems. Commencing such efforts as soon as possible will significantly enhance the company's ability to ensure the systems meet the needs of USN.

UHF SATCOM system testing will be performed using: (a) PSC-5D (RT-1672D) multi-band multi-mission radio (MBMMR) equipment manufactured by Raytheon and (b) AN/ARC-210 (RT-1794D) radio equipment manufactured by Rockwell Collins. This equipment has been type-certified for UHF SATCOM Demand Assigned Multiple Access (DAMA) and non-DAMA UHF SATCOM operations by the Joint Interoperability Test Center (JITC).

The UHF SATCOM system for the LCS also includes: (a) high power amplifiers (AM-7565/ARC) manufactured by Raytheon, (b) a SATCOM modem (MD-1324B) and a quad diversity combiner (QDC-100) manufactured by Viasat, (c) antennas (AV-2075-9) manufactured by Trivec Avant, and (d) a variety of switches, diplexers, and attenuators.

The integrated UHF SATCOM radio system will be deployed to access existing USN 5 kHz and 25 kHz DAMA and non-DAMA circuits for voice and data transmissions. The test will allow BAE to verify the design and integration of the SATCOM radios, amplifiers, diplexers, switches, receive diversity combiners, and antennas through operability testing.

The C-Band and X-Band test will be performed using the AN/WSC-6(V)9 Multi-Band Satellite Communications Terminal (MSCT) manufactured by Harris and provided to the LCS program as Government Furnished Equipment (GFE) by the Space and Naval Warfare Systems Center, San Diego (SPAWAR).

The MSCT will be deployed to access commercial Intelsat circuits over C-Band channels and military Defense Satellite Communication System (DSCS) circuits over X-Band channels. The manufacturer has already obtained Defense Information Systems Agency (DISA) terminal certification for DSCS satellite access capability. The test at BAE's land-based test facility will allow the company to verify the design and integration of the MSCT with LCS cryptographic systems, multiplexers, and routers, and interoperability of the integrated system with the Navy shore facilities.

4**) Dates of Proposed Operation:**

January 2, 2007 through July 2, 2007

5) Location(s) of Proposed Operations:

44420 Pecan Court
California, MD 20619

Coordinates: 38-18-38.0N, 076-32-27W (NAD 83)

6) Class of Station:

The FCC station class code for the proposed operation is "FBT." A limited number of base stations will be located at temporarily fixed locations as described below.

7) Equipment To Be Used:

V/UHF Radio	Raytheon	RT-1672D (Qty. 3)
UHF Amplifier	Raytheon	AM-7565/ARC (Qty. 4)
V/UHF Radio	Rockwell-Collins	RT-1794D (Qty. 1)
SATCOM Modem	Viasat	MD-1324B (Qty. 1)
C/X-band Satellite Terminal	Harris	AN/WSCV-6(V)9 (Qty. 1)

The company does not propose to use prototype equipment during this trial.

8) Frequencies Desired:

UHF SATCOM:	C-Band:	X-Band:
Uplink: 292-312 MHz	Uplink: 5.850-6.425 GHz	Uplink: 7.900-8.400 GHz
Downlink: 249-270 MHz	Downlink: 3.700-4.200 GHz	Downlink: 7.250-7.750 GHz

9) Power Levels:

UHF SATCOM:	C-Band:	X-Band:
TPO: 125 Watts (via HPA)	TPO: 800 Watts (via HPA)	TPO: 1000 Watts (via HPA)
EIRP: 20 dBW (Peak)	EIRP: 63.25 dBW (Peak)	EIRP: 66.69 dBW (Peak)
ERP: 60.26 Watts (Peak)	ERP: 1.28 MW (Peak)	ERP: 2.83 MW (Peak)

Additional technical information regarding the proposed operations in the C-Band is provided on the attached pages prepared by Comsearch in connection with its frequency coordination of BAE's test.

10) Type of Emission, Modulation Technique, and Bandwidth Required:

UHF SATCOM:	C-Band:	X-Band:
7K20G1D, 5K00G1D 25K0F1D, 25K0G1D 25K9F1D	2M64G7W	3M98G7W

Other emission modes and modulation techniques may be utilized, but in no event will the emissions extend beyond the frequency bands requested.

11) Overall Height of Antenna(s) Above Ground:

HAAT: UHF SATCOM: 30 feet
HAAT: C/X-Band : 8 feet

12) Restrictions on Operation:

As noted above, BAE does not propose to use prototype equipment during this test. The STA will support testing to be conducted under United States Government Contract No. N00024-03-C-2310. BAE is acting as a subcontractor for the integration of communications systems into a ship to be built for the United States Navy under this contract. As such, the equipment will not be marketed to non-federal entities. BAE understands that: (a) permission to operate the units has been granted under experimental authority issued by the Federal Communications Commission, is strictly temporary, and may be cancelled at any time and that (b) operation is subject to the condition that it not cause harmful interference.

13) Interference Protection/Stop Buzzer Contact Information:

BAE recognizes that the operation of any equipment under experimental authority must not cause harmful interference to authorized facilities. It therefore will coordinate its activities with any licensees in the proposed bands in accordance with FCC requirements. Should interference occur, the company will take immediate steps to resolve the interference, including if necessary arranging for the discontinuance of operation. In any event, BAE submits that its experimental operations are unlikely to cause interference. The company proposes to limit the power and transmitting times to the minimum necessary to evaluate the equipment.

BAE advises the Commission that Tina Green (BAE Systems - GD LCS Team, Communications IPT, Chief Engineer) will be personally responsible for the tests and will be available at her office at (301) 863-1562 or by mobile telephone at (240) 538-8351. Ms. Green will act as a "stop buzzer" if any issues regarding interference arise during testing.

14) Compliance With Human Exposure Limits:

BAE certifies that it will operate under this STA in full compliance with IEEE C95.1 - 1991, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

15) Application Contact Information:

Company Contact:

Collin S. Campbell
Director, Coast Guard Programs
BAE Systems
Integrated Electronics Solutions
23481 Cottonwood Parkway
California, MD 20619
Telephone: 301-862-9355
Facsimile: 301-862-9330
collin.s.campbell@baesystems.com

Legal Contacts:

David E. Hilliard
Kurt E. DeSoto
Wiley Rein & Fielding LLP
1776 K Street, N.W.
Washington, DC 20006
Telephone: (202) 719-7000
Facsimile: (202) 719-7207
dhilliard@wrf.com
kdesoto@wrf.com

FREQUENCY COORDINATION REPORT

Temporary Earth Station – Operation Dates 1/02/2007 – 07/02/2007

Prepared for
BAE Systems
CALIFORNIA, MD
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
October 30, 2006

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.

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.

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Verbal and written coordination was conducted with the below listed carriers on October 27 and October 30, 2006.

Company

AT&T Communications of Maryland Inc
AT&T Corp
Bay Broadband Communications LLC
Baltimore Gas and Electric Company
College Of Southern Maryland
Cellco Partnership - Virginia
Cellco Partnership-Newark-Dallas Verizon
Charles, County of
Cingular Pennsylvania, LLC
Delaware State – DTI

Enoch Pratt Free Library
Federal Communications Commission
First Television Corp.(Mid-Atlantic)
Hanover County
Maryland Public Broadcasting Commission
MCI Communication Services, Inc.
Maryland, State of - DBM
New Cingular Wireless PCS - VA, MD, DC
New Cingular Wireless PCS LLC - DC
Prince William County
Stafford County Sheriffs Dept
State of Maryland, Miemss
Southern Maryland Electric Cooperative
Virginia Commonwealth State Police
Verizon Maryland, Inc.
Verizon Virginia, Inc.
Virginia Electric & Power Company
Washington D.C. SMSA L.P.
Wireless Strategies, Inc.

There are no unresolved interference conflicts involving this earth station

I hereby certify that I am the technically qualified person responsible for the preparation of the frequency coordination data contained in this application. I am familiar with Parts 101 and 25 of the FCC Rules and Regulations. 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.

Timothy O. Crutcher
Frequency Planner
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: October 30, 2006

The following 3 pages present the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5665 http://www.comsearch.com

Date: 10/30/2006
Job Number: 061030COMSTC01

Administrative Information

Status	TEMPORARY (Operation from 01/02/2007 to 07/02/2007)
Licensee Name	BAE Systems

Site Information — CALIFORNIA, MD

Venue Name	CDIS FACILITY
Latitude (NAD 83)	38° 18' 38.0" N
Longitude (NAD 83)	76° 32' 27.0" W
Climate Zone	A
Rain Zone	2
Ground Elevation (AMSL)	33.53 m / 110.0 ft

Link Information

Satellite Type	Geostationary
Mode	TO - Transmit-Only
Modulation	Digital
Satellite Arc	24° W to 56° West Longitude
Azimuth Range	115.4° to 148.9°
Corresponding Elevation Angles	20.4° / 40.7°
Antenna Centerline (AGL)	1.1 m / 3.6 ft

Antenna Information — Transmit - FCC32

Manufacturer	WSC-6
Gain / Diameter	39.1 dBi / 1.52 m
3-dB / 15-dB Beamwidth	1.00° / 2.00°

		38K4G7W	4M91G7W
Max Available RF Power	(dBW/4 kHz)	-8.6	-8.6
	(dBW/MHz)	15.4	15.4
Maximum EIRP	(dBW/4 kHz)	30.5	30.5
	(dBW/MHz)	54.5	54.5
	(dBW)	40.3	61.4

Interference Objectives:	Long Term	-154.0 dBW/4 kHz	20%
	Short Term	-131.0 dBW/4 kHz	0.0025%

Frequency Information — Transmit 6.1 GHz

Emission / Frequency Range (MHz)	38K4G7W - 4M91G7W / 5925.0 - 5989.4
	38K4G7W - 4M91G7W / 6019.6 - 6245.0
Max Great Circle Coordination Distance	164.3 km / 102.1 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5665 http://www.comsearch.com

Coordination Values	**CALIFORNIA, MD**
Licensee Name	BAE Systems
Latitude (NAD 83)	38° 18' 38.0" N
Longitude (NAD 83)	76° 32' 27.0" W
Ground Elevation (AMSL)	33.53 m / 110.0 ft
Antenna Centerline (AGL)	1.1 m / 3.6 ft
Antenna Mode	Transmit 6.1 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	-8.6 (dBW/4 kHz)

Transmit 6.1 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	113.72	-10.00	147.60
5	0.39	109.13	-10.00	132.24
10	0.35	104.46	-10.00	134.29
15	0.39	99.78	-10.00	132.24
20	0.32	95.08	-10.00	136.56
25	0.25	90.38	-10.00	143.19
30	0.00	85.70	-10.00	147.60
35	0.00	81.01	-10.00	147.60
40	0.00	76.34	-10.00	147.60
45	0.00	71.68	-10.00	147.60
50	0.00	67.04	-10.00	147.60
55	0.00	62.42	-10.00	147.60
60	0.00	57.84	-10.00	147.60
65	0.00	53.31	-10.00	147.60
70	0.00	48.84	-10.00	147.60
75	0.00	44.45	-9.20	150.28
80	0.00	40.17	-8.10	154.07
85	0.00	36.04	-6.92	158.29
90	0.00	32.13	-5.67	162.94
95	0.27	28.33	-4.31	160.41
100	0.33	25.07	-2.98	159.41
105	0.33	22.47	-1.79	164.30
110	0.42	20.62	-0.86	157.81
115	0.43	19.92	-0.48	158.44
120	0.37	20.48	-0.79	163.85
125	0.46	22.00	-1.56	151.92
130	0.36	24.57	-2.76	157.12
135	0.36	27.70	-4.06	152.30
140	0.35	30.90	-5.25	149.09
145	0.28	33.95	-6.27	152.43
150	0.22	36.75	-7.13	155.65
155	0.00	39.40	-7.89	154.81
160	0.00	41.53	-8.46	152.80
165	0.22	43.06	-8.85	148.99
170	0.48	44.59	-9.23	126.91
175	0.79	46.49	-9.68	110.65
180	1.29	48.61	-10.00	100.00
185	1.41	51.32	-10.00	100.00

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5665 http://www.comsearch.com

Coordination Values	**CALIFORNIA, MD**
Licensee Name	BAE Systems
Latitude (NAD 83)	38° 18' 38.0" N
Longitude (NAD 83)	76° 32' 27.0" W
Ground Elevation (AMSL)	33.53 m / 110.0 ft
Antenna Centerline (AGL)	1.1 m / 3.6 ft
Antenna Mode	Transmit 6.1 GHz
Interference Objectives: Long Term	-154.0 dBW/4 kHz 20%
Short Term	-131.0 dBW/4 kHz 0.0025%
Max Available RF Power	-8.6 (dBW/4 kHz)

Transmit 6.1 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	1.60	54.25	-10.00	100.00
195	1.27	57.65	-10.00	100.00
200	1.27	61.02	-10.00	100.00
205	1.27	64.52	-10.00	100.00
210	1.29	68.11	-10.00	100.00
215	1.11	71.84	-10.00	100.00
220	1.37	75.53	-10.00	100.00
225	1.37	79.33	-10.00	100.00
230	0.92	83.21	-10.00	104.08
235	1.00	87.04	-10.00	100.39
240	1.45	90.89	-10.00	100.00
245	1.20	94.74	-10.00	100.00
250	1.22	98.58	-10.00	100.00
255	1.37	102.42	-10.00	100.00
260	1.33	106.19	-10.00	100.00
265	1.29	109.90	-10.00	100.00
270	1.29	113.55	-10.00	100.00
275	1.39	117.15	-10.00	100.00
280	1.15	120.48	-10.00	100.00
285	1.08	123.74	-10.00	100.00
290	1.08	126.86	-10.00	100.00
295	1.08	129.77	-10.00	100.00
300	1.15	132.47	-10.00	100.00
305	1.11	134.81	-10.00	100.00
310	1.05	136.77	-10.00	100.00
315	0.87	138.21	-10.00	106.11
320	0.53	139.03	-10.00	121.66
325	0.37	139.51	-10.00	133.59
330	0.38	139.66	-10.00	132.77
335	0.41	136.42	-10.00	130.61
340	0.26	131.98	-10.00	141.42
345	0.00	127.43	-10.00	147.60
350	0.00	122.90	-10.00	147.60
355	0.23	118.38	-10.00	144.44

Application for
Special Temporary Authority
0814-EX-ST-2006

SUPPLEMENTAL INFORMATION

1) Radiation Hazard Report

Attached as a supplement to the above-referenced application for special temporary authority is an "Analysis of Non-Ionizing Radiation for a 1.5 Meter C- and X-Band Earth Station System."

2) Antenna Pattern Data

The characteristics of the antenna to be deployed under this experimental license are as specified below:

3 dB Beamwidth = 1.32 degrees

10 dB Beamwidth = 2.51 degrees

20 dB Beamwidth = 6.31 degrees

These characteristics are based on the following:

$G = G - 25\log10(\theta)$ dBi, $1.0° \leq \theta \leq 20.0°$

$G = -3.5$ dBi, $20.0° < \theta \leq 180°$

WRFMAIN 12577483.3

Analysis of Non-Ionizing Radiation for a 1.5-Meter C- and X-Band Earth Station System

This report analyzes the non-ionizing radiation levels for a 1.5-meter C- and X-Band earth station system. The analysis and calculations performed in this report comply 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 (mW/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 (mW/cm^2)
30-300	1.0
300-1500	Frequency (MHz)*(4.0/1200)
1500-100,000	5.0

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

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	1.5	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	1.77	m^2
Feed Flange Diameter	D_{fa}	Input	5.0	cm
Area of Feed Flange	A_{fa}	$\pi D_{fa}{}^2/4$	19.63	cm^2
Frequency	F	Input	C-Band: 5850 X-Band 7900	MHz
Wavelength	λ	300 / F	C-band: 0.05128 X-Band: 0.03797	M
Transmit Power	P	Input	C-Band: 800 X-Band: 1000	W
Antenna Gain (dBi)	G_{es}	Input	C-Band: 37.5 X-Band: 40.3 Sidelobe: -3.5	dBi

Parameter	Symbol	Formula	Value	Units
Antenna Gain (factor)	G	$10^{Ges/10}$	C-Band: 5623.4 X-Band: 10715.2 Sidelobe: 0.44668	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	C-Band: .666 X-Band: .696 Sidelobe: 0.00005289	n/a

1. Far Field Distance Calculation

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

Distance to the Far Field Region

$$R_{ff} = 0.60\ D^2 / \lambda \quad (1)$$

$$= 26.33\text{m (C-Band)}$$

$$= 35.55\text{m (X-Band)}$$

The maximum main beam power density in the far field can be determined from the following equation:

On-Axis Power Density in the Far Field

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^{\ 2}) \quad (2)$$

$$= 516.39\ W/m^2$$

$$= 51.639\ mW/cm^2\ \text{(C-Band)}$$

$$= 4.1018e\text{-}2\ W/m^2$$

$$= 4.1018e\text{-}3\ mW/cm^2\ \text{(Sidelobe)}$$

$$= 674.70\ W/m^2$$

$$= 67.470\ mW/cm^2\ \text{(X-Band)}$$

$$= 2.8126e\text{-}2\ W/m^2$$

$$= 2.8126e\text{-}3\ mW/cm^2\ \text{(Sidelobe)}$$

2. Near Field Calculation

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:

Extent of the Near Field

$$R_{nf} = D^2 / (4\ \lambda) \quad (3)$$

$$= 11.0\ \text{m (C-Band)}$$

$$= 14.8\ \text{m (X-Band)}$$

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

Near Field Power Density $S_{nf} = 16.0\ \eta\ P / (\pi\ D^2)$ (4)

$= 1206.0\ W/m^2$

$= 120.60\ mW/cm^2$ (C-Band)

$= 9.577e\text{-}4\ W/m^2$

$= 9.577e\text{-}5\ mW/cm^2$ (Sidelobe)

$= 1575.4\ W/m^2$

$= 157.54\ mW/cm^2$ (X-Band)

$= 1.1972e\text{-}1\ W/m^2$

$= 1.1972\ mW/cm^2$ (Sidelobe)

3. Transition Region Calculation

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 R_t can be determined from the following equation:

Transition Region Power Density $S_t = S_{nf}\ R_{nf} / R_t$ (5)

$= 120.60\ mW/cm^2$ (C-Band max)

$= 9.577e\text{-}5\ mW/cm^2$ (Sidelobe max)

$= 157.54\ mW/cm^2$ (X-Band max)

$= 1.1972\ mW/cm^2$ (Sidelobe max)

The distance at which the power density of the X-Band sidelobe drops to $1mW/cm^2$ can be determined from the following equation:

$R_t = S_{nf}\ R_{nf} / 1.0\ mW/cm^2$

$= 17.72\ m$

4. Region between the Feed Assembly and the Antenna Reflector

Transmissions from the feed assembly are directed toward the antenna reflector surface, and are confined within a conical shape defined by the type of feed assembly. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the feed assembly and reflector surface can be calculated by determining the power density at the feed assembly surface. This can be determined from the following equation:

Power Density at the Feed Flange

$$S_{fa} = 4000\ P / A_{fa} \quad (6)$$
$$= 163015\ mW/cm^2 \text{ (C-Band)}$$
$$= 203770\ mW/cm^2 \text{ (X-Band)}$$

5. Main Reflector Region

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

Power Density at the Reflector Surface

$$S_{surface} = 4\ P / A_{surface} \quad (7)$$
$$= 1807.9\ W/m^2$$
$$= 180.79\ mW/cm^2 \text{ (C-Band)}$$

$$= 2259.9\ W/m^2$$
$$= 225.99\ mW/cm^2 \text{ (X-Band)}$$

6. Region between the Reflector and the Ground

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

Power Density between Reflector and Ground

$$S_g = P / A_{surface} \quad (8)$$
$$= 451.98\ W/m^2$$
$$= 45.198\ mW/cm^2 \text{ (C-Band)}$$

$$= 564.97\ W/m^2$$
$$= 56.497\ mW/cm^2 \text{ (X-Band)}$$

7. Summary of Calculations

Table 4. Summary of Expected Radiation levels for Uncontrolled Environment – C-Band

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 26.33 m)	S_{ff} 51.639 (Main lobe) S_{ff} 4.1018e-3 (Side lobe)	Potential Hazard Satisfies FCC MPE
2. Near Field (R_{nf} = 11.0 m)	S_{nf} 120.60 (Main lobe) S_{nf} 9.577e-5 (Side lobe)	Potential Hazard Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t 120.60	Potential Hazard
4. Between Feed Assembly and Antenna Reflector	S_{fa} 163015	Potential Hazard
5. Main Reflector	$S_{surface}$ 180.79	Potential Hazard
6. Between Reflector and Ground	S_g 45.198	Potential Hazard

Table 5. Summary of Expected Radiation levels for Uncontrolled Environment – X-Band

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 35.55 m)	S_{ff} 67.470 (Main lobe) S_{ff} 2.8126e-3 (Side lobe)	Potential Hazard Satisfies FCC MPE
2. Near Field (R_{nf} = 14.8 m)	S_{nf} 157.54 (Main lobe) S_{nf} 1.1972 (Side lobe)	Potential Hazard Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t 157.54	Potential Hazard
4. Between Feed Assembly and Antenna Reflector	S_{fa} 203770	Potential Hazard
5. Main Reflector	$S_{surface}$ 225.99	Potential Hazard
6. Between Reflector and Ground	S_g 54.497	Potential Hazard

Table 6. Summary of Expected Radiation levels for Controlled Environment – C-Band

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 26.33 m)	S_{ff} 51.639 (Main lobe) S_{ff} 4.1018e-3 (Side lobe)	Potential Hazard Satisfies FCC MPE
2. Near Field (R_{nf} = 11.0 m)	S_{nf} 120.60 (Main lobe) S_{nf} 9.577e-5 (Side lobe)	Potential Hazard Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t 120.60	Potential Hazard
4. Between Feed Assembly and Antenna Reflector	S_{fa} 163015	Potential Hazard
5. Main Reflector	$S_{surface}$ 180.79	Potential Hazard
6. Between Reflector and Ground	S_g 45.198	Potential Hazard

Table 7. Summary of Expected Radiation levels for Controlled Environment – X-Band

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)	Hazard Assessment
1. Far Field (R_{ff} = 35.55 m)	S_{ff} 67.470 (Main lobe) S_{ff} 2.8126e-3 (Side lobe)	Potential Hazard Satisfies FCC MPE
2. Near Field (R_{nf} = 14.8 m)	S_{nf} 157.54 (Main lobe) S_{nf} 1.1972 (Side lobe)	Potential Hazard Satisfies FCC MPE
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t 157.54	Potential Hazard
4. Between Feed Assembly and Antenna Reflector	S_{fa} 203770	Potential Hazard
5. Main Reflector	$S_{surface}$ 225.99	Potential Hazard
6. Between Reflector and Ground	S_g 54.497	Potential Hazard

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

8. Conclusions

Based upon the above analysis, it is concluded that harmful levels of radiation may exist in those regions noted for the Uncontrolled (Tables 4 and 5) and Controlled (Tables 6 and 7) Environments.

The antenna will be installed at BAE System's CDIF facility in California, Maryland. The earth station will be marked with the standard radiation hazard warnings for personnel working in the immediate vicinity. An area of diameter 18m around the earth station will be cordoned off and marked with the standard radiation hazard warnings to inform those in the general population, who might be working or otherwise present.

The applicant will ensure that the main beam of the antenna will be pointed a minimum of 30 degrees in elevation from the horizon, and at least 30 degrees away from any building, or other obstacles in those areas, that exceed the MPE levels. Since 20 degrees removed from the center of the main beam the side lobe power levels are down at least 30 dB, or by a factor of 1000, these potential hazards do not exist for either the public, or for earth station personnel.

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.