

LICENSE REQUEST AND DESCRIPTION OF OPERATIONS

1. Introduction

By the instant application ("Application"), BAE Systems Information and Electronic Systems Integration Inc. ("BAE Systems") requests that the Commission grant a two-year experimental license for the facilities (the "Facilities") specified in the instant Form 442.

Pursuant to File No. 0221-EX-ST-2005 (the "STA Request"), the Commission granted Special Temporary Authority ("STA") under Call Sign WC9XDV to BAE Systems to operate the subject Facilities through November 18, 2005. Because BAE Systems anticipates that it will remain responsible for testing and maintaining the system after the November 18, 2005 expiration date of the STA, BAE Systems hereby requests grant of the instant Application for Two-Year License so that it can operate the Facilities under a full experimental license. In the grant issued by the Commission under File No. 0221-EX-ST-2005, the Commission imposed a number of conditions, including prohibitions on emissions within +/- 25 kHz of certain specific frequencies. BAE Systems hereby confirms that it is willing to accept the same conditions for this application as were imposed under File No. 0221-EX-ST-2005.

2. Purpose of the Operation

BAE Systems Information & Electronic Warfare Systems (IEWS), a business unit of the Information and Electronic Systems Integration Sector (IESI) within BAE Systems North America, will conduct the testing specified in this Application. IEWS is a major producer of electronic warfare systems, protection systems, and tactical surveillance and intelligence systems for all branches of the armed forces. IEWS' lines of business include Electronic Warfare/Electronic Protection, Electronic Warfare/Information Warfare, Integrated Defense Solutions, and Mission Electronics with products and services spanning the whole electromagnetic spectrum.

The testing at the Litchfield Antenna Test Range is a critical part of the manufacture and delivery of military systems provided to the Armed Forces in support of Homeland Security as well as war efforts. As a general matter, the purpose of the facilities for which consent is requested herein is to measure individually the performance of scale model antennas of various types (i.e., loop, monopole, dipole), then install arrays of these antennas on scale models of various military fixtures, and measure the performance of the antennas in their installed configuration.

The programs to be implemented utilizing these Facilities are as follows:

- Contract #: W56HZV-05-C-0724; Customer: U.S. Army TACOM (Tank, Automotive and Armaments Command); Purpose: To develop and deliver a networked systems of 18 communication subsystems that are to link the soldier with manned and unmanned ground and air vehicles and sensors - utilizing the latest of technologies; Point of Contact: Allen Traciak, Grants Officer - TACOM, (586) 574-5678. This is the program for which authority was originally requested under File No. 0221-EX-ST-2005, and for which authority is requested under the instant Application. This program will be referred to as the "Original Program".

- Contract #: N00024-04-C-4210 (Naval Sea Systems Command) (Point of Contact: Kemal Atam (of NAVSEA) 202-781-0420) [By e-mail dated September 12, 2005, the Commission confirmed that BAE Systems could transmit overlapping facilities under this additional contract pursuant to the authority for File No. 0221-EX-ST-2005. A copy of that e-mail is attached hereto. Accordingly, authority to operate these same facilities pursuant to this Application is requested.]
- A classified contract, which has been identified by BAE Systems through the Commission's Security Office. [By e-mail dated October 14, 2005, BAE Systems identified additional overlapping facilities ("Overlapping Classified Contract Facilities") associated with a classified contract which would be operated under the authority for File No. 0221-EX-ST-2005. BAE Systems has separately submitted to the Commission's Security Office, under applicable classified submission procedures, the relevant program name, contract number and point of contact for the classified contract (See classified submission of BAE Systems associated with File No. 0593-EX-ST-2005)].

3. Discussion Regarding the Specified Frequency Bands

The Application seeks Commission authority to operate within a number of different frequency bands. Although BAE Systems is aware that requesting authority for such a broad selection of frequencies will require significant review and coordination efforts, BAE Systems notes that the subject system's capabilities will span the HF to Millimeter-wave frequency spectrum. As contractually specified by all government procurement agencies, any development and/or product sell-off requires realistic measurement of a system. Should BAE Systems be denied the critical ability to perform radiation measurement over a broad range of frequencies, such denial would severely hinder the execution of the programs and systems developed by the company in support of Homeland Security efforts. Accordingly, authorization under such a broad variety of frequency bands is necessary in this context.

4. Other Issues

A. Requested Area of Operation

The Litchfield Antenna Test Range is comprised of multiple separate testing locations on the BAE Systems campus at which the subject experiment may be conducted. In addition, depending on the particular requirements of the experiment (i.e., when generating signals at zero degree elevation), it may be necessary to move a given antenna along the bore site line on the range up to a distance of 100 feet. ***Accordingly, as was approved with respect to the STA granted under File No. 0221-EX-ST-2005, in order to accommodate these requirements, BAE Systems is requesting authority to operate all of the specified facilities within a 1,500 foot (.46 km) radius from the centerpoint geographic coordinates identified in the STA Request (i.e., 42-48-22 N.Lat.; 071-25-33 W.Long. [NAD 83]).*** Commission approval of such area of operation will provide BAE Systems with the flexibility it requires to move the specified test equipment to any appropriate testing location on the Litchfield Antenna Test Range during the authorized term of operation, in response to the requirements of the experiment.

B. Directionality and Height of Antennas

A single Antenna Registration has been submitted for the instant STA Request, and such Antenna Registration specifies “Yes” in response to the questions: “Is a directional antenna used?”, and “Will the antenna extend more than 6 meters above the ground....” In accordance with discussions with Commission staff, such approach was taken in order to simplify the filing process and to reduce the amount of duplicative information contained in the STA Request. However, as further discussed with Commission staff, certain of the antennas involved in the subject experiment are not directional in nature, and certain of the antennas do not exceed 6 meters in height. Therefore, the following breakdown of antenna groupings is set forth to provide an accurate understanding of the directionality and height of the antennas involved in the experiment:

i. Non-Directional (Omni-directional) Antennas
With Heights Lower Than 6 Meters

This antenna grouping relates to 8 different antennas which are non-directional (omni-directional) in nature, and which do not exceed 6 meters in height above the ground (or above any structure). These antennas are as follows:

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
Shakespeare	229B	2	-15 to +5 dBi	OMNI	N/A
Sanders	1/4Mon	4	-5.2 dBi	OMNI	N/A
Electro Metrics	EM-6924	2	+2.6 dBi	OMNI	120°
Sanders	TASES 36	2	-60 to -5dBi	OMNI	N/A
Sanders	TASES 24	2	-31.5 to +1.1 dBi	OMNI	N/A
Sanders	TASES 12	2	-10 to -5	OMNI	N/A
Sanders	Slant	1	-20 to -5	OMNI	N/A
BAE	AJCN46	1	-20 to -2 dBi	OMNI	120°

ii. Directional Antennas
With Heights Lower Than 6 Meters

This antenna grouping relates to 3 different antennas which are directional in nature, and which do not exceed 6 meters in height above the ground (or above any structure). These antennas are as follows:

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
Sanders	1/2 Horn	1	+8dBi	60-30°	N/A
Sanders	1/2 Horn	1	+8dBi	60-45°	N/A
Sanders	BRD	1	-30 to -5dBi	35°	N/A

iii. Directional Antennas
With Heights Above 6 Meters

This antenna grouping relates to 13 different antennas which are directional in nature, and which exceed 6 meters in height above the ground (or above any structure).¹ These antennas are as follows:

Manufacturer	Model #	Quantity	Gain (Nominal)	3dB BW E (Vertical)	3dB BW H (Horizontal)
KMA	26500	1	-6dBi	90°	90°
SA	26-0.1	1	+8 dBi	60°	120°
SA	29-0.1	2	+8 dBi	60°	120°
SA	27-1.0/8	1	+8 dBi	9°	1.5°
SA	28-1.0/8/10	1	+8 dBi	9°	4.5°
SA	11-0.9	1	+13.7dBi	40°	35°
SA	11-1.1	2	+15.5dBi	30°	27°
SA	11-1.7	2	+15.5dBi	30°	27°
Condor	AS-48461	1	+5-+18dBi	60-10°	60-10°
Narda	639	2	+16.5dBi	6-20°	6-20°
AEL	H-1498	1	+8-+12dBi	60-30°	60-30°
SA	28-2.0/8/10	1	+8dBi	60-30°	60-30°
Sanders	Dual Horn	1	+8dBi	60-30°	60-30°

¹ In the attached form, the "overall height of above ground to tip of antenna" is identified as 36.6 meters. It should be noted that this figure represents the highest point to which the subject antennas would be raised in the course of the experiment for the Original Program. Based on the particular requirements of the experiment for the Original Program, a given antenna in this grouping may be lowered, or raised to the 36.6 meter limit, to generate appropriate receive angles. As BAE Systems has advised the Commission, for the Overlapping Classified Contract Facilities the following minor differences apply, none of which will impact on the emissions levels or potential for interference associated with the system: (i) The transmitters operated as part of the Overlapping Classified Contract Facilities remain stationary at ground level, while under Original Program the transmitters were authorized for heights from ground level to 36.6 meters above ground level; (ii) The receive targets utilized for the Overlapping Classified Contract Facilities are full scale models of military vehicles, while the receive targets under the Original Program are scale models; and (iii) The receive targets utilized for the Overlapping Classified Contract Facilities may be operated while resting at ground level or resting on a platform raised no higher than 5 meters above ground level, while under the Original Program the receive targets are placed at ground level. See Exhibit 2.

C. Note Regarding Output Power/ERP Figures

For the purpose of completion of the attached form, antenna efficiency has been assumed to be 100%. Therefore, the transmitter power and the radiated power are reported as equal (i.e., both the Output Power and the ERP are reported as “.007 W”). In practice the antenna efficiency and cable loss between the transmitter and the antenna will be considered and the transmitter power adjusted to achieve the approved output radiated power level.

D. Note Regarding “Mean” Power Designation

In the attached form, the power levels are reported as a “Mean” value. The transmitter will not be left on continuously due to the nature of the experiment and the need to physically reposition the unit under test between measurements, cycle through frequencies, change elevation angles of the transmit antenna, etc. where the transmit power is reduced to zero. The actual duty cycle of the transmit system is approximately 7%. Mean power is therefore a more accurate representation of the applicant’s proposed activity.

E. Transmitting Equipment

In response to Item No. 8 in the Administrative portion of the STA Request, the following information is provided with respect to the transmitting equipment to be involved in the experiment. It is noted that each of these transmitters is non-experimental in nature:

Manufacturer	Model	Quantity
Fluke	Fluke 6060	1
HP	HP8341	1
HP	HP8643A	2
HP	HP8340B	2
HP	HP8662A	1
HP	HP8671A	1
HP	HP8753A	2
HP	HP8753D	2
HP	HP8753E	2
HP	HP8510B	1
HP	HP8510C	1
Agilent	E8257D	1

F. Additional Signal Amplification

Due to the low gain of the transmit antennas, an additional signal amplification may be utilized as follows:

Power Amplifiers	Model	Frequency Band	Power Output	Quantity
OPHIR	5069	.5MHz to 500MHz	8W	1
OPHIR	5094	1MHz to 1000MHz	3W	1
OPHIR	5160	.8GHz to 4.2GHz	7W	1
CPI	VZV-2776K4/K6	4.0GHz to 18GHz	25W	1
ENI	510L	1.7MHz to 500MHz	9.5W	2
ENI	603L	.8 MHz to 1000MHz	3W	1
ENI	550L	1.5 MHz to 400 MHz	50W	1
Amplifier Research	5W1000	1MHz to 1000MHz	50W	1

G. Prevention of Interference

BAE SYSTEMS hereby advises the Commission that the tests to be conducted under the requested Commission authorization are to be conducted solely on the campus of BAE SYSTEMS' Litchfield, New Hampshire facilities. Such location will result in the separation of the test facilities from other existing transmit or receive facilities. BAE SYSTEMS' Richard C. Ball will be personally conducting the test and will be available by wireless telephone at (603) 318-6913. Mr. Ball will act as a "stop buzzer" if any issues regarding interference arise during testing.