

Public Interest Statement

By the instant application (“STA Request”), BAE Systems Information and Electronic Systems Integration Inc. (“BAE Systems”) requests that the Commission grant Special Temporary Authority (“STA”) to permit near-term operation of the facilities specified herein.

1. Purpose of Operation

The requested operations are to support radiating testing requirements set forth under the following government contract:

Contract Number: N00019-15-C-0038
Agency Customer: US Navy/PMA-213
Contract POC: Mr. Matthew Fleck Naval Air Warfare Center Aircraft Division
301-995-8114
matthew.fleck@navy.mil

The operations relate to BAE Systems’ manufacture and testing of the AIMS OE-120/UPX Antenna using various Navy Acceptance Test Procedures.¹ The OE-120/UPX is an advanced electronically steered circular antenna system developed for the U. S. Navy. It is part of the AEGIS battle control system installed on all Navy surface warfare platforms, including Navy destroyers, cruisers, amphibious assault, and aircraft carrier platforms. Its primary purpose is to provide IFF (Identification Friend or Foe) data to the battle control system with a secondary purpose of providing fire control data to the AEGIS system if main radar is degraded. The AIMS antenna is used as the passive transmit/receive element of the shipboard antenna system that operates with the IFF system in all military IFF modes or in military and commercial air traffic control radar beacon system (ATCRBS) equipment.

The AIMS OE-120()/UPX Antenna is comprised of three (3) units as shown in Attachment 1. The antenna group is used as the passive transmit/receive element of the shipboard antenna system that operates with the identification friend or foe (IFF) system in all military IFF modes or in military and commercial air traffic control radar beacon system (ATCRBS) equipment.

¹ The test program for each antenna is accomplished in accordance with U. S. Navy Acceptance Test Procedures, originally developed and released in 1982. ATP06009346 (current Revision V), covers the electrical tests necessary to ensure that the Antenna Group oe-120()/UPX is thoroughly evaluated for conformance to the requirements of the applicable specifications.

2. Equipment/Signal Characteristics

The equipment used in this experiment is listed at Attachment 2. With respect to the equipment and the transmissions, the following is noted:

- The RF equipment radiates CW signals, not interrogations nor replies.
- There is only the antenna range continuous wave (CW) RF signal generator and no Pulse Repetition Rate (PRR) since the signal is CW.
- There is no Interrogator AN/UPX-##, there is no transponder AN/APX-###, and there is no "...Mode 3//a response..."

3. Discussion of Requested Power Levels

A. Regarding 1W Power Levels for 1025-1035 MHz and 1087-1093 MHz:

The requested 1 W ERP power level for these bands cannot be reduced. Reduction of the 1 W ERP levels as requested by FAA will not allow successful completion of the required tests, and would seriously impact delivery of OE-120()/UPX antennas to the Navy.

Specifically, if the emissions were lowered to 1 mw or less, then the signal available to the Scientific Atlanta 1770 receiver would not allow the receiver to reliably lock. The AIMS Antenna is tested in all kinds of weather (weather related free space loss has not been included above), and there has to be enough signal for the receiver to hold lock. Under the current ATP specifications, the signal available to the receiver is -69 dBm. The receiver floor is -80 dBm. In a moderate fog/rain/snow conditions and as range vegetation grows (trees, bushes etc.), the signal can become intermittent, 1770 Receiver lock is lost and testing has to stop. If we lower the transmit signal from the current 10 dBm to 0 dBm, the receiver would not lock reliably even in clear weather.

B. Regarding 10kW Power Level for 1059.6-1060.4 MHz

The requested 10 kW (ERP) is required to allow the U.S. Navy to operate an OE-120()/UPX IFF Antenna using an AN/UPX-xx Interrogator Set. This operational characteristic, however, is not contained in the 06009346 ATP, and is therefore not a normal operation at the test range.

While it is necessary to retain on the license the 10kW ERP level for the 1059.6-1060.4 MHz band in the event that operation of the Interrogator Set is required by the Navy, for transmissions above 100W and up to 10kW, ***BAE Systems will agree to a Special Condition imposed on the license which would require prior coordination with the U.S. Navy and FAA before transmissions could proceed at levels above 100W. Accordingly, BAE Systems proposes the following language for the Special Condition, which would apply in the event that the U.S. Navy directed that due to an operational requirement, the use of an AN/UPX-xx Interrogator Set was required:***

“Special Condition: For transmissions in the 1059.6-1060.4 MHz band at power levels above 100W and up to 10kW, licensee must have prior coordination with U.S. Navy and FAA.”

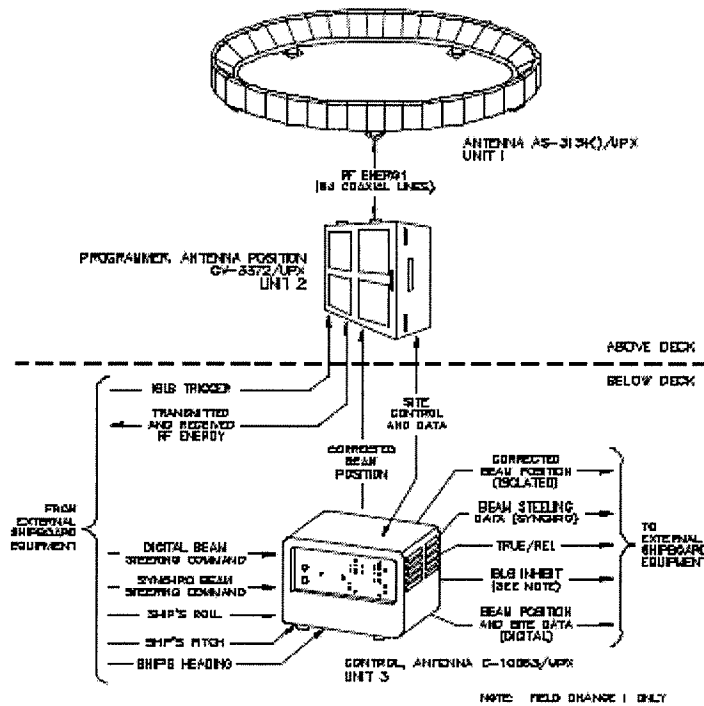
4. Mitigation of Interference/Stop Buzzer

BAE Systems is well aware of its obligation under Commission rules to immediately terminate operation in the event of interference to any other licensed emitter. BAE Systems is a long-standing Commission licensee and the company will take any and all actions to ensure that it complies with its obligations as a licensee of experimental facilities.

The Stop Buzzer in the event of interference is:

BAE Systems Emergency Services Center – (603) 885-3842

Attachment 1 – Graphic Depiction of the AIMS OE-120()/UPX Antenna And Overview of Structures and Emissions



The subject test range is an outdoor test facility comprised of two major structures:

1. The Receive Tower contains the test equipment which receives the test signals, provides data reduction and analysis and is the location where the test results are presented to our Navy customer for acceptance. The receiver technology located in this facility is based on Scientific Atlanta 1770 analog receivers.
2. The Transmit Tower contains the test equipment necessary to transmit three frequencies as specified by the Navy ATP. The 1030MHz, 1060MHz and 1090MHz frequencies are supplied in CW format by an Agilent signal generator source. For testing at the 1030MHz and 1090 MHz frequencies, signal level output of the signal generator is maintained at +10 dBm. This signal feeds through 50 feet of RG-214 and various connectors and adapters to terminate to the antenna vertical polarization feed of an 18 foot diameter parabolic dish.

Measurement of signals (reference block diagram for signal paths):

Agilent Signal Generator ATP source level = +10 dBm @ 1.030 & 1.090 GHz

50 ft of RG-214 coax loss = 6 dB

Connectors, transitions, feed point losses = 2 dB

Signal level into vertical polarization parabolic dish = +2 dBm

Free space loss (Sage Labs), transmit to receive tower @ .23 mi = 84.1 dBi

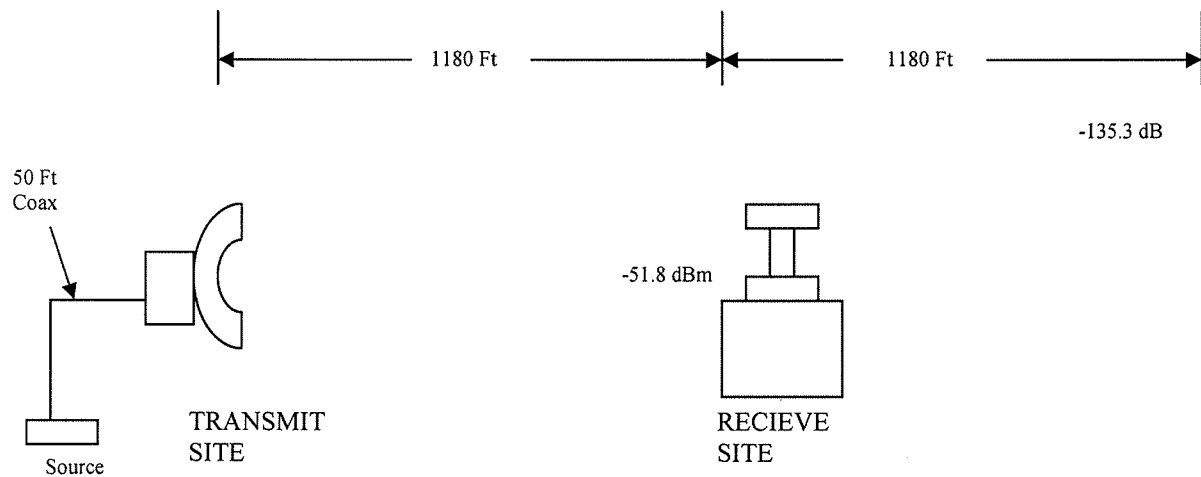
Signal level calculated at receive site (1030) = -51.8 dBm

Signal level calculated at receive site (1090) = -54.6 dBm

Signal level calculated* at 1770 Scientific Atlanta Receiver (1030) = -69.8 dBm

Signal level calculated* at 1770 Scientific Atlanta Receiver (1030) = -72.6 dBm

*(Loss due to cable, rotational joint, mixers and connectors = 18 dB)



Simplified Signal Block Diagram of AIMS Antenna Test
Range with Test Procedure Parameters
1030 MHz

Attachment 2 – Equipment List

<u>Description</u>	<u>Manufacturer</u>	<u>Model</u>
Transmit Antenna	Electronic Specialties	
Synthesized Signal Generator	Hewlett-Packard	8660C
RF Section Plug In	Hewlett-Packard	86602B
Frequency Extension Module	Hewlett-Packard	11661B
Microwave Amplifier	Servo Microwave Amplifier	2112
Frequency Counter	Hewlett-Packard	5245L with 5245B plug in
Directional Coupler	Narda	3002-30
Directional Coupler	Narda	3002-20
Antenna Support Fixture		
Three Axis Positioner	Scientific Atlanta	55290
Positioner Control Unit	Scientific Atlanta	4161
Receiver	Scientific Atlanta	1774
Digital Amplitude Display and Ratiometer	Scientific Atlanta	1833A-20-4
Pattern Recorder	Scientific Atlanta	1520
Position Indicator Unit	Scientific Atlanta	4423-325
Digital Frequency Display	Scientific Atlanta	1871A-1
BSC Tester		06010388
Standard Gain Horn		
RF Switch	Transco Products Inc.	919C70100
Dual Directional Coupler	Hewlett-Packard	776D
Waveguide to Coax Adapters (2)	BFXR, Inc.	600L
Crystal Detector	Hewlett-Packard	423A
Oscilloscope	Philips	PM3262
Pulse Generator	Wavetek	166

TWT Amplifier	Hewlett-Packard	489A
Fixed Attenuators	Hewlett-Packard	
3dB		8491A (003)
6dB (2)		8491A (006)
10dB		8491A (010)
30dB		8491A (030)
Precision Variable Attenuator	Arra Inc.	3617-20
Antenna Range, Towers and Support Equipment		
Termination, 75 Ohm, BNC		