

BAE Systems Information and Electronic Systems Integration Inc.  
65 Spit Brook Road, NHQ1-719  
Nashua, NH 03061

June 17, 2016

Julius P. Knapp, Chief  
Office of Engineering and Technology  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Re: BAE Systems Information and Electronic Systems Integration Inc.  
Application for Special Temporary Authority - File No. 0897-EX-ST-2016

Mr. Knapp:

BAE Systems Information and Electronic Systems Integration Inc. (“BAE Systems”) seeks approval of its above-referenced application for experimental Special Temporary Authority (“Experimental STA”), which includes operations using the 700 MHz band spectrum licensed to The First Responder Network Authority (“FirstNet”).

The purpose of the proposed operation is to perform Direction Finding and Geolocation calibration for the U.S. Army Tactical Signals Intelligence (SIGINT) Payload (TSP) Pod Antenna System. The objective of the TSP program is to provide the commander with a comprehensive picture of electronic emitters in the battlespace, and the ability to detect, identify geo-locate, and copy emitters, including High Value Targets (HVTs). In order to satisfy these objectives and meet the requirements of the system, a dense (approximately 1% bandwidth steps over frequency) calibration of the array must be conducted over a broad frequency spectrum which includes the “FirstNet” frequency band. This calibration requires measurement of the aperture antenna patterns over the desired field-of-view on the BAE Systems Litchfield Antenna Range. This antenna characterization involves short duration, low power transmissions on the ground towards the pod antenna system.

The requested STA is sought as an extension and continuation of the operations previously authorized under STA call sign WI9XOS (0444-EX-ST-2015) and WJ9XFT (1178-EX-ST-2015), which permitted operations within or adjacent to the frequencies licensed to FirstNet. Pursuant to applicable policy which allows authority on these frequencies only pursuant to STA, and because BAE Systems requires continued operations on these frequencies, this filing is being presented as an STA seeking authority for a 6 month period. Because the prior granted STA under WJ9XFT is scheduled to expire on July 4, 2016, grant of the instant application is respectfully requested no later than July 17, 2016 to allow for uninterrupted operations with minimal interruption.

The proposed operations are sought for a period of 180 days, between July 17, 2016 and January 17, 2017, and such operations will be conducted in conjunction with the existing granted experimental license issued to BAE Systems under call sign WF2XAM.

The transmissions on the subject frequencies will be solely ground-based, fixed transmissions, initiated from BAE Systems' antenna range at the company's campus location at Litchfield, NH (42-48-22 N.Lat; 071-25-33 W.Long. (NAD83)).

BAE Systems submits this cover letter as part of the above-referenced application to affirm its understanding of the primary status of FirstNet as the licensee, and to provide BAE Systems' commitment to conduct operations under this requested STA as described below:

- 1) Operation will be confined to fixed, ground-based operations, at BAE Systems' campus at Litchfield, NH. Transmissions will involve the use of a single fixed antenna located at 42-48-22 N.Lat; 071-25-33 W.Long. (NAD83)). There will be no portable or mobile units involved in the experiment.
- 2) In the subject STA Request, BAE Systems has requested to operate on 757.850 MHz, 758-764 MHz, 773 MHz, 788.45 MHz, 794-800 MHz and 804.225 MHz, which are either within or immediately adjacent to the 758-769/788-798 MHz bands licensed on a nationwide basis to FirstNet.
- 3) Operation will begin when the Commission grants the requested Experimental STA and will continue for no longer than 6 months from such grant. The Experimental STA cannot be renewed. To the extent that BAE Systems would like to obtain additional Experimental STA use of the radio frequencies licensed to FirstNet, beyond the 180 day period to which this application refers, BAE Systems must file a separate request with the FCC. BAE Systems understands that an experimental Special Temporary Authority or license only permits shared use of the subject radio frequencies and that it may have to coordinate with other entities licensed for experimental purposes.
- 4) BAE Systems has analyzed the information from the FCC's license databases and has determined that the proposed operations would not interfere or create a significant potential for interference with any operations in the 700 MHz band. To that end, Appendix C to FCC 13-31 does not list any incumbent operations in the State of New Hampshire, and the only adjacent active license identified in the ULS database which is authorized on the frequencies requested by BAE Systems is WPRR298, and the guard band licensee for that station – BPC Spectrum LLC – in its most recent Annual Report to the Commission confirmed that “BPC Spectrum does not have otherwise customers and has not otherwise commenced providing commercial services to customers”. See WPRR298 2016 Annual Report dated 2/26/2016. BAE Systems is not aware of any deployment by FirstNet in the geographic area covered by the application.
- 5) This temporary operation will not be used in mission-critical operations or in the delivery of live transmissions in duties to protect life, property or safety. As explained in the STA Request, the requested transmissions will be limited only to fixed, ground-based operations to characterize (calibrate) the antenna array responses of the Direction Finding and Geolocation antenna arrays for the TSP Pod Antenna System. In order to satisfy the requirements of the TSP system, a dense (approximately 1% bandwidth steps over frequency) calibration of the array must be conducted over a broad frequency spectrum which includes the “FirstNet” frequency band. This calibration involves short duration, low power transmissions on the ground towards the pod antenna system on the BAE

Systems Litchfield Antenna Range. The types of ground-based transmissions will include CW transmissions directed at target aircraft.

- 6) BAE Systems has provided “stop buzzers” contacts in case of interference issues: Mr. Sean Hallinan – (603) 361-5959; Mr. Richard C. Ball - (603) 318-6913; and BAE Systems Emergency Services Center - (603) 885-3842.
- 7) All experimental operations by BAE Systems will be secondary, meaning that they must not cause interference to narrowband or broadband operations authorized on a primary basis, including in the spectrum licensed to FirstNet. Narrowband or broadband operations authorized on a primary basis, including in the spectrum licensed to FirstNet, have no obligation to mitigate any interference that such primary operations may present to the BAE Systems experimental operations. BAE Systems understands that if, during the term of the STA, FirstNet or its assigns or lessees, plans to deploy in this area, BAE Systems may have to reduce the coverage or power levels of its experimental transmissions or cease them entirely.

In this regard, it is noted that under the circumstances BAE Systems must seek experimental authority to operate on the FirstNet bands, and the company does not have the flexibility in this case to avoid such bands or tune away from them for this experiment. In order to satisfy the strict requirements of the TSP system, a dense (approximately 1% bandwidth steps over frequency) calibration of the array must be conducted over a broad frequency spectrum which includes the “FirstNet” frequency band. This calibration involves short duration, low power transmissions on the ground towards the pod antenna system on the BAE Systems Litchfield Antenna Range. Avoidance of all FirstNet frequencies generates an unacceptable frequency gap in the system calibration tables and precludes meeting the geolocation accuracies required by the system. While more specific TSP mission and employment information of the system is classified secret and cannot be discussed in this public forum, BAE Systems can confirm that there are mission critical reasons that require transmission on the requested frequencies. Should additional classified information be required by FirstNet regarding the mission and employment of the system, such information would have to be obtained through classified processes from the applicable Army program office, the contact information for which can be provided by BAE Systems. Such additional information should be unnecessary, however, as BAE Systems can confirm that due to the power levels employed (both peak and average) for this experiment, there are no filters that can be properly integrated with the system to tune out the FirstNet frequencies/bands while still allowing fulfillment of the experiment’s objectives.

- 8) BAE Systems has demonstrated that interference potential to FirstNet and other public safety operations has been substantially mitigated based on several factors, including:

Operation will be confined exclusively to fixed ground-based operations, at BAE Systems’ campus at Litchfield, NH. There will be no portable or mobile units involved in the experiment.

The transmit antenna will be mounted on the ground and the beam pattern will be projected at low elevation angles (< 3 degrees) relative to the horizon to significantly reduce the propagation distance.

The transmissions will be pulsed in nature, extremely short in duration and will be sporadic and not occurring continuously. Testing will be conducted according to the following limitations:

- Testing will always consist of transmit durations of 100 milliseconds or less.
- Testing will always be conducted at low power levels (<0.007 W)
- Testing will be conducted with a directional beam transmit antenna to reduce transmissions in other than the intended direction.
- Testing for a duration of 15 minutes shall not occur more than 1 time/day
- Testing can be conducted during limited test windows as desired by FirstNet

Such factors significantly reduce the potential for interference to public safety operations on the FirstNet Frequencies.

For the foregoing reasons, with respect to the above-referenced STA Request, BAE Systems seeks approval to operate on 757.850 MHz, 758-764 MHz, 773 MHz, 788.45 MHz, 794-800 MHz and 804.225 MHz, which are either within or immediately adjacent to the 758-769/788-798 MHz bands licensed on a nationwide basis to FirstNet.

BAE Systems understands that FirstNet's consent may be subject to FirstNet's ongoing ability to monitor any operations and use of FirstNet's licensed spectrum, and will accept a condition on the Commission's grant stating that "FirstNet can request the FCC to order the licensee to cease operations within 24 hours".

Respectfully submitted,

Sean Hallinan, Principle Electrical Engineer  
BAE Systems Information and Electronic Systems Integration Inc.  
603-885-2392  
sean.hallinan@baesystems.com