Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Improving Public Safety Communications in the 800 MHz Band	)	WT Docket No. 02-55
Consolidating the 800 and 900 MHz Industrial/Land Transportation and Business Pool Channels	)	
Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems	)	ET Docket No. 00-258
Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service	)	ET Docket No. 95-18

DSI COMMENTS IN SUPPORT OF THE JOINT PETITION FOR WAIVER

DSI RF Systems, Inc. ("DSI") hereby submits its comments in support of the Joint Petition for Waiver of Sprint Nextel Corporation, the Association for Maximum Service Television, Inc., the National Association of Broadcasters, and the Society of Broadcast Engineers (collectively, the "Petitioners") filed on September 4, 2007,[1] in the above captioned proceeding. As Petitioners demonstrate, the 2 GHz Broadcast Auxiliary Service ("BAS") transition is extremely complex, requiring the transition of approximately 1,000 incumbent BAS systems, many of which are customized systems assembled piecemeal over the past 30 years. Although DSI has worked diligently on various aspects of the transition, the relocation process has proven to be more complicated and require more time than initially anticipated, as discussed below. Accordingly, DSI urges the Federal Communications Commission ("FCC" or "Commission") to grant Petitioners' request for a 29-month waiver of the BAS completion date.

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[1] Joint Petition for Waiver of Sprint Nextel Corporation, the Association for Maximum Service Television, Inc., the National Association of Broadcasters, and the Society of Broadcast Engineers, WT Docket No. 02-55 (September 4, 2007) ("Petition").

I. Introduction and Background

DSI has served the broadcast industry for over 20 years, providing customers with expert service in the latest broadcasting technologies. In addition to providing design and installation services for electronic news gathering ("ENG") systems, DSI offers both scheduled and emergency maintenance services for transmitter and camera systems. DSI staff is trained to handle projects from start to finish and is prepared to meet a variety of engineering challenges. DSI's customers include CNN, NBC, CBS, and ABC.

DSI has been involved in the BAS relocation from its initial stages. Early on, DSI was awarded a contract from Sprint Nextel to provide third-party inventory verification service for the relocation. DSI's verification teams are well versed in ENG systems and, to date, have verified over 250 television stations on the East Coast. In order to perform these verifications, and in preparation for the anticipated increase in demand for BAS installers and equipment integrators, DSI has coordinated with Sprint Nextel to expand its workforce and add overflow capacity. Among other things, DSI has almost tripled its full-time workforce, increasing the number of employees from 12 to 30, and expanded its reliance on an existing network of approximately 30 subcontractors. DSI has made 10,000 square feet of warehouse space available for verification, pre-testing, and storage of new BAS equipment pending site installation and has trained its staff regarding the use of the new technology.

Despite these significant investments, DSI has encountered a number of unanticipated hurdles that have delayed the relocation process. As detailed below, the process of submitting and verifying BAS inventories has taken longer than expected. This is in large part because some equipment was older, stored in multiple locations or used only rarely. As a result, licensees often discovered equipment after the inventory had been verified, requiring the amended inventory to again work its way through the verification and subsequent processes. Installation and integration of BAS systems – already complex – has also been delayed by equipment supply issues and

technical and other communications-related problems, such as ensuring that the old equipment can "talk" to the new equipment. In addition, stations have rescheduled installations in order to avoid disruption to their operations during critical times, including during sweeps periods. Cumulatively, these delays have made it impossible to complete the 2 GHz BAS retuning within the 31.5 months originally allotted by the Commission.[2] It is critical that the FCC grant the request for waiver to allow the industry sufficient time to ensure that BAS licensees are transitioned to the new 2 GHz band without compromising broadcast operations.

II. Discussion

A. The BAS Transition Has Been More Complicated Than Originally Anticipated

1. Inventory Verification and Installation Processes

As noted, during the inventory stage of the relocation process, DSI provided third-party verification services for more than 250 BAS stations. After the station had conducted and submitted its "self-inventory" to Sprint Nextel, Sprint Nextel would assign that inventory to DSI for verification. DSI would then coordinate its inventory verification visits with the licensee to ensure that engineering staff would be present during the visit. On the scheduled date, DSI would travel to the station in order to visually inspect each piece of BAS equipment and identify all devices (including ancillary facilities) requiring replacement. Among other things, DSI would verify and/or collect information for the following equipment categories:

- *Mobile Units* – each ENG or other truck containing BAS equipment must be listed, including the VIN (vehicle identification number), mast height, garage location, and other vehicle data;
- *Central Receive Sites* – including location (address), antenna height, and accessibility;
- *Fixed Links* – including license call sign, transmit and receive coordinates, channel frequency, path length, and antenna height;

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[2] *See Improving Public Safety Communications in the 800 MHz Band; Consolidating the 800 and 900 MHz Industrial/Land Transportation and Business Pool Channels,* Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order, 19 FCC Rcd 14969, ¶¶ 252, 352 (2004), as amended by Erratum (rel. Sept. 10, 2004), Second Erratum, 19 FCC Rcd 19651 (2004), and Public Notice, 19 FCC Rcd 21492 (2004).

- *Studios* – including information necessary to identify master controllers and their relationship to the controlled sites;
- *Portable Equipment* – all types of portable equipment; and
- *Spares* – all spare equipment used by the licensee.

DSI would verify and supplement the station's detailed "self inventory" reports, including verifying photographic documentation and system diagrams, as needed.

The installation process for BAS systems is also extremely complex. Although every system is unique, BAS projects typically require DSI to perform most or all of the following steps:

- Review the project system design, including assessing the required components and recommending system improvements, if any;
- Coordinate all aspects of equipment delivery, including:
  - checking deliveries against packing lists and resolving any inconsistencies,
  - pre-assembling and testing all equipment,
  - documenting, storing and caring for equipment prior to installation, and
  - when necessary, traveling to manufacturer to test and receive gear;
- Inspect project site to ensure compliance with proposed scope of the project and, where needed, prepare a report regarding any required corrective measures;
- Oversee all aspects of the installation process, including coordinating with station management and on-site personnel to ensure station down time is minimized and compiling all necessary on-site materials and equipment;
- Coordinate communication, scheduling and deadlines among parties involved in installation and integration, including truck integrators (if different from DSI), manufacturers, tower climbers, sub-contractors, and other third parties, as needed;
- Prepare written status reports and other required documentation;
- Obtain necessary insurance certificates;
- Install and test system, including visual inspection, damage reporting and correction, supporting documentation, new cable installations (where necessary), and existing equipment removal; and
- Document, package and deliver equipment to Sprint Nextel.

Two BAS installation and integration projects completed by DSI earlier this year provide a flavor of the myriad complexities that a single project may involve. The first project occurred in May 2007 in Baltimore, Maryland, and involved eleven installation sites with towers ranging from 39 to 990 feet. As detailed in the attached overview, indoor work encompassed drawings, cabling and bench testing prior to tower installation and installation of cable and wiring for all associated equipment. Outdoor work included multi-tower and roof top installations of various transmission equipment intended for communication back to the central receive site. Moreover, because

multiple manufacturers supplied the BAS equipment for this multi-site installation, DSI performed extensive testing, including pre-testing in its laboratory as well as subsequent on-site testing, and troubleshooting of the end-to-end system to ensure interoperability and functionality. Safety was also of paramount concern, requiring DSI personnel to use RF radiation suits during the entire installation.[3]

The second project occurred in June 2007 in Harrisburg, Pennsylvania, and required the design and installation of a rooftop tower structure suitable for station applications. The rooftop installation required the erection of a 30 foot tower to hold the remote ENG camera, a microwave antenna and lightning suppression system. Conduit installation was necessary to accommodate the new cable runs. In addition, the overall job required a high-level of care and coordination because the site was located on an apartment building occupied by private residents.[4]

2. Unexpected Complications Faced by DSI

The inventory verification process took more time and was subject to unforeseen errors for a variety of reasons. As noted, each BAS licensee operates a complex, integrated network of fixed and portable links scattered among a wide variety of different types of facilities and locations that licensees have assembled, piece-by-piece, over a period that might span several decades. These facilities, which are not often well documented with detailed technical schematics, vary greatly in location, use, accessibility, and upkeep.

Much of this equipment is older and can prove difficult to locate because it is used only occasionally or kept as a backup in a remote location. Other equipment is in near-constant use and requires special considerations to ensure continued operational readiness. In one case, for example, the inventory was conducted in the winter, and equipment that was stored near the beach for use in the summer was inadvertently omitted from the inventory list. In another case, a station

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3 *See* Project Profile, Baltimore, MD 2007, attached as Exhibit A.

4 *See* Project Profile, Harrisburg, PA 2007, attached as Exhibit B.

in Boston did not include in its original inventory several spare portable radios that were stored in a back closet and used only for parades and other special events. In these and other cases, the inventory list would be amended to include the missing equipment. Every amendment would result in the project being delayed, while the amended inventory again worked its way through the verification process.

Already complex, BAS installations also raised a host of unexpected problems. Among other things, communications problems between new control systems and new antenna systems and receivers have held up installations. Incomplete or unverified shipments, bad weather, washed out roads, and missing parts also have caused delays. In some cases, delays have resulted from more cataclysmic events. For example, DSI was hired to install new equipment on the roof of a 54-story building in New Orleans. Hurricane Katrina, however, caused the building's elevator to be out of service for months. DSI installers in the end had to carry the new BAS equipment up 54 flights of stairs to the roof. Instead of taking three to four employees one to two days, as it should have, the job ended up taking six employees almost an entire week. The sheer magnitude of the BAS equipment shipments, most of which require palletized shipments of six to twelve boxes/crates, some of which are six feet cubed, also complicates installation. Many stations do not have loading docks or storage facilities, and thus are ill-equipped or unable to unload, verify, and store the new equipment pending installation. Although having the ability to unload or store a large shipment or palletized crate may seem to be a routine aspect of doing business, the issue did not become obvious until DSI began coordinating with manufacturers and stations regarding delivery of the new equipment.

DSI also has rescheduled or delayed installations to avoid disruption to stations' ENG operations during certain times of the year. Among other things, DSI has had to schedule installations late at night or postpone them to avoid weekday programming, sweeps periods,

holidays, elections, or major news and national and local sporting events. Several stations, for example, rescheduled their installations earlier this year during the May television sweeps period to ensure that their operations would not be adversely affected by the relocation. More recently, DSI has been asked to defer the start time for existing projects until after the upcoming November sweeps period. This will push the work into December and the approaching holiday season.

Installations have also been delayed because of equipment supply issues. Some of these issues are relatively minor, such as mislabeled boxes, while other problems, such as equipment being on extended back order or partial shipments, are more disruptive. Because much of the BAS equipment is customized, if a piece of equipment is missing from a shipment, there is a good chance the item is not in stock and thus may not be available for several weeks. Of course, such delays are not uncommon where, as here, there is a growing, large-scale distributed manufacturing environment, with physically disaggregated equipment, methods and processes. Nonetheless, because installation usually cannot occur on a piecemeal basis without compromising the operational integrity of the BAS system, DSI often must wait until the licensee has received all of the necessary equipment before commencing installation.

Delays also occur when changed circumstances require modification of a station's original relocation plan. For instance, DSI verified a station relocation that initially required a simple antenna change on a tower. The tower owner, however, subsequently entered into an agreement with a third-party tenant, who asked to install his new DTV antenna in the aperture occupied by the existing ENG antenna. This change required development and submission of a new design plan, delaying the project over two weeks.

Technical and other communications-related difficulties have also impeded the installation and integration process. BAS service depends on a complex interconnected network of transmitters, receivers, antennas, controllers and related equipment. As a result, it is not

uncommon to find that the newly installed equipment is incompatible or unable to communicate with older controller equipment systems. In those cases, DSI must coordinate the "handshake," or interactivity, between the new and old, analog and digital, BAS equipment. For example, in order to transmit information, the BAS controller must communicate with the spectrum monitor (which monitors signal strength). Moreover, although analog systems are able to communicate over a dial-up connection, digital systems require a high-speed connection. In some cases, no broadband connection has been deployed, which impedes deployment and testing of the new system. Coordinating the "handshake" may also require the expertise of the equipment manufacturers as well as other third parties such as software vendors.

B. DSI Has Taken A Variety of Steps To Help Expedite The BAS Relocation

To help streamline the inventory verification process, DSI developed and implemented a standard checklist of questions aimed at identifying all equipment eligible for replacement, including seasonal and spare equipment, and any equipment that might be stored at different locations. In addition, DSI offers stations the option to arrange for replacement equipment to be shipped directly to DSI's warehouse for pre-assembly and testing. In those cases, DSI unpacks, visually inspects, and verifies that the shipment is complete. It then pre-assembles and pre-tests the equipment, and stores it pending installation. As the installation date approaches, DSI reships the equipment to the station, along with an "installation toolkit" containing extra cables and other spare parts. This process enables DSI to ensure that all system components and the basic materials necessary for the installation have been received and tested as a unit prior to the installation date.

Although pre-testing has helped avoid installation delays, it is not a silver bullet. As noted, in some cases, operational or compatibility issues do not emerge until the new equipment is on-site and being installed. For example, when an antenna is receiving a feed upgrade, the new feed is installed on site and cannot be tested off site as a complete system (control, feed, antenna) until the work is completed on location. In those cases, DSI has implemented processes to help ensure

that technical problems encountered in the field are resolved as soon as possible. For example, DSI, in conjunction with equipment manufacturers, has established a "single point of contact" system that improves communications when problems arise in the field. Specifically, DSI's overall BAS project manager acts as a single point of contact with each manufacturer or vendor. This not only facilitates coordination among the parties, but also eliminates duplicate inquiries on the same topic.

In addition, DSI has purchased and outfitted several company trucks that are used specifically on BAS installation projects. These trucks have on-board installation tool kits and a variety of BAS-specific equipment and materials, including field computers "pre-loaded" with BAS equipment software. Field technicians use the on-site software to identify and implement "fixes" for a variety of basic integration problems, thus potentially avoiding unnecessary and time consuming calls to the equipment manufacturer or software developer. DSI has also developed a database that catalogs technical issues as they arise. The database, which is accessible on-site via the field computers, allows DSI's field technicians to determine quickly whether a particular problem has arisen before and, if so, how the issue was resolved.

C. The Requested 29 Months Is Necessary To Complete The 2 GHz Relocation

DSI anticipates that these solutions will streamline implementation of the relocation in the coming months. Nonetheless, substantial work remains to be done to complete the transition. Installing and integrating 1,000 customized BAS systems – each of which takes an average of 3-4 weeks to install and fully integrate under the best of circumstances, which may not occur for all of the reasons cited above that can delay integration and installation for additional weeks or months – is a time consuming process beset with potential delays.

Although the measures implemented by DSI and others have helped anticipate and minimize setbacks, unavoidable delays are likely to occur in the future. For example, while pre-assembly and testing can help minimize installation delays, it is often impossible to detect

interoperability or compatibility problems until the installer is on-site. Similarly, installation and integration require specialized labor like tower climbers, who are in relatively short supply. Tower climbers, for instance, require extensive training in fall protection and rescue techniques, including specialized lessons in body supports, lanyards, self-retracting lifelines, rope grabs, anchorage components, anchorage points, and component compatibility. This already limited pool of trained and qualified climbers must also possess the technical skills necessary to assemble complicated electronic equipment. BAS installation projects, moreover, must compete for these scarce, highly trained professionals with businesses completing the ongoing conversion to digital television in anticipation of the analog shut-off in 2009, potentially slowing the pace of installations in the future.

DSI is confident the parties involved can solve – or at least mitigate the effect of – these problems, but doing so undoubtedly will require additional time. DSI accordingly supports Petitioners' request for an additional 29 months.

III. Conclusion

Despite DSI's and other stakeholders' efforts to minimize delays, unforeseen complications have significantly slowed the 2 GHz BAS relocation effort, making it impossible to complete the retuning in the timeframe originally prescribed by the Commission. DSI supports Petitioners' request for an additional 29 months, which will give installers, such as DSI, and other involved parties, the additional time needed to complete the complicated task of relocating BAS licensees, while maintaining the operational integrity of the broadcast systems.

Respectfully submitted,

DSI RF SYSTEMS, INC.

/s/ Tim Carroll

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October 26, 2007

Exhibit A

PROJECT PROFILE

Baltimore, MD 2007

Job Type:
2 GHz BAS Implementation

Industry:
Television Broadcast

Scope of Work:
11 Associated Job Sites
Site Survey
Inventory Coordination
Job Site Coordination
Project Management
Systems Integration

Project Details
Project consists of multiple site/multiple product indoor and outdoor 2GHz BAS Microwave equipment installations, with outdoor tower elevation range of 39' to 990'.

Indoor work encompasses drawings, cabling & bench testing prior to tower installation and installation of cable & wiring for all associated equipment.

Outdoor work includes multi-tower and rooftop installations of various transmission equipment intended for communication back to central receive site.

Job Site: Legg Mason Building Quad Antenna Installation

Job Site: TTI Tower Elevation: 990' Microwave Antenna Installation

Job Site: TTI Tower Elevation: 990' Microwave Antenna Installation & DSI Staff Member

Job Site: TTI Tower Elevation: 990' Microwave Antenna Installation Completed

Challenges
Multi-Site indoor & outdoor locations and various heights. Equipment supplied from multiple manufacturers requires interoperability functionality & field troubleshooting at times.

RF Safety concerns due to number of antennas on the tower

Solution
Establish strong relationships & communications among and between all involved manufacturers. Work as a team to remedy intercommunications issues between equipment. Perfomed bench tests in our lab prior to project start.

Utilized RF Radiation suits during the entire installation.

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Exhibit B

PROJECT PROFILE

Harrisburg, PA 2007

Job Type:
2 GHz BAS Implementation

Industry:
Television Broadcast

Scope of Work:
Rooftop Installation
Site Survey
Inventory Coordination
Job Site Coordination
Project Management
Systems Integration

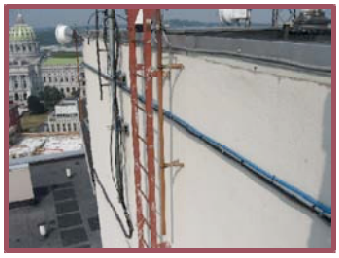
Project Details

A complete rooftop installation beginning with the erection of a 30' tower to hold Remote ENG Camera, Microwave Antenna and lightning suppression system.

Conduit installation was necessary to accomodate new cable runs.

The overall job requires care because the site is located on an apartment building occupied by private residents.

Tower Mount & Section Install



Complete Conduit & Cable Run

Installation of second & third tower section

View of completed tower from rooftop. Antenna mount, microwave antenna remote ENG camera, all cabling & lightning suppression configured & installed by DSI.

ENG Remote Camera installation close up.

Challenges

1. Lack of existing structure
2. Several stages of implementation requiring expertise in RF, Cameras, Tower Construction & electrical.
3. Time Limitation
4. Inventory coordination

Solution

1. Create a tower structure suitable for station applications.
2. DSI staff is trained to meet the demands of a multi-staged, varied project, from start to finish.
3. Create & adhere to negotiated timeline.
4. Utilize DSI Project Mobilization team to assure proper materials & equipment supply.

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