

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Part 90 of the Commission's Rules)	WP Docket No. 07-100
)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band)	PS Docket No. 06-229
)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands)	WT Docket No. 06-150

Comments of Shared Spectrum Company

Shared Spectrum Company ("SSC") respectfully submits these Comments in response to the Public Notice released on October 30, 2013 by the Federal Communications Commission's Public Safety and Homeland Security Bureau (Bureau) seeking comment on the above-captioned 4.9 GHz National Plan Recommendations Final Report (Report) submitted by the National Public Safety Telecommunications Council (NPSTC) on October 24, 2013.¹

NPSTC filed its Report in connection with a Fifth Further Notice of Proposed Rulemaking (Further Notice) released by the Commission on June 13, 2013, which

¹ 4.9 GHz National Plan Recommendations, Final Report, filed by National Public Safety Telecommunications Council in a letter from Ralph A. Haller, Chair, NPSTC, to Marlene H. Dortch, Secretary, Federal Communications Commission, dated October 24, 2013 (Report). The Report can be found at <http://apps.fcc.gov/ecfs/document/view?id=7520950503> (last accessed Oct. 28, 2013).

considered a number of issues to improve spectrum efficiency and to encourage greater use of the 4940-4990 MHz (4.9 GHz) band for public safety communications.²

Shared Spectrum Company participated in filing Comments and Reply Comments in this proceeding, and welcomes the opportunity to further discuss this matter in light of NPSTC's recent proposals.

I. Comments.

A. Background. SSC is a leader in the development and deployment of Dynamic Spectrum Access ("DSA") devices employing spectrum sensing and/or geo-location techniques to share spectrum. SSC in its Comments and Reply Comments in this proceeding, -- and in other proceedings before the FCC and NTIA,-- has consistently espoused the view that spectrum sharing is best achieved when sensing is deployed, either as a stand-alone approach, or in concert with databases such as those developed for the TV White Spaces.

SSC applauds the many NPSTC participants who came together, in over 30 conference calls, and countless hours of deliberations, to form this consensus report. Similarly, SSC welcomes the FCC's invitation for feedback on this proposal; this type of deliberative process is key to moving policy forward in a meaningful manner.

B. NPSTC's Proposal for the 4.9 GHz Band.

In its report, NPTSC proposes to bring more clarity to the 4.9 GHz band, including setting aside two 5 MHz wide channels on a co-primary basis for Critical

² Public Notice, released October 20, 2013, DA 13-2096.

Infrastructure Industry (CII) users if Public Safety does not need them in any particular area.³ NPSTC also encourages sharing between CII and Public Safety in other instances where Public Safety is given 30 days notice that CII wishes to use a channel.⁴ In those instances, CII licenses would be coordinated with the frequency coordinators and the ULS would be updated to reflect those CII licenses.⁵ NPSTC promotes sharing between Public Safety and CII entities, essentially giving CII access to most of the Public Safety channels on a co-primary basis within three years.⁶

NPSTC also proposes to allocate five channels of 1 MHz each for use by Air-to-Ground operations (i.e., UAV's) and robots.⁷ Such Air-to-Ground operations would be limited to no more than 400 feet above ground, NPSTC proposes.⁸ These operations, as well as the use of bomb robots, would be intermittent, exceptions-based operations, such as when a UAV is flown above a crime scene in progress, for example.

SSC generally supports the concept of sharing between CII and Public Safety, and using needs-based information to improve operations and frequency coordination. SSC does not, however, believe that permanently allocating channels to any one service, such as 5 MHz to the Air-to-Ground operations, is the most efficient way to manage spectrum.

To the contrary, such thinking is based on a traditional view that suggests one

³ NPSTC at 4 (proposing to allocate channels 6 and 7 to CII).

⁴ NPSTC at 11.

⁵ Id.

⁶ NPSTC at 11.

⁷ NPSTC at 8.

⁸ NPSTC at 8.

frequency band should be allocated for UAVs and another should be allocated for utilities, so never the two shall meet. If the United States is to achieve the PCAST Report's goals and identify 500 MHz for broadband use, we will not come close to achieving this goal if we use the older methods of setting up walls between services.⁹

SSC feels compelled to point out the efficiency of sensing as a sharing technique, rather than the more static approach proposed by NPSTC. The NPSTC approach is based on the paradigm wherein a ULS license database governs who uses the spectrum, and licenses are coordinated based on terrain models and frequency propagation estimates. Those database decisions are coordinated in advance, and reflected in a fixed database, and so spectrum is not shared on a time or local basis which reflects the real world environment in the field.

For example, SSC feels confident that most of the 5 MHz NPSTC proposes to allocate to UAVs and bomb robots could be normally used by general Public Safety and CII users without any interference to these exceptions-based operations of drones and robots. The sensing in DSA radios, and an intelligent database, could be deployed to permit primary allocation to the UAVs and robots, so that when they are in use, the CII users, for example, do not access that particular channel in that place and time. To do otherwise and simply allocate 5 MHz permanently to those UAV and robotic uses, is in our view, a misallocation of 5 MHz to UAVs and bomb robots which, thankfully, are not

⁹ President's Council of Advisors on Science and Technology (PCAST) Report, *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth*, http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf released July 20, 2012.

operating 24 x 7 above jurisdictions in the United States.

SSC believes that intelligent databases are needed in the 4.9 GHz band; these are databases which input the availability of frequencies in time and space, and permit their use by a well-defined group of users such as Public Safety, utilities, pipelines, metropolitan transit agencies, and other CII radio users. This intelligent database would include sensing technology distributed in a sensor network comprised of base stations or similar access points. Sensing the available channels and giving the database feedback from devices in the field, a network of sensors in the field can make databases intelligent, rather than just a repository of static information.

NPSTC recognizes that jurisdictional licensing does not make sense, i.e. licenses should not be allocated based on a police jurisdiction. However, replacing that paradigm with site-based licensing, and carving up the band into this type of use and that type of use, misses a larger opportunity to share the spectrum between responsible users in a very efficient manner.

An intelligent database is needed: one which recognizes the real world environment, and updates data accordingly. Sensing can permit sharing in situations where it may not otherwise occur. Similarly, sensing can help to correct misinformation in databases, where sharing *should not* occur because of the potential for real world interference, but a fixed database believes perhaps sharing should occur in that time and place. Sensing in tandem with an intelligent database provides more accurate

information than just a static, “dumb database” approach.

Over the medium term, SSC envisions a world where devices are smart, they have sensing capabilities built into them and do not need an intelligent database to avoid interfering with primary users, such as Public Safety users in this instance. In that near-future scenario, responsible CII parties such as utilities, oil and gas industry users, transportation and other CII entities, will obtain 4.9 GHz certified radios that have sensing capabilities built into them. These DSA radios will understand the priority rules and will avoid interfering with Public Safety users in the 4.9 GHz band. And because the parameters of the CII user community are well-known and geographically defined, i.e., an oil refinery worker in Northern California will likely never use his 4.9 GHz radio in Northern Virginia, for example, there is an extra layer of certainty surrounding the use of sensing in the CII context for sharing with Public Safety users.

As SSC noted in its original Comments in this proceeding, there is a willingness in the Public Safety community for sharing with Critical Infrastructure Users in the *700 MHz* band, among other bands, because CII users work closely with Public Safety officials. According to a recent article in Urgent Communications,

Seasoned public-safety communications leader Harlin McEwen, speaking at the recent Association of Public-Safety Communications Officials (APCO) conference in Minneapolis, agreed that utilities should have access to public-safety spectrum. "We just have to come up with a way to manage that. We're willing to talk."

Utilities Angling to use Public Safety's 700 MHz Broadband Spectrum, Urgent Communications, by Tammy Parker, September 6, 2012.

However, NPSTC apparently rejected the concept of a private, intelligent database simply because of cost reasons.¹⁰ In its Report, NPSTC does not cite to any actual cost estimates of using an intelligent database, but SSC believes that such database operators, like Google, Spectrum Bridge, Microsoft, etc. are ready and willing to provide competitive services in the TVWS and other bands, and are looking for an opportunity to show what they can achieve. Therefore, the cost of *not having efficient database operations* should be taken into account,-- there is an opportunity cost to pay for Public Safety and CII users who cannot obtain broadband connectivity, set up Wi-Fi hotspots, or manage point to point links, because the static database keeps them from holding a license to operate.

If spectrum policy is going to change for the better, then Public Safety users need to lead that effort. In a frequency constrained world, the inability to access what are otherwise unused channels creates a real cost, too. SSC believes that cost is much higher than any incremental cost of a DSA radio and/or an intelligent database with a network of sensors.

Spectrum is a limited resource, it cannot be measured neatly in terms of dollars and cents. When a police officer cannot access the information he needs because he has crossed county lines and is now in an area licensed to a utility, or a utility crew member in a storm has no video of an outage because the channels are taken by a bomb robot that sits in a warehouse, that creates a real cost that is harder to measure but which is just as

¹⁰ NPSTC at 9.

real. Sharing based on sensing and use of channels is the best path forward for Public Safety and CII users.

II. Conclusion.

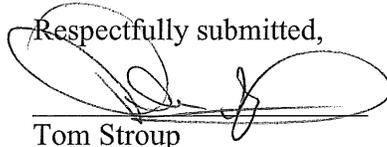
SSC believes that the FCC should manage sharing by creating an intelligent database that permits the allocation of frequencies in the 4.9 GHz band to Public Safety users as the first priority, but which permits secondary users among the CII community. Those CII users are responsible parties, with known geographic areas of operations, and with deep telecommunications knowledge and experience.

As such, CII users will operate in cooperation with the intelligent database, using a network of sensors contained in their base stations or access points, and eventually relying upon DSA radios that sense the presence of Public Safety and avoid interfering with those users. Those access point or base station sensors will report such information to the intelligent database, so that the database updates the lack of availability of those Public Safety channels at that time and place.

In order for the FCC, NTIA and other government agencies to truly share spectrum at a level required by the Administration's own PCAST report, bold action needs to be taken. Sensing needs to be deployed in the real world with TVWS type databases; and the 4.9 GHz band is the ideal place for that to occur first, because of the responsible nature of the CII licensees and the existing capabilities of both intelligent databases and DSA radios. The time is now and this is the best opportunity for decisive

action to advance our common goals of spectrum sharing in a responsible and meaningful manner.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Tom Stroup', is written over a horizontal line. The signature is fluid and cursive, with a large loop at the end.

Tom Stroup
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