

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

In the Matter of:

)	
Revision of Part 15 of the Commission's Rules)	
to Permit Unlicensed National Information)	ET Docket No. 13-49
Infrastructure (U-NII) Devices in the 5 GHz)	
Band)	

To: The Commission

COMMENTS OF SHARED SPECTRUM COMPANY

Shared Spectrum Company (SSC) hereby responds to various issues raised in the Notice of Proposed Rulemaking (NPRM) in the above captioned proceeding.

I. INTRODUCTION:

Shared Spectrum Company is a leader in developing spectrum sharing technologies, including Dynamic Spectrum Access (DSA) radios, frequency sensors, and software applications. For the past several years, SSC has been a consistent advocate – before the FCC, NTIA and elsewhere – for the use of state-of-the-art technologies that can open new spectrum bands for sharing among different types of users, such as federal entities and non-federal users, and sharing among different types of devices, such as radars and two-way radios.

For example, in the recent “Incentive Auction” proceeding,¹ SSC filed comments and reply comments in which it noted that sharing can be accomplished in a manner that will promote innovation in the broadcast bands and ensure that broadcast licensees do not experience harmful interference. SSC pointed out that sensing technologies, in particular, can play a large role in maximizing the efficient use of those bands.² Similarly, in the recent 3.5 GHz proceeding,³ SSC pointed out that sensing technologies can help reduce exclusion zones between military radars and commercial devices.⁴

Earlier, SSC was instrumental in developing the record to support the creation of the TV White Spaces.⁵ In addition, SSC was deeply involved in the preparation of the Report of the President's Council of Advisors on Science and Technology (PCAST), as well as the work of the Commerce Spectrum Management Advisory Committee (CSMAC), related to spectrum sharing.⁶ The record in these proceedings and others

¹ In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, GN Docket No. 12-268, *Notice of Proposed Rule Making*, 27 FCC Rcd 12357(2012).

² Comments of SSC in GN Docket No. 12-268 at 6, 8 (filed Jan 25, 2013); Reply Comments SSC in GN Docket No. 12-268 at 3-4, 8 (filed March 12, 2013).

³ In the Matter of Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, *Notice of Proposed Rule Making and Order*, 27 FCC Rcd 15594 (2012).

⁴ Comments of SSC in WT Docket No. 12-354 at 3-6, 10, 14 (filed Feb. 20, 2013); Reply Comments of SSC in WT Docket No. 12-354 at 1, 6-7 (filed Apr. 5, 2013).

⁵ See In the Matter of Unlicensed Operation in the TV Broadcast Bands Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Docket No. 02-380, *Second Report and Order and Memorandum Opinion and Order*, 23 n.73 (rel. Nov. 14, 2008); Comments of SSC in ET Docket No. 02-380 (filed Apr. 17, 2003); See *ex parte* presentation by Shared Spectrum Company in ET Docket No. 02-380, on September 29, 2003.

⁶ The PCAST prepared a report that examined how advances in situation-aware spectrum-sharing technologies could facilitate commercial use while preserving the mission capabilities of federal users. PCAST, “Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth” at 30 (rel. July 20, 2012) (“PCAST Report”), available at http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

The CSMAC made recommendations on using dynamic spectrum access and geo-location/database approaches to offer new opportunities to increase spectrum sharing. NTIA, “Commerce Spectrum Management Advisory Committee, Final Report of the Interference and Dynamic Spectrum Access

make clear that, in order to meet the growing demand for licensed and unlicensed commercial spectrum, the use of sensing-based technologies must be an essential element of U.S. regulatory policy.

It is in this spirit that we welcome the opportunity to provide these comments on the NPRM. The 5 GHz band has been a Wi-Fi success story. Millions of Americans look to Wi-Fi for home and office coverage for their daily internet use. While traveling, countless Americans use hotspots in coffee shops, at airports and in other public spaces. Wireless carriers and cable companies increasingly offload traffic onto wireless hotspots to ameliorate congestion on their core facilities. For example, the five major cable companies have publicly committed to build tens of thousands of additional hotspots nationwide, and to permit their own subscribers to roam to each others' hotspots.⁷

I. ALLOCATING MORE 5 GHZ UNLICENSED SPECTRUM IS A POSITIVE STEP.

The Commission, in the NPRM, proposes to add 195 MHz in the 5 GHz band for unlicensed use. SSC supports the Commission's proposal to expand the 5 GHz band available for unlicensed services, including Wi-Fi.

Subcommittee" (rel. Nov. 8, 2010) (*CSMAC Subcommittee Final Report*), available at http://www.ntia.doc.gov/files/ntia/publications/interference-dynamic_spectrum_access_subcommittee.pdf.

⁷ See Kevin C. Tofel, "5 Cable Companies Cut the Cord, Offer Free Wi-Fi Roaming," (May 25, 2012) available at <http://gigaom.com/2012/05/21/5-cable-companies-cut-the-cord-offer-free-wi-fi-roaming>.

In January 2013, the NTIA released its report evaluating sharing the 5 GHz band with federal users.⁸ That report provides a road map for spectrum sharing, including the unlicensed use of the 5 GHz band. At its core, the unlicensed use of the 5 GHz band is based on sensing technologies. Normally, Wi-Fi and other unlicensed services scan the available spectrum, find an open channel and use it for their communications link. SSC believes that this sensing approach is effective and that, as long as interference to existing weather and military radars can be avoided, the FCC should continue to expand the reach of these economy-boosting, spectrum-sharing technologies.

II. SSC CAUTIONS AGAINST COSTLY AND UNWORKABLE RULES FOR MANUFACTURERS.

The Commission expressed concern that after-market tampering with software or hardware could enable devices to transmit in ranges that interfere with military and weather (Doppler) radars, particularly the 5.60-5.65 MHz band's Terminal Doppler Weather Radar system. In paragraph 51 of the NPRM, the FCC asks whether it should require manufacturers to embed some type of technology into chips that would render unlicensed devices tamper-proof, or inoperable if the device is later tuned to other bands.⁹

⁸ Department of Commerce, "Evaluation of the 5350-5470 MHz Band and 5850-5925 MHz Bands Pursuant to Section 6406(b) of the Middle Class Tax Relief and Job Creation Act of 2012," (Jan. 25, 2013) ("NTIA 5 GHz Report") available at http://www.ntia.doc.gov/files/ntia/publications/ntia_5_ghz_report_01-25-2013.pdf.

⁹ While the FCC recognizes these devices are not certified as Software Defined Radios (SDRs), it also seeks to impose restrictions which may not be workable.

SSC believes that such a requirement may prove counter-productive. Adding requirements such as this may actually impede further deployment of Wi-Fi and other unlicensed services. In particular, the significant additional cost and complexity of tamper-proof solutions could limit the availability of future devices for consumers and have the exact opposite effect the Commission seeks, by limiting, rather than expanding, Wi-Fi use in this band.

Instead, the Commission should promote the increased reliance upon sensing-based devices, both in conjunction with a geo-location database and as a stand-alone option. For example, in paragraph 53 of the NPRM, the Commission asks whether, to avoid interference to Doppler Radar, it should require use of a database with geo-location technology in the portion of the 5 GHz band adjacent to Doppler radar. This approach may be suitable as one alternative.

In paragraphs 62-65 of the NPRM, the FCC discusses sensing as a means of avoiding interference to Doppler radars. The FCC seeks comment on whether it should implement a rule requiring that Wi-Fi devices sense for radar signals at, or exceeding, 100 percent of their occupied bandwidth. The FCC notes that expanding the sensing bandwidth will prevent co-channel operations between Wi-Fi devices and radar receivers and thus will reduce the potential for harmful interference. SSC supports this proposal to enhance the role of sensing in this portion of the 5 GHz band.

Such an approach would be consistent with the NTIA's 5 GHz Report, in which

the NTIA observed that “[a] vast majority [of cases of interference to Doppler radars] are due to unauthorized operation of devices rather than failure of a properly operating U-NII device.”¹⁰ Sensing will help to reduce the likelihood of interference; even if a device is tampered with in the after-market, properly designed sensors would cause the device to nonetheless “see” the incumbent operation and select a different, vacant channel.

The FCC also invites comment on the technical difficulty and cost of implementing this sensing capability in Wi-Fi devices in that portion of the 5 GHz band near Doppler radar. SSC offers sensing technology today that could achieve such capability. The cost is in line with similar technologies which are in the marketplace today, such as database and cognitive radio technology.

CONCLUSION

In the NPRM, the FCC proposes allocating additional spectrum in the 5 GHz band to unlicensed use, such as Wi-Fi. SSC supports this proposal.

The FCC is understandably concerned with preventing after-market modifications to consumer equipment that could result in interference with radars. However, requiring tamper-proof products could impose significant extra costs, or be impractical, or both, which, in turn, could undermine the huge benefits to consumers, carriers, and others from the use of Wi-Fi and other unlicensed devices, at home, in the office, and in public hotspots.

¹⁰ NTIA 5 GHz Report at 3-5.

SSC believes that expansion of sensing-based approaches, including stand-alone sensing and sensing in combination with a geo-location database, represent cost-effective and technically sound ways to avoid such problems. SSC applauds the Commission for its efforts in this regard.

Respectfully submitted,

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