

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

In the Matter of)	
)	
Fostering Innovation and Investment in the Wireless Communications Market)	GN Docket No. 09-157
)	
A National Broadband Plan For Our Future)	GN Docket No. 09-51

COMMENTS OF SPECTRUM BRIDGE, INC.

Introduction

Spectrum Bridge, Inc. (“Spectrum Bridge”) hereby responds to the Commission’s Notice of Inquiry in the above-referenced dockets (“*Wireless Innovation NOI*”).¹

Spectrum Bridge was established in 2007 with the goal of identifying and implementing methods to facilitate access to spectrum for service providers, private users, equipment manufacturers, and systems integrators through secondary market transactions.²

Spectrum Bridge applauds the Commission for encouraging the dialogue on how best to foster innovation and, specifically, for noting Spectrum Bridge’s contribution as a provider of “an online spectrum marketplace.”³

Needless to say, spectrum availability is one of the major drivers of wireless innovation. We believe that Spectrum Bridge’s comprehensive spectrum database and the pending TV White Spaces database will be the first steps toward a dynamic, scalable,

¹ *Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan For Our Future*, Notice of Inquiry, GN Docket Nos. 09-157 and 09-51 (rel. Aug. 27, 2009) (“*Wireless Innovation NOI*”).

² See Spectrum Bridge Home Page, <http://www.spectrumbridge.com>.

³ *Wireless Innovation NOI* ¶ 43.

market-based allocation system of spectrum among new and existing users, which can provide the framework for the allocation of primary and secondary market spectrum.

I. Accurate, Complete Spectrum Databases are Necessary for Efficient Spectrum Acquisition.

Despite the Commission's introduction of secondary market initiatives in 2003,⁴ the secondary market has been slow to evolve absent an obvious and convenient place for buyers and sellers to investigate the possible exchange of spectrum rights. The most common mechanism used by those interested in acquiring or divesting a spectrum asset is to engage a communications attorney to identify available spectrum through Commission databases and contact potential sellers individually, which is a time-consuming and expensive process. Moreover, most databases:

- are incomplete and in some cases inaccurate;
- are difficult to search;
- do not contain secondary market information, such as availability, price, coverage, terms, and conditions for lease or sale; and
- typically cannot be updated by a buyer or seller.

Spectrum Bridge, however, has developed an extensive spectrum database, SpecEx, which has several advantages to support secondary markets. SpecEx includes Universal Licensing System data, information from other Commission databases, like the Common Direct Broadcasting Service database, Geographic Information Systems data, demographic (census) data, and complementary data from sources like the Federal Emergency Management Agency. SpecEx is simple to search and allows users to compare detailed information regarding available spectrum for secondary leasing. The

⁴ *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Report and Order and Further Notice of Proposed Rulemaking, WT Docket No. 00-230, 18 FCC Rcd 20604 (2003) (“*Secondary Market Rules*”).

system is also integrated with spectrum management tools and provides the means to track and create subdivisions of spectrum through disaggregation, partitioning, and/or timesharing. Much of this information is available to the general public over the internet through the SpecEx website.⁵

Our intent is to make SpecEx the de facto starting point for secondary market transactions. While today Spectrum Bridge is the only comprehensive spectrum database provider, it does not own a monopoly – most of the raw data comes from public sources. We believe that Spectrum Bridge has established a baseline for future market-driven databases. We respectfully submit that the Commission need not devote resources to duplicate such a database as it is generally easier for a commercial entity to quickly respond to market needs. The Commission can assist secondary markets, however, by providing easy and timely electronic access to basic licensing data. Currently, this information is sometimes incorrect and often updated slowly.

II. The TV White Space Database Can Lead to Dynamic Spectrum Allocation.

The Commission's soon-to-be-implemented TV White Space database will provide an opportunity to develop and test database improvements, and could lead to new, more efficient dynamic spectrum allocation methods.⁶ Spectrum Bridge has already added TV White Space spectrum data to the SpecEx framework, resulting in the Show My White Space database.⁷ As the Commission finalizes the White Space rules,

⁵ See SpecEx Home Page, www.specex.com.

⁶ See *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices, Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, 16878-79 ¶¶ 204-207 (2008) (“*Second White Spaces Order*”).

⁷ See Show My White Space Home Page, www.showmywhitespace.com.

Spectrum Bridge will need only to adapt its interference avoidance algorithms to specific regulatory requirements.

A database management system for TV White Space is a first step towards what Spectrum Bridge envisions as an overlay management system that manages spectrum as a finite but renewable resource.⁸ As currently defined, the database for TV White Space will determine if spectrum is available in a specific location based on licensing rules.⁹ Spectrum Bridge believes that the idea behind the TV White Space database should be expanded to all spectrum that is offered on the secondary market. Once frequency agile radios and Software-Define Radios (“SDRs”) are established in the market – facilitated by use in TV White Spaces to dynamically exploit TV White Spaces spectrum, there is no reason that a database could not direct such radios to all available secondary market spectrum, limited only by the capability of the technology. By eventually combining such a comprehensive database with spectrum sensing technologies, we can allow an initial form of dynamic spectrum distribution based on more accurate knowledge of spectrum availability and usage at a given time and place. Ultimately, the goal is to create a more efficient, albeit more complex, implementation system with the introduction of feedback loops that can determine spectrum use in real time. The evolution is from “if it is not licensed, you can use it,” to “if it is licensed but not allocated to the licensee network, you can use it,” to finally “if the primary user is not using it right now, you can use it.”¹⁰ This leap in innovation will allow spectrum to become a market asset that can be transferred to the most efficient user.

⁸ *Second White Spaces Order* 23 FCC Rcd at 16884-85 ¶¶ 221-24.

⁹ *Id.* 23 FCC Rcd at 16878-85 ¶¶ 204-224.

¹⁰ Provided that the primary user has agreed to permit secondary market use.

III. Secondary Markets

The Commission has asked whether current secondary market policies adequately enable spectrum acquisition.¹¹ The answer is yes, but the policies can be improved by providing enhanced information regarding spectrum availability and increasing market confidence. As the Commission noted, Spectrum Bridge is successfully utilizing the Commission's secondary market policies,¹² and has successfully completed tens of millions of dollars of secondary market transactions in 2009 alone. A vibrant secondary market has many benefits over other spectrum allocation techniques, not the least of which are providing certainty regarding availability and cost as well as ensuring unfettered access for the duration of the secondary market lease. This is especially important for business-critical and government mission-critical applications that users may not be willing to operate on unlicensed spectrum or on a secondary basis due to interference or preemption concerns.

But a marketplace will only prosper and benefit users if a trust exists that merchandise will be available. The Commission's rules related to flexible use and secondary markets provide a substantial amount of available unused or underused spectrum for sale or lease, but the challenge is to market spectrum and maintain an inventory that provides a basis for such trust. The lack of market awareness and understanding of how secondary markets operate is a major impediment to achieving that trust. The Commission should educate the market, in part, through website enhancements that highlight the capabilities of spectrum coordination and secondary markets, as well as provide references to companies that are involved.

¹¹ *Wireless Innovation NOI* ¶ 32.

¹² *Id.* at ¶ 43.

Market confidence is also hampered by fear that network investment will be worthless when a spectrum lease expires. That is simply not true if there is a ready and available inventory of spectrum upon which to operate the network. Unfortunately, only a fraction of the spectrum designated for secondary markets is available because some licensees do not understand that short-term leasing is available, viable, and can work to their benefit without affecting primary use and, thus, are reluctant to put spectrum on the secondary market. For example, many licensees are unaware that the Commission counts secondary market build-out towards the overall build-out requirement for primary licensees.¹³ This fact alone, if well known and understood, would provide incentive to license holders to put unused spectrum on the secondary market.

It is more important for the Commission to facilitate access to spectrum already designated for secondary use than to designate additional spectrum.¹⁴ The spectrum is available, we simply need to improve the efficiency of the secondary marketplace and reduce transaction costs. The Commission can take regulatory steps towards this goal. First, the Commission should streamline the cumbersome and time-consuming process of transferring licenses and leases and consider pro forma approval in most if not all routine situations.¹⁵ The Commission should clarify its ability and willingness to repurpose spectrum through waivers when in the public interest, such as those that Spectrum Bridge has received to use Part 22 spectrum for Part 90 utility applications. It will also be helpful to allow aggregation of narrowband channels into wider channels to create more flexibility for frequency agile radios and SDRs to operate over a large frequency range

¹³ *Secondary Market Rules* 18 FCC Rcd 20655 ¶ 114.

¹⁴ *See id.* 18 FCC Rcd 20618 ¶¶ 27-28.

¹⁵ *See Wireless Innovation NOI* ¶ 32.

with different channel sizes, thus matching more types of available spectrum to user needs. Allowing entities to group together more effectively and efficiently into spectrum sharing cooperatives may also be advantageous. Finally, the marketplace is the mechanism by which the Commission should provide access to “orphaned” spectrum, leftover spectrum from primary auctions, or spectrum that has been returned to the FCC. Collectively, these small individual spectrum licenses comprise a significant and valuable asset that can be exploited by modern radio technology.

Spectrum Bridge believes, however, that additional regulation for interference mitigation is unnecessary as technology and current rules allow for a license holder and potential secondary user to coordinate and monitor interference.¹⁶ In the simplest case, only one user would operate at any given time. For instance, a school board could use spectrum for distance learning during school hours, while a utility uses the same spectrum for power meter reading in the middle of the night. This arrangement creates no interference between parties. More complex sharing arrangements work equally well with the appropriate choice of technology, advanced planning, and coordinated operational management.

IV. Other Spectrum Acquisition and Use Issues.

There is some theoretical appeal to the idea of imposing spectrum user fees to encourage more efficient spectrum use,¹⁷ but in practice user fees would be almost impossible to quantify, monitor, and evaluate. How would “use” be defined? How would it be valued? Moreover, a user may feel justified in paying a fee to simply to maintain continual spectrum access, even if the spectrum lies fallow. This lacks the

¹⁶ See *id.* ¶¶ 35-37.

¹⁷ See *id.* ¶ 42.

efficiency of a vibrant secondary market and encourages spectrum squatting.

Economic efficiency is the only reasonable measure of efficiency.¹⁸ To use a “spectrum efficiency” or “technical efficiency” measure does not represent the potential value of the spectrum. For instance, a smart grid application may demand low bandwidth using a technically inefficient modulation scheme (to get adequate range) to dramatically improve energy use efficiency. Comparing that spectrum efficiency with a network solution optimized for streaming video (say from YouTube) fails to capture the value of the spectrum to the economy.

Moreover, any meaningful efficiency comparison requires accurate knowledge of spectrum use. Current rules allow, for example, gaming of the system when it comes to build-out requirements, which distorts true spectrum usage. Installing repeaters or transmitters to send out a test signal to comply with the letter, but not the intent, of the rule fails to measure accurate usage or efficiency. The challenge will be to create regulation that prevents such gaming in the future. One way to solve this particular problem would be to move away from the strict “use it or lose it” policy, so that a licensee could maintain its license simply by putting it up for sale or lease under reasonable terms and conditions, thus providing less incentive to cheat while simultaneously adding to spectrum inventory. Should any particular license not attract willing buyers in the market, the Commission may use that information to review whether the attendant service rules need to be adjusted.

Finally, current spectrum allocation methods are as much a barrier to entry as the legacy technical rules. The auction process, for instance, tends to favor those with deep

¹⁸ See *id.* ¶ 40.

