

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

In the Matter of

Request to Amend Sections 47 C.F.R.  
15.711(b) and 47 C.F.R. 15.717 Regarding  
Changes to Certain Rules for Unlicensed  
Operations in the Television Bands,  
Repurposed 600 MHz Band, 600 MHz Guard  
Bands and Duplex Gap and Channel 37

RM-11745

**OPPOSITION OF GOOGLE INC.**

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May 1, 2015

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## **Introduction and Summary**

Despite its theatrical title and overheated rhetoric, the National Association of Broadcasters' (NAB) "emergency" petition for a rulemaking identifies no actual interference or other harm to its member broadcasters, no failure of any FCC-certified television white space database, and no violation of any Commission rule. Rather, unlicensed users of vacant television channels (known as white spaces) have provided significant benefits to communities across the country *without* causing harmful interference to protected entities. The individual database entries that NAB brands as "false" are likely test entries used by device manufacturers and database administrators to ensure that the broadcaster-protection system is working properly. Real world experience—including the absence of any interference complaints—shows that the Commission's rules adequately protect licensed users. The Commission accordingly should dismiss NAB's rulemaking petition without further proceedings.

## **Discussion**

### **I. NAB's Assertions Regarding Individual Records Do Not Warrant Changing Commission Policy**

The so-called "false"<sup>1</sup> database entries on which NAB premises its petition are likely the result of routine, beneficial testing and permissible data management and retention practices. Neither the presence of these test entries nor variations in data retention practices among database providers increases the risk of harmful interference to protected entities in the television bands.

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<sup>1</sup> National Association of Broadcasters, *Emergency Motion for Suspension of Operations and Petition for Rulemaking*, RM-11745, at 2-3, 9-11, 15 17 (filed Mar. 19, 2015) (Petition).

**A. Test entries do not compromise effective database or device operation**

NAB makes much of obviously fictitious contact names, addresses, and device serial numbers it found in white space databases. None of this information, however, is “data used by the database administrators to determine proper operating channels for unlicensed devices,” as NAB erroneously alleges.<sup>2</sup> These fields are informational only, and have no operational significance.

The contact names, addresses, and serial numbers cited by NAB, moreover, most likely represent innocent test entries. For example, contact names such as “first\_last” or “Meld\_test” are clearly tests.<sup>3</sup> (Meld Technology is a company in Sunnyvale, California, that makes white space devices.<sup>4</sup>) Similarly, serial numbers such as “test” and “SN-0000” are most likely test numbers.<sup>5</sup> While it may not have been a best practice to accompany those entries with generic address information,<sup>6</sup> there is no reason to suspect that these entries represent actual devices in the field that could interfere with reception of TV broadcasts.

Manufacturers and database administrators create test entries for a variety of legitimate reasons, such as ensuring that databases are exchanging information in compliance with the FCC’s rules, ensuring that devices can communicate their location to databases, and verifying that devices continue to communicate securely after updates are

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<sup>2</sup> *Id.* at 9.

<sup>3</sup> *Id.* at 10 (alleging that “at one point, more than 80 devices listed ‘Meld test’ as the contact name.”).

<sup>4</sup> Meld Technology, <http://www.meldtech.com/staging2/> (last visited May. 1, 2015).

<sup>5</sup> Petition at 10.

<sup>6</sup> *See id.*

made. The fact that no broadcaster has ever asserted a claim of interference suggests that the most obvious explanation is the correct one—these are nothing more than data entries, and do not conceal any radio device information that would be relevant to interference protection.

**B. Database providers' data retention policies do not affect interference protection**

NAB makes much of the fact that iConnectiv's database maintains some obsolete records that are not retained in the Google and Spectrum Bridge databases.<sup>7</sup> These differences, too, do not compromise interference protection, for they are merely historical information.

While the Commission requires database providers to exchange certain information daily,<sup>8</sup> it does not require databases to maintain perfect "harmonization" of their systems, as NAB implies.<sup>9</sup> A database provider must keep registration data for fixed devices that have contacted its database within the last three months, after which a registration is considered inactive.<sup>10</sup> Although inactive fixed device registrations are deleted by the database provider that originally received the registration, there is no requirement to harmonize deleted registrations.<sup>11</sup>

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<sup>7</sup> *Id.* at 12, n.26.

<sup>8</sup> 47 C.F.R. § 15.715(l).

<sup>9</sup> Petition at 12, n.26.

<sup>10</sup> *In the Matter of Unlicensed Operation in the TV Broadcast Bands, et al.*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd. 16807 ¶ 211 (2008) (Second Report and Order).

<sup>11</sup> Declaration of Andy Lee (Lee Decl.), Appendix A, ¶ 7.

Google has reviewed the differences across databases that NAB cites. As explained by Andy Lee, technical lead for Google's Spectrum Database program, iConnectiv's database contains 67 records not retained by either the Google database or the Spectrum Bridge database as of March 19, 2015.<sup>12</sup> Each of these records represents a fixed white space device registration originally submitted to Spectrum Bridge and appropriately shared with other database providers, including iConnectiv.<sup>13</sup> At some point, Spectrum Bridge deleted the registrations.<sup>14</sup> Google also deleted these stale records, but iConnectiv retained them.<sup>15</sup>

As noted, these variations in data retention policy have no effect on spectrum availability or interference protection.<sup>16</sup> For the database interoperability messages that *do* affect spectrum availability, such as wireless microphone reservations and multichannel video programming distributors' receive-site reservations, each database provider has verified that its systems exchange information properly and incorporate new information when received.<sup>17</sup> The FCC also tests these critical functions as part of its database certification process.<sup>18</sup> Nothing in NAB's petition suggests that this aspect of the database interoperability framework has failed to function effectively. As a result, the variations NAB

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<sup>12</sup> *Id.*

<sup>13</sup> *Id.* at ¶ 8.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.* at ¶ 9.

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

identifies—which are likely the result of differences in housekeeping policies among database providers—create no risk of harmful interference.

## **II. There Is No “Emergency” Warranting Suspension of Database Operations**

In addition to the request for a rulemaking on which Commission seeks comment, NAB asks for an emergency suspension of white space database operations.<sup>19</sup> The latter request is absurd, as NAB cannot point to a single broadcaster or television viewer harmed by the use of white space devices. Instead, NAB merely speculates that its members “will be harmed” in the future if the Commission’s rules are not modified.<sup>20</sup> Nor does NAB allege that any database provider has failed to fulfill its interference protection obligations in a manner consistent with the rules. Rather, NAB grudgingly concedes that broadcasters and viewers have experienced “minimal or no impact” as a result of alleged inconsistencies in database entries<sup>21</sup>—and even that is an overstatement, for there has been no harm at all.

At best, NAB has cobbled together inconsistencies that could be fixed by better housekeeping on the part of device manufacturers and additional clarification from the Commission regarding database record retention, none of which presents a danger of actual interference to broadcast operations. There is no emergency suggesting suspension of white space database operations.

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<sup>19</sup> See generally Petition.

<sup>20</sup> *Id.* at 1, n.2.

<sup>21</sup> *Id.* at 5.

### **III. By Requiring Professional Installation of Fixed Devices, the Commission's Rules Enhance Access to Broadband Services While Protecting Incumbent Users from Harmful Interference**

The Commission's rules accomplish both protection of incumbents and efficient spectrum utilization by treating fixed and personal/portable devices differently. In focusing primarily on the registration of fixed devices, NAB's petition fails to note that the Commission requires personal/portable devices to rely on an automated geolocation capability.<sup>22</sup> This approach makes sense for consumer devices that are likely to be sold on the mass market and operated in a variety of locations.

By contrast, the Commission permits fixed device users to rely on a professional installer to determine the geolocation coordinates of a fixed device that does not have automated geolocation capability.<sup>23</sup> This, too, is an entirely appropriate choice. Fixed devices are likely to be deployed by commercial network operators or in institutional or enterprise settings, not by mass market consumers. It is reasonable for the Commission to presume that these sophisticated operators are familiar with the FCC's rules for white space devices and have the necessary technical expertise to deploy them correctly.<sup>24</sup> Furthermore, commercial and institutional operators have more at stake if they are found to violate Commission rules.

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<sup>22</sup> 47 C.F.R. §15.711(b)(2).

<sup>23</sup> *Id.*

<sup>24</sup> See *In the Matter of Unlicensed Operation in the TV Broadcast Bands, et al.*, Third Memorandum Opinion and Order, 27 FCC Rcd. 3692 ¶ 52 (2012) (noting that consumers may "lack knowledge or experience in determining and entering a device's coordinates").

The fact that most databases require device operators to enter location information directly on the fixed white space device further limits the possibility of inadvertent interference. It would require willful wrongdoing to enter incorrect locations for large numbers of individual devices.<sup>25</sup> Although the NAB purports to fear “willful circumvention” of the rules,<sup>26</sup> it has provided no evidence of such misconduct, and indeed, it is extremely unlikely that installers with the requisite expertise and knowledge regarding FCC requirements would engage in willful violations, especially repeatedly, on a device-by-device basis.

The Commission struck a reasonable balance in recognizing that personal/portable devices ought to rely on automated geolocation capability while fixed devices can provide their location information through the services of a professional installer.<sup>27</sup> Nothing in NAB’s petition or in the Commission’s years of experience with the rules warrants a change in course.

#### **IV. The Commission Should Reject NAB’s Proposal To Impose Additional Requirements on Database Providers**

NAB’s proposal to impose additional requirements on database providers ignores the providers’ existing obligations, and NAB’s specific recommendations are misguided.

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<sup>25</sup> Lee Decl. ¶ 4.

<sup>26</sup> Petition at 11; *see also* Petition at 9 (suggesting device operators may have “deliberately falsified” records).

<sup>27</sup> Second Report and Order ¶ 8 (2008).

Database providers already are required to respond in a timely manner to complaints that their database contains inaccurate information.<sup>28</sup> The FCC also requires a provider to remove information from the database if it receives a request from the Commission in writing.<sup>29</sup>

Requiring database providers additionally to validate contact and location information for individual devices, as recommended by NAB, would be unwise and impractical. For fixed devices, contact information and location information are typically populated directly into the device, which then transmits this information to a database.<sup>30</sup> The database that first receives fixed device information also transmits that information to all other databases.<sup>31</sup> Both transmissions between devices and databases and transmissions among databases follow established, automated protocols.<sup>32</sup> This process reduces error because location information is populated contemporaneously in the field—where it is calculated—rather than at a centralized location before or after the installation. In many cases, moreover, the database provider may not even receive this information directly from the device; it will receive the location information from another database provider. Inserting a manual review process into this automated data flow would create new risks of delay and error.

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<sup>28</sup> 47 C.F.R. § 15.715(i).

<sup>29</sup> *Id.* § 15.713(i)(2).

<sup>30</sup> Lee Decl. ¶ 3.

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

Furthermore, NAB's suggestion that database providers should validate "the facial integrity of the data submitted" would introduce undesirable subjectivity.<sup>33</sup> Database providers are not well-positioned to make these determinations. Different reviewers could reach different conclusions regarding whether information is "facially" sound. Introducing human review into an automated process would also make it more difficult for database providers to offer their services at reasonable rates.<sup>34</sup>

For all these reasons, NAB's proposals to impose additional obligations on database providers should be rejected.

**V. Although NAB's Petition Lacks Merit, Google Supports Reasonable Process Improvements**

While NAB's specific proposals should be rejected, Google is working with other white space database providers and Commission staff to develop additional best practices regarding data validation and information exchange.<sup>35</sup> For example, Google is participating in discussions on uniform treatment of inactive device registrations.<sup>36</sup> There may also be automated processes that could improve the data quality of fixed device registrations, for instance requiring test devices to use specific IDs or serial numbers (like "WXYZ0000-TEST"), so that test registrations can be filtered automatically.<sup>37</sup> Consistent with its existing

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<sup>33</sup> Petition at 15.

<sup>34</sup> Lee Decl. ¶ 5.

<sup>35</sup> *Id.* ¶ 10.

<sup>36</sup> *Id.*

<sup>37</sup> *Id.*

obligations,<sup>38</sup> Google also stands ready to work with the Commission and others who raise concerns about specific entries in the Google database.<sup>39</sup>

## **VI. Unlicensed Devices in the Broadcast Bands Provide Consumer and Civic Benefits**

Revealing its continued hostility to the very idea of putting vacant television white spaces to productive use, NAB attacks users of white space devices as “anything but professional” and up to “mischief.”<sup>40</sup> The fact is that users of television white spaces are bringing consumer and civic benefits to communities across the United States. For example:

- In Thurman, New York, a public-private white space network delivers wireless broadband to residents who previously had to choose between using Wi-Fi in the parking lot of the town hall and subscribing to expensive satellite access plans.<sup>41</sup>
- Cal.net has been offering commercial wireless broadband service in California’s Gold Country for the last two years.<sup>42</sup>
- The town of Wilmington, North Carolina, uses white spaces to offer free Wi-Fi in some public spaces, as well as to manage a variety of smart city initiatives, including monitoring water quality and traffic conditions in real time.<sup>43</sup>

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<sup>38</sup> 47 C.F.R. §§ 15.715(i); 15.713(i)(2).

<sup>39</sup> Lee Decl. ¶ 11.

<sup>40</sup> Petition at 12, 17.

<sup>41</sup> Phillip Dampier, *Thurman, N.Y.’s Rural ‘White Space’ Wireless Network Debuts; Speed, Capacity Blows DSL and Satellite Away*, Stop the Cap, Mar. 31, 2015, <http://stopthecap.com/2015/03/31/thurman-n-y-s-rural-white-space-wireless-network-debuts-speed-capacity-blows-dsl-and-satellite-away/>.

<sup>42</sup> Press Release, *White Space Arrives in Gold Country*, Apr. 18, 2013, <http://www.carlsonwireless.com/press-releases/white-space-arrives-gold-country/>.

<sup>43</sup> *Whatever Happened To ... White Space Network Products, L.A.’s Gmail Contract, Fingerprint ID Program?*, Government Technology, Aug. 26, 2013, <http://www.govtech.com/health/Whatever-Happened-To--White-Space-Network-Products->

- The Gigabit Libraries Network is helping libraries within the United States and internationally test and install TV band equipment that will allow the libraries to extend the reach of their Internet connections into the surrounding community.<sup>44</sup>
- The Air.U consortium has been using white spaces to improve wireless broadband access in universities and their surrounding communities.<sup>45</sup>

These initiatives provide real benefits to Americans without causing harmful interference to television licensees. It is regrettable that NAB cannot bring itself to acknowledge public interest benefits from services other than broadcasting.

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LAs-Gmail-Contract-Fingerprint-ID-Program.html; Amar Toor, North Carolina launches FCC-approved TV White Space network in Wilmington, ENGADGET, Jan. 30, 2012, <http://www.engadget.com/2012/01/30/north-carolina-launches-fcc-approved-tv-white-space-network-in-w/>.

<sup>44</sup> WhiteSpace Pilot, Gigabit Libraries Network, <http://www.giglibraries.net/page-1712342> (last visited May. 1, 2015).

<sup>45</sup> *Nation's First Campus 'Super Wi-Fi' Network Launches at West Virginia University*, July 9, 2013, <http://wvutoday.wvu.edu/n/2013/07/09/nation-s-first-campus-super-wi-fi-network-launches-at-west-virginia-university#sthash.Kreio2ue.dpuf>.

**Conclusion**

Unlicensed access to television white spaces benefits consumers and communities without causing harmful interference to licensed users. While Google continuously seeks opportunities to improve database procedures, NAB's petition does not propose any necessary or even helpful change to the Commission's rules. The petition for a rulemaking should be dismissed.

Respectfully submitted,



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RM-11745

**DECLARATION OF ANDY LEE**

1. My name is Andy Lee. I am the technical lead for the Spectrum Database program at Google Inc. (Google). Before joining Google, I founded TV Fool LLC (TV Fool), an industry-leading website providing spectrum analysis tools and other resources for analyzing the strength and availability of over-the-air broadcast transmissions. Prior to TV Fool, I worked for several years on wireless issues for the digital television, cellular, GPS, consumer electronics, and aerospace industries. I have a B.S. degree in electrical engineering from the University of California, Los Angeles, and a M.S. degree in Computer Engineering from the University of Southern California.

2. I have reviewed the Emergency Motion for Suspension of Operations and Petition for Rulemaking (Petition) filed by the National Association of Broadcasters (NAB) in the above-captioned proceeding.

### **Collecting and Sharing Fixed Device Registrations**

3. Unlike portable TV white space devices, which rely on automatic geolocation and need not be registered with a white space database, fixed white space devices must be registered. Working together, manufacturers of fixed white space devices and database providers have developed an automated data-entry process to report the registered location for any fixed devices that do not rely on automated geolocation capability. In the data entry process, a professional installer typically enters location information directly into the white space device. The device then communicates the location information to one of the FCC's certified databases. Once the location is received by a database, that database provider shares the fixed device registration with all other certified databases. Information regarding new fixed device registrations must be shared by the database provider at least once per day. Communications between devices and databases and among databases take place over secure protocols.

4. Entering location information on the white space device itself minimizes the likelihood of incorrect location entries in at least two ways. First, it requires a professional installer to provide location information when installing the device at the relevant location, rather than allowing an installer to provide that information after the fact or from a different location. Second, on-site location entry makes it practically impossible to overwrite correct location information with incorrect information on a large scale. Implementing such a scheme would require obtaining access to installed fixed devices and laboriously reconfiguring them one-by-one.

### **Validating Fixed Device Registrations**

5. In its Petition, NAB suggests that database providers should be required to confirm the “facial integrity” of fixed device registrations.<sup>1</sup> If database providers were required to apply the “facial integrity” test to each individual registration of a fixed device, it would be difficult for database providers to offer their services at reasonable rates. Indeed, the costs of database provision would rise significantly as more and more devices use the database. The “facial integrity” test, moreover, would be a subjective standard that different database providers might apply differently, leading to inconsistencies across the full set of database entries.

### **Discrepancies Between Database Records**

6. NAB’s petition also notes some variations between the fixed device registrations present in the databases provided by iConnectiv, Google, and Spectrum Bridge.<sup>2</sup>

7. After NAB brought these differences to the Commission’s attention, Google conducted its own investigation of these entries. As of March 19, 2015, iConnectiv’s database contained 67 records not retained by either the Google database or the Spectrum Bridge database. Each of these records represented a fixed white space device registration originally submitted to Spectrum Bridge and appropriately shared with other database providers, including Google and iConnectiv.

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<sup>1</sup> National Association of Broadcasters, *Emergency Motion for Suspension of Operations and Petition for Rulemaking*, RM-11745, at 15 (filed Mar. 19, 2015) (Petition).

<sup>2</sup> *Id.* at 12, n.26.

8. Database providers are required to keep registration data for fixed devices that have been active within the last three months. Although inactive fixed device registrations are deleted by the database provider who originally received the registration, there is no requirement to harmonize deleted registrations. It appears that Spectrum Bridge deleted the registrations at issue after the three-month retention period. Google also deleted these records, but iConnectiv retained them.

9. These variations in data retention policy have no effect on spectrum availability or interference protection. For the database interoperability messages that *do* affect spectrum availability, such as wireless microphone and multichannel video programming receive-site reservations, each database provider has independently verified that its own systems exchange information properly and incorporate new information into its interference protection calculations. These critical functions are also tested by the FCC as part of its database certification process.

#### **Google's Efforts to Improve Data Quality**

10. Google nevertheless is working with the Commission and other database providers on process improvements to address NAB's observations. Responsive measures could include developing additional best practices regarding data validation and information exchange, and uniform procedures for the treatment of inactive device registrations. Similarly, additional automated processes could be considered to improve the data quality of fixed device registrations. These might include requiring all test devices

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to use specific IDs or serial numbers (for example, "WXYZ0000-TEST"), so that they can be automatically filtered when examining the fixed device registrations.

11. Google also stands ready to work with the Commission and others who raise concerns regarding specific entries in the database.

I, Andy Lee, declare under penalty of perjury that the foregoing declaration is true and correct. Executed on May 1, 2015.

A handwritten signature in black ink that reads "Andy Lee". The signature is written in a cursive style with a horizontal line underneath it.

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Andy Lee

**Certificate of Service**

I, Sybil Anne Strimbu, state that copies of the foregoing Opposition of Google Inc. were sent via first-class mail to the following:

Rick Kaplan  
Jerianne Timmerman  
Patrick McFadden  
Scott Goodwin  
National Association of Broadcasters  
1771 N Street NW  
Washington, DC 20036



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Sybil Anne Strimbu