

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

In the Matter of)	
)	
Proposals from Entities Seeking to Be Designated TV Band Device Database Managers)	DA 09-2479
)	
Unlicensed Operation in the TV Broadcast Bands)	ET Docket No. 04-186
)	

COMMENTS OF THE PUBLIC INTEREST SPECTRUM COALITION

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NEW AMERICA FOUNDATION,
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TABLE OF CONTENTS

INTRODUCTION AND SUMMARY	2
A. A Nonprofit Clearinghouse and Multiple, Competing, Retail Database Service Providers Would Best Serve Consumers and the Public Interest.....	4
1. Competition Among Multiple Retail Database Service Providers is Beneficial	4
2. The Commission Should Designate a Single Nonprofit Clearinghouse for Protected Entity and Registration Data, and That Clearinghouse Entity Should Include Consumer Representation.....	6
3. All Repository Data Should be Fully Transparent to the Public on an Open Online Interface.....	9
4. Protected Entity Eligibility and Interference Protection Algorithms Must be Provided by or Verified by the Commission and not Left to the Discretion of Database Operators	15
B. Database Providers Should Impose No Restrictions or Burdens on White Space Devices Beyond What is Explicitly Required by the Commission	17
C. The Commission Should Designate Database Managers Utilizing Business Models That Rely on One-Time Device Activation Fees Paid by Device Makers or Vendors, and Not on Per- Query or Subscription Fees Imposed on End-Users.....	18
D. The Commission Needs to Resolve Uncertainties that are Delaying the Development and Deployment of an Unlicensed TV Bands Ecosystem.....	21
CONCLUSION.....	22

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The Public Interest Spectrum Coalition¹ (“PISC”) respectfully submits the following comments on various proposals from entities seeking to be designated TV band device database managers. These entities submitted their proposals in the above-captioned docket in response to a *Public Notice*² from the Commission’s Office of Engineering and Technology (“OET”) calling for such proposals. PISC sets forth below general principles that should guide the Commission in its selection of an entity or entities that would manage the central repository for TV “white spaces” (or “TVWS”) data, as well as entities that would serve as query service providers³ managing the process for TV band devices to query that database.

¹ PISC consists, for purposes of the present submission, of the following organizations: Consumers Union, Media Access Project, New America Foundation, Public Knowledge, and U.S. PIRG.

² See “Office of Engineering and Technology Invites Proposals from Entities Seeking to be Designated TV Band Device Database Managers,” ET Docket No. 04-186, *Public Notice*, DA 09-2479 (rel. Nov. 25, 2009) (the “*Public Notice*”). The *Public Notice* required entities seeking to be designated database managers to file their proposals by January 4, 2010. It also set the initial due date for comments on such proposals as February 3, 2010. In response to an extension request from Maximum Service Television, Inc. (“MSTV”), OET subsequently moved the initial comment filing deadline to February 9, 2010. PISC timely files these comments today, based on weather-related federal agency and Commission closures that further extended the deadline for initial comments. See 47 C.F.R. § 1.4(e)(1).

³ See *Public Notice* at 2 (describing repository and query service functions within basic architecture of TV band database).

INTRODUCTION AND SUMMARY

As an initial matter, PISC applauds the Commission for moving straight to the submission of proposals from potential TVWS Database administrators – and for scheduling public input in response concerning the general principles that should govern Database architecture and the selection of particular entities to manage open public access to this new unlicensed band. In the comments that follow, PISC makes the following general recommendations:

First, PISC strongly supports what appears to be a consensus that the Commission should permit and encourage a number of competing Database managers to provide the “retail” (user-facing) query services and other value-added services. While competition in retail services should clearly benefit consumers, PISC believes that a single, non-commercial Clearinghouse should be designated as the sole point of aggregation for FCC licensing and registration data on Protected Entities and TV white space devices (“WSDs”). The Clearinghouse should provide an open architecture, utilizing a non-discriminatory and non-proprietary interface available to any database provider authorized by the Commission to provide white space database services, including but not limited to channel availability queries. All non-proprietary data should be fully transparent to participants and to the public. The Clearinghouse should be established and managed by a nonprofit association representing proponents of unlicensed uses of the TV white space. PISC strongly urges the Commission to require substantial representation by bona fide consumer groups (or their designees) on the governing board of this entity.

Second, we urge the Commission to require explicitly that any entity authorized as a Clearinghouse for Protected Entity and WSD registration must employ a database architecture

and business model sufficiently open and flexible to accommodate the addition of new frequency bands subject to different access rules if the Commission so determines in the future.

The designated Clearinghouse, or any other authorized TVWS Database provider, should be subject to an affirmative obligation to synchronize with any separate database of available frequency channels authorized by the Commission for shared access in the future.

Third, we urge the Commission to ensure that the Clearinghouse, or any other Database repository of Protected Entity and registrant information, is completely transparent to the public through a standardized, online interface. Any information that would be publicly accessible through FCC records should be publicly accessible through this open Internet portal to be provided by database managers. This critically important transparency obligation should require database managers to provide at least two levels of information and access: First, general public access, at no cost, to information regarding channel availability outputs on a discrete (address-level) geographic basis; and second, public access to the underlying input data on Protected Entities and other TV band registrants in the Clearinghouse (or other authorized repositories) for use in calculating the availability of a channel.

Fourth, PISC believes that the Commission must explicitly require any authorized Clearinghouse and/or Database provider to register and assign exclusive channel reservation to Protected Entities *only* upon verification against a list of licensees provided by the FCC itself. While it should be obvious that the Commission should not and cannot effectively delegate licensing authority to private sector Database operators, it is troubling that a few of the proposals appear to contemplate self-registration by certain Protected Entities without prior verification of an FCC license or registration number. Unverified self-registration by entities seeking exclusive

use of frequencies is an invitation to large-scale abuse that could undermine the accuracy and utility of the Database to enable authorized communication by WSDs.

Fifth, PISC would like to encourage the Commission to favor approaches that are as simple, transparent, and low-cost as possible, with no restrictions or burdens on White Space devices beyond what is explicitly required by the Commission's rules.

Finally, PISC observes that nearly all of the proposals recognize that the best business model would rely on revenue from a simple per device fee that is paid in bulk by the device manufacturer, or other vendor, and supplemented by fees for value-added services. The Commission should approve business models that are seamless for consumers and likely to keep transaction costs as low as possible. A one-time device activation fee assessed at the wholesale level on manufacturers or service providers (*e.g.*, an ISP or a VoIP application provider) would be efficient and virtually invisible to end-users, minimizing both transaction costs and potential confusion that could deter use of the band. PISC believes it would be appropriate and reasonable for the Commission initially to limit Database managers to one-time registration and/or activation fees, plus any other revenue from value-added services that evolve in the future.

A. A Nonprofit Clearinghouse and Multiple, Competing, Retail Database Service Providers Would Best Serve Consumers and the Public Interest

1. Competition Among Multiple Retail Database Service Providers is Beneficial

PISC believes the Commission should permit and encourage a number of competing managers to provide "retail," user-facing services that would allow TV band devices to query the TVWS Database. The Commission should not dictate any single database architecture or set of services that can be provided by these entities. Indeed, there appears to be a consensus among the database applicants that multiple solutions can and should coexist; and that database managers should be permitted to develop value-added services on top of the required query

service, through which query process TV band devices will receive a location-specific list of available “white space” channels. PISC agrees with this general consensus, and suggests that the Commission also provide an opportunity annually for new qualified applicants to apply in the future to be database managers.

Competing database providers at the retail level offer a number of significant potential benefits for consumers, including:

- *Innovation and differentiation.* Just as WiFi burst forth and evolved on unlicensed frequencies once thought to be “junk” bands, so too could TVWS technologies. It is too early to predict the full range of devices, applications, and services that will seek access to the unlicensed TV band channels. While one database provider may be optimized for mobile broadband or consumer broadband routing devices, another provider may specialize in serving more complex mesh networks, remote sensing networks, or other uses for low-power and unlicensed connectivity we can hardly imagine today. It is also easy to imagine innovation in value-added services, which will be encouraged by competition. For example, one database provider could enhance its service by not only providing a list of available channels, but by ranking channels offered and/or coordinating devices to enhance quality of service based on a variety of factors, including feedback from the devices themselves (*e.g.*, reporting back channel selection and/or sensing data on the radio environment at that location). This advantage will be magnified if and when additional “white space” frequency bands are added to the initial TVWS Database and/or to new shared-access databases modeled on the TVWS Database.
- *Choice and price discipline.* Device makers and operators will be better able to choose the service that fits their particular needs if given a choice of competitive offerings – and to switch away from providers that prove to have inadequate service or higher-than-justified fees. In addition to a choice among retail providers, manufacturers in the future may find it most cost-effective to operate their own specialized query service, an option that should be accommodated by the rules.

- *No chokepoints.* If the TV white space grows on a scale comparable to today's WiFi, tens of millions or more devices could be sending queries for available channels on a daily basis within three-to-five years. Assuming overall demand provides a market large enough to support multiple database providers, it would be prudent to avoid making the entire ecosystem dependent on a single point-of-failure and to instead let the market determine which providers are most effectively scaling to meet demand with quality service.

2. The Commission Should Designate a Single Nonprofit Clearinghouse for Protected Entity and Registration Data, and That Clearinghouse Entity Should Include Consumer Representation

Competition among multiple database query service providers appears to be the best way to promote the principles described in Part A.1 above. There remains, however, the problem of how to ensure accuracy and consistency among competing databases. There is a danger that even if competition emerges, as expected, if each and every database provider can separately register Protected Entities and flow that data automatically into the common repository, incumbent licensees might exert influence over database providers to the detriment of white space users.

PISC therefore supports those providers that have recommended the creation of a single, non-commercial clearinghouse as the sole point of aggregation for FCC licensing and registration data on Protected Entities and TV white space devices ("WSDs"). PISC recognizes that other proposals might equally serve the purposes of promoting transparency and minimizing the risk from some entities leveraging the database to their own ends. At this time, however, it would appear that the best way to achieve these goals is through a single Clearinghouse structured to include consumer representation and subject to FCC supervision.

This Clearinghouse, operating under FCC supervision, should be the sole source of raw data for channel occupancy and device registration/certification, should operate on a near a real-time basis, and should have as its sole purpose the dissemination of this data to the multiple

TVWS database service providers discussed above. The Clearinghouse entity should not be permitted to offer retail channel query or other value-added database services that would compete, or otherwise cause potential conflicts of interest, with the other retail database providers it serves.

PISC believes that a single data repository managed by a nonprofit association with consumer representation, and subject to close monitoring by the Commission, is the most likely to be cost-effective for consumers. More critically, a unified repository under close FCC supervision is more likely to ensure the consistency and integrity of Protected Entity and WSD user registrant data, as well as the best-placed entity to ensure proper application of rules and algorithms used to calculate interference protection constraints on public access. A single Clearinghouse also seems best able to evolve over time into a real-time data repository, as it would be unburdened by the extra costs, risks, and latency potential inherent in synchronizing repository data among what could and should be a significant and expanding number of different retail database providers. Achieving a real-time (or nearly real-time) repository of Protected Entity and user registration data could also facilitate the future listing of other under-utilized bands – including bands unused or under-used as measured by frequency, location, time, or power level in other parts of the spectrum – thereby greatly enhancing the availability and efficient use of the nation’s spectrum resources.⁴

⁴ See Michael Calabrese, “The End of Spectrum ‘Scarcity’: Building on the TV Bands Database to Access Unused Public Airwaves,” New America Foundation, Wireless Future Program Working Paper #25 (June 2009); Reply Comments of the Public Interest Spectrum Coalition, *In the Matter of Fostering Innovation and Investment in the Wireless Communications Market*, GN Docket Nos. 09-157 and 09-51, at 22-32 (filed Nov. 5, 2009) (“PISC Spectrum NOI Reply Comments”); see also Kevin Werbach, “DNS in the Air,” available at http://werbach.com/docs/DNS_in_the_air.pdf (last visited Feb. 10, 2010); Kevin Werbach, “The Addressing System for the Next (Wireless) Internet,” CircleID (May 21, 2009), at http://www.circleid.com/posts/20090521_addressing_system_for_next_wireless_internet/.

On this issue, PISC generally endorses the position set forth in the proposals filed by Google Inc. and Comsearch.⁵ The Clearinghouse should provide an open architecture, utilizing a non-discriminatory and non-proprietary interface available to any database provider authorized by the Commission to provide white space database services, including but not limited to channel availability queries. All non-proprietary data should be fully transparent to participants and to the public. The Clearinghouse should be established and managed by a nonprofit association representing proponents of unlicensed uses of the TV white space. This would follow the precedent of existing spectrum database management entities designated by the Commission, such as the American Society of Healthcare Engineering (which manages the Wireless Medical Telemetry Service) and the North American Portability Management LLC.

In recognition of the fact that this Clearinghouse would manage access to *unlicensed* spectrum for direct access by consumers using off-the-shelf WiFi-type devices, PISC strongly urges the Commission to require substantial representation by bona fide consumer groups (or their designees) on the governing board of this entity. This representation should not be token, but constitute at least 25 percent of the board or other group designated to both oversee and make policy decisions concerning the management of and fees levied by the Clearinghouse. Moreover, if (as PISC has previously advocated)⁶ the Commission were to add additional “white space” from other unused and underutilized bands to the Clearinghouse database in the future, it would be important for consumers to have a voice in decisions concerning the evolution of the repository to enhance consumer welfare.

⁵ Proposal by Google Inc. to provide a TV Band Device Database Management Solution, ET Docket No. 04-186, at 16-17 (filed Jan. 4, 2010) (“Google Proposal”); Comsearch Proposal to be Designated as a TV Band Device Database Manager, ET Docket No. 04-186, at 42-52 (filed Jan. 4, 2010) (“Comsearch Proposal”).

⁶ See PISC NOI Spectrum Reply Comments at 22-32; Calabrese, “The End of Spectrum ‘Scarcity’,” *supra* note 4.

In addition, PISC recommends that the Commission make several other obligations explicit conditions in the authorizing agreement with the Clearinghouse entity or any Database service provider that will act as a repository for licensing data:

First, PISC urges the Commission to require explicitly that any entity authorized as a Clearinghouse for Protected Entity and WSD registration must employ a database architecture and business model sufficiently open and flexible to accommodate the addition of new frequency bands subject to different access rules if the Commission so determines in the future.

Second, the designated Clearinghouse, or any other authorized TVWS Database provider, should also be subject to an affirmative obligation to synchronize with any separate database of available frequency channels authorized by the Commission for shared access in the future.

Third, the Commission should require the Clearinghouse provider(s) to conduct periodic updating and re-verification of all Protected Entity data, in order to ensure that no frequency channels are reserved for an entity no longer eligible or in operation.

Finally, if the Commission designates a single Clearinghouse entity, the Commission should ensure continuity of operations by affirmatively requiring that Clearinghouse to transfer all of its assets and information back to the Commission in the case of bankruptcy or a change in control of the designated database manager.

3. All Repository Data Should be Fully Transparent to the Public on an Open Online Interface

The Commission also should adopt a requirement that the data repository Clearinghouse and/or any designated Database managers must provide or facilitate “a simple Web based interface that lets the public view the availability of white space for a location that they input,”⁷

⁷ Spectrum Bridge response to PN DA-09-2479: Proposals for Designated TV Band Database Manager, ET Docket No. 04-186, at 12 (filed Jan. 4, 2010) (“Spectrum Bridge Proposal”).

as well as access to all of the underlying data (on a read-only basis) – particularly the information on Protected Entities and other registrants. Any information that would be publicly accessible through FCC records should be publicly accessible through this open Internet portal to be provided by database managers. The only possible exception is personal contact information or other proprietary business data that would not be publicly accessible under FCC rules because such data is sensitive, or due to personal privacy concerns.

Generally, fulfilling this critically important transparency obligation should require database managers to provide at least two levels of information and access: First, general public access, at no cost, to information regarding channel availability outputs on a discrete (address-level) geographic basis; and second, public access to the underlying input data on Protected Entities and other TV band registrants in the Clearinghouse (or other authorized repositories) for use in calculating the availability of a channel.

As an example of the first level of transparency, Spectrum Bridge offers a link to its prototype at www.showmywhitespace.com that returns what Spectrum Bridge believes are available channels at any specific street address and zip code typed into its database. PISC recognizes that the list of channels displayed on this public access interface could not be relied upon by certified TV band devices, which themselves will need to be authenticated by a query service provider before such devices can transmit based on a real-time channel list.

Nevertheless, this level of transparency to the general public is important for several reasons. First, it helps to inform consumers and firms in advance about the relative availability of spectrum on a geographic basis for devices or services, both before and after purchase. Second, it provides information to facilitate accountability both for consumers who find they are denied access to apparently vacant channels and for Protected Entities that experience unexplained

interference. Finally, unlike in other frequency bands, without this feature there would be no public disclosure of how much TV band spectrum in each local market is actually available to the public and how much the Commission has effectively reserved for exclusive, licensed use. The full disclosure of what is in practice spectrum assignment information becomes particularly salient in the context of the geographically granular Radio Spectrum Inventory Act bills currently pending in Congress.⁸ If the Commission does not require the authorized repositories of white spaces data to provide this functionality at no cost to the public, then the Commission should create its own web portal to provide easy public access to such information.

A second, equally important level of public disclosure is necessary for data that functionally serves as “licensing information” that qualifies Protected Entities to reserve access to TV band channels. The Clearinghouse or other repositories will aggregate this information and database providers will use it to generate the list of channels accessible for public access in each locality. Of course, as the various Database proposals acknowledge, most of this data will be imported, aggregated, and updated continuously from already public FCC databases, which include the FCC’s Universal Licensing System database and the FCC’s Consolidated Database System.⁹ Most critically, TVWS database managers must be required to disclose to the public the registration and location information of Protected Entities “that are licensed by [the] FCC but are not available in the FCC databases via a web portal.”¹⁰ According to Spectrum Bridge and several other Database applicants, these include:

- Low Power TV stations and TV translators

⁸ See Radio Spectrum Inventory Act, S. 649, 111th Cong.; Radio Spectrum Inventory Act, H.R. 3125, 111th Cong.

⁹ For a sample list of existing FCC primary data sources that a Clearinghouse and/or Database service providers would aggregate and update, see, for example, Spectrum Bridge Proposal at 11-12.

¹⁰ White Spaces Proposal by KB Enterprises LLC and LS Telcom, ET Docket No. 04-186, at 14 (filed Jan. 4, 2010) (“KB/LS Proposal”).

- Cable TV headends outside the protection area of the related TV site
- Temporary Broadcast Auxiliary Devices (BAS)
- Low Power Auxiliary Devices such as portable microphones¹¹

Regardless of whether all Protected Entity licensing-related information is available on an automated basis from FCC databases via a web portal, we believe that any data that serves as an input to determine the availability of frequency assignments should be readily accessible through a public web interface, albeit on a read-only basis to protect the integrity of the data repository. All information that is (or would be) publicly accessible in FCC records should be displayed.

For example, all Low Power Auxiliary Devices (viz., wireless microphones) that are eligible for protection in a TV bands database operate under Part 74 licenses that can be verified by the Database provider through the Commission's ULS database. Just as ULS currently reveals the licensee, the licensee's contact information, permitted frequency, permitted locations, permitted power level, and other relevant information to the general public, the data repository of the Clearinghouse (or any other authorized data repository maintained by an authorized Database provider) should display this same licensing information in relation to a channel or frequency by discrete geographic area. All wireless microphone operators that are eligible for registration in the Database have filed detailed Part 74 licensing records that are already publicly-accessible through the ULS system.¹²

In addition, similar information that is a result of the FCC rules governing access to the TV band should also be transparent to the public. For example, when Part 74 licensees reserve

¹¹ *Id.*; see also *Public Notice* at 1 n.4.

¹² The Commission's ULS database discloses detailed licensing information for Part 74 licensees, and includes search functionality. The informed public can readily determine, for example, that the National Football League has a Broadcast Auxiliary Low Power license (BLPO1517) renewed in 2007 (for eight years) that authorizes mobile use of 44 units nationwide at power levels up to 250 mWatts on frequencies between 494 and 806 MHz (except 609 to 614 MHz). There is also contact information for the licensee, including a contact name, address and phone. See <http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=1101926>.

particular channels for scheduled, exclusive use at qualifying venues, the time and place of these licensing reservations should be accessible to the public.

The disclosure of licensing-related information for Protected Entities (as well as for fixed wireless devices required to register with the eventual TVWS Database) will have the same beneficial purposes described above with respect to full disclosure of channel availability output data. In addition, PISC believes that the Commission should ensure that this data, although made available in read-only format, nonetheless will be presented in a format that can be readily downloaded. Facilitating ease of use of this data by academic researchers and others will allow such trusted sources to inform the public and the policy process, as these researchers analyze topics such as white space occupancy and availability by place and time.

It is important that the Commission make this requirement explicit in its authorizations for and agreements with the Clearinghouse and/or other designated Database managers, since several of the proposals contained vague language evidencing an intent to make at least certain licensing information inaccessible to the public. For example, Spectrum Bridge states that its public access interface “does not and will not display private data of any kind.”¹³ Spectrum Bridge does not specify the scope of “private data” it intends to exclude from the interface, but this is troubling because any required disclosure to the repository by Protected Entities would involve only the provision of the same licensee information already made publicly accessible in FCC records.

Telcordia Technologies states that its “Public Access Service” will disclose only “appropriate information” and offers “wireless microphone registration IDs” as an example of

¹³ Spectrum Bridge Proposal at 12.

information that “may be kept confidential.”¹⁴ However, as noted above, the “registration IDs” of licensed wireless microphone operators are already publicly available through ULS – and PISC believes there is no reason to make this same information (or any information in ULS) inaccessible through the public access interface for any TVWS database.

Key Bridge Global proposes an elaborate data encryption solution because “[v]oluntary registration data submitted to the TV band database is considered commercially sensitive or proprietary.”¹⁵ This assertion is false, and the Commission’s acceptance of it would impose an unnecessary cost on consumers, at least with respect to incumbent services seeking exclusive channel access as Protected Entities. Once again, there appears to be no relevant data that a Protected Entity should be required to disclose to a Database manager that is any more “sensitive” or “proprietary” than the very detailed information in licensing records typically available to the general public through the ULS system and other FCC public records.

Finally, Comsearch does not propose a public interface, but would “[p]rovide a secure web-based interface to allow the FCC access to protected entity and registration data stored in the database.”¹⁶ Of course, from the public interest perspective, full transparency could still be achieved under this scenario if the Commission opened this interface as a portal accessible to the public on the FCC website. Indeed, public access through a portal on the FCC website would tend to enhance the visibility of the disclosure. What’s most critical is that any entity designated to operate as the data repository be required to affirmatively facilitate full public access through an open Internet portal in a manner determined by the FCC.

¹⁴ Comments of Telcordia Technologies; Proposal Seeking to be Designated as a TV Band Device Database Manager, ET Docket No. 04-186, at 17 (filed Jan, 4, 2010) (“Telcordia Proposal”).

¹⁵ Key Bridge Proposal to Administer a TV Bands Database, ET Docket No. 04-186, at 157 (filed Jan, 4, 2010) (“Key Bridge Proposal”).

¹⁶ Comsearch Proposal at 30.

4. Protected Entity Eligibility and Interference Protection Algorithms Must be Provided by or Verified by the Commission and not Left to the Discretion of Database Operators

A related issue concerns the discretion that the Commission will delegate to a designated Clearinghouse and/or Database service providers to determine the eligibility of entities for registration and protection through the Database. PISC respectfully submits that the obvious answer to this question should be “absolutely no discretion at all.” PISC believes that the Commission must explicitly require any authorized Clearinghouse and/or Database provider to register and assign exclusive channel reservation to Protected Entities *only* upon verification against a list of licensees provided by the FCC itself.

The proposal by KB Enterprises and LS Telcom suggests one possible mechanism “to prevent abuse in filing and ensure that all devices are accurately represented in the database.”¹⁷ It proposes that the Commission require BAS, cable headends, or any other operators eligible for protection via the Database “to first obtain an FCC registration number (FRN) through CORES before registering with the TV band database.”¹⁸ We concur with KB/LS that “[r]equiring an FRN when [registering] would help to prevent large-scale spamming that could negatively impact the database accuracy and performance.”¹⁹ For example, cable headends are cited in most of the proposals as examples of “unlicensed” Protected Entities for which information is not available through an FCC interface. However, the Media Bureau maintains the Cable Operations and Licensing System (“COALS”);²⁰ and if what the Media Bureau determines to be headends eligible for Protected Entity status are not already verifiable via COALS, they should be.

¹⁷ KB/LS Proposal at 31.

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ FCC Media Bureau Cable Operations and Licensing System (COALS): <http://fjallfoss.fcc.gov/csb/coals/index.html>.

While it might seem obvious that the Commission should not and cannot effectively delegate licensing authority to private sector Database operators, it is troubling that a few of the proposals appear to contemplate such discretion. The most egregious example is the proposal from Key Bridge Global LLC. In a section detailing its proposed registration and protection procedures for low power auxiliary services, including wireless microphones, Key Bridge asserts that “[p]resently there are no restrictions on enrollment. . . . The Key Bridge web portal solution is convenient and easily accommodates small or fixed installations like churches, high schools and theaters.”²¹ However, there are few if any institutions of this type that are licensed and therefore eligible to register as a Protected Entity.

It is extremely troubling that Key Bridge not only misinterprets the Commission’s Part 15 rules, but also proposes a “trust me” self-registration system for wireless microphones that does not mention the need to verify the registrant’s licensing status against FCC records. Unverified self-registration by entities seeking exclusive use of frequencies through Protected Entity status is an invitation to large-scale abuse that could undermine the accuracy and utility of the Database to enable authorized communication by WSDs.

The proposal by Comsearch frankly acknowledges that it perceives ambiguity in the rules that may result in Database administrators arbitrating the eligibility of wireless microphones as Protected Entities:

Broadening the registration eligibility aperture [for wireless microphones] leaves open the question of who is eligible, **which may fall to database administrators to determine**. In addition, the definition of “significant wireless microphone use” under a broadened eligibility definition would not seem to limit much who is eligible for registration in the database. . . . Comsearch has spoken with several members of the

²¹ Key Bridge Proposal at 89.

wireless microphone community and understands the number of active wireless microphones to be between 700,000 and 1 million.²²

The Comsearch proposal is also troubling, however, because it suggests the creation of a secure web-based interface where “[n]on-FCC registered protected entities will be able to search, *modify* and view their registration records.”²³ There should be no such thing as a “non-FCC registered protected entity” that is given direct access to register itself in the Database, or to modify information used to calculate the reservation of exclusive channel access, without prior verification of its licensing status by the Commission.

In sum, PISC urges the Commission to clarify that no entity can be registered as a Protected Entity and granted exclusive use of spectrum frequencies without prior and periodic verification of the entity’s licensed status by the FCC itself.

B. Database Providers Should Impose No Restrictions or Burdens on White Space Devices Beyond What is Explicitly Required by the Commission

A review of the nine proposals from potential Database managers suggests considerable differences in the degree of complexity and in the layers of “security” among the solutions presented. While it is easy to become enamored with impressive-looking but over-engineered solutions, PISC would like to encourage the Commission to favor approaches that are as simple, transparent, and low-cost as possible. For example, the Key Bridge Global proposal appears to add unnecessary layers of “verification” and “security” that could add costs, delays and points of failure. For example, Key Bridge proposes that when a TV bands device queries for available channels, its Database would query in turn the FCC’s Equipment Authorization System (“EAS”)

²² Comsearch Proposal at 20 & n.26 (emphasis added) (citing to FCC decisions that Comsearch characterizes as “quite inclusive”).

²³ *Id.* at 32 (emphasis added).

database to “[v]alidate that the device is certified to transmit in TV bands frequencies.”²⁴ It is not clear if Key Bridge intends this as a one-time verification upon device activation and initial channel query, or whether this verification process would repeat periodically. In either case, it would seem sufficient for the Database manager to verify the Grantee Code assigned to the manufacturer by the FCC when the FCC certifies the equipment for sale to the public. At that point the manufacturer (or other vendor) can enroll the FCC IDs (Grantee Code plus product code) for all devices that it expects to query the Database – and the Database can rely on this set of FCC IDs to authenticate a device without an additional external verification process.

Key Bridge also claims that “[r]egistration is a prerequisite for unlicensed operation of Fixed or Mode-II TV band devices and for the protection of services not in the FCC’s databases,”²⁵ which is simply not true. Consumers using personal/portable devices operating at very low power and on channels determined based on a query to the Database do not need to register with the Database, nor do Mode II devices “require a direct commercial account between the TVBD user and Key Bridge.”²⁶ As explained below, the Commission should not approve a business model premised on imposing registration and subscription fees on end-users – at least not for the basic query service mandated by the Commission – and should instead favor proposals that are simple, low-cost and seamless to consumers.

C. The Commission Should Designate Database Managers Utilizing Business Models That Rely on One-Time Device Activation Fees Paid by Device Makers or Vendors, and Not on Per-Query or Subscription Fees Imposed on End-Users

PISC is pleased that nearly all of the proposals from potential Database managers recognize that the best business model would rely on revenue from “a simple, per device fee that

²⁴ Key Bridge Proposal at 79-81.

²⁵ *Id.* at 95.

²⁶ *Id.*

is paid by the device manufacturer” and supplemented by fees for value-added services.²⁷ The Commission should approve business models that are seamless for consumers and likely to keep transaction costs as low as possible. A one-time device activation fee assessed at the wholesale level on manufacturers or service providers (*e.g.*, an ISP or a VoIP application provider) would be efficient and virtually invisible to end-users, minimizing both transaction costs and potential confusion that could deter use of the band. Comsearch suggests a two-step process for charging device manufacturers that appears to satisfy this criteria. Comsearch suggests that manufacturers be charged in bulk for “device reservation” (loading device-specific information into the database so that it can instantly recognize a device upon sale and activation) and for “location registration” when the device is first put into operation and queries available channels.²⁸

If the Commission decides to authorize a Clearinghouse to serve as a single point of contact for Protected Entity and device registration data, then it should require that any fees be imposed only on Database service providers and device registrants, not on device end-users. If the Commission decides to authorize a number of competing Database providers, it could offer more flexibility with respect to how revenues may be collected. Presumably, any competing Database service providers that offer unappealing fee structures will attract fewer customers. Nevertheless, even with competition, we believe the Commission should consider prohibiting per-query fees or recurring subscriptions for query services that would be charged directly to device end-users. As Google stated in its proposal, per-query fees “burden the user and would discourage database use.”²⁹ And while there should be an option for individual consumers to

²⁷ Spectrum Bridge Proposal at 7. *Accord*, Telcordia Proposal at 9 (“The revenues in Telcordia’s business plan will be derived from a onetime fee for each device registration and may also include separate charges for added value services.”); Comsearch Proposal at 26 (“A one-time fee can be assessed either during the Device Registration or Location Registration steps.”); Google Proposal, at 13 (“Google does not plan to implement per-query fees, which burden the user and would discourage database use.”).

²⁸ Comsearch Proposal at 25-26.

²⁹ Google Proposal at 13.

register a device and access Database query services, PISC agrees with Google that “it probably would be more reasonable to adopt something akin to a per-unit device registration fee” rather than per-query or recurring subscription fees.³⁰

The KB/LS Proposal, by contrast, posits an example of an inefficient and undesirable revenue model. KB/LS propose “to charge TV band devices a fee for initial registration with the database with the option of annual or bi-annual renewal fees.”³¹ Although KB/LS suggest that manufacturers could pre-register devices in bulk, the notion of treating query services as a subscription that must be renewed annually (or bi-annually) is not only potentially burdensome on consumers, but it also imposes a back-door registration requirement on individual end-users of personal/portable WSDs that the Commission specifically chose not to impose. KB/LS would need to know the identity, address, and credit card information of any user of off-the-shelf consumer devices to implement its proposal. The Commission should reject this overly burdensome end-user registration fee model.

Considering the large and increasing projected volume of WSD unit shipments expected by at least some of the applicants, based on historic growth in WiFi/802.11 technology – for example, Spectrum Bridge projects unit shipments reaching 150 million within five years³² – PISC believes it would be appropriate and reasonable for the Commission initially to limit Database managers to one-time registration and/or activation fees, plus any other revenue from value-added services that evolve in the future.

³⁰ *Id.*

³¹ KB/LS Proposal at 11.

³² Spectrum Bridge Proposal at 7.

D. The Commission Needs to Resolve Uncertainties that are Delaying the Development and Deployment of an Unlicensed TV Bands Ecosystem

Finally, PISC would like to endorse and reiterate the observation expressed in the Comsearch proposal “that there are numerous uncertainties”³³ surrounding the rules that will ultimately govern unlicensed access to the TV band white spaces for broadband services and innovation. These uncertainties make it difficult for aspiring Database administrators to develop a definitive approach to the Database architecture and business model. More critically, these uncertainties continue to delay the R&D, marketing and deployment of TV band WSDs and services to consumers. Each month the TV band lies fallow for lack of decisive forward progress at the FCC is a dead weight loss for consumers and the American economy.

As Comsearch states, these uncertainties include resolution of the very substantial issues raised a year ago in the Petitions for Reconsideration. Some of these issues – such as whether devices can rely on permission to transmit from an authorized Database, or must also rely on sensing – will determine whether there is much of a market at all for unlicensed devices in the TV band white spaces. The same holds for the recent FNPRM concerning the status of the 700,000 to 1 million wireless microphones that have been operating illegally on TV band frequencies. There is also the long-deferred Notice of Inquiry that will examine the feasibility of permitting variable power and higher-power operation of WSDs, particularly in rural areas, where there are multiple consecutive vacant channels available. Layered over these interactive pieces of the regulatory puzzle that will determine whether the TVWS will indeed enable “WiFi on steroids” is the possibility that the National Broadband Plan will cloud the long-term viability of the TV band as an open, shared platform for unlicensed device innovation.

³³ Comsearch Proposal at 18.

PISC respectfully requests the Commission to move all of these outstanding regulatory issues – particularly the Database architecture, the Petitions for Reconsideration, and the status of unlicensed wireless microphones – on an expedited and synchronized time frame. While we understand that the Commission and especially OET have been burdened by a plethora of complex issues and special projects over the past year, we nevertheless request that a timely and decisive resolution of the remaining issues delaying the deployment of broadband services in the TV white spaces be elevated to priority status over the next several months.

CONCLUSION

The development of new cognitive radio technologies and services to take advantage of shared, unlicensed access to the TV White Spaces is likely to open the door to a new wave of innovation and enhanced consumer welfare. The Database access system selected and delegated by the Commission has the added potential to be a prototype for identifying and opening access to a far larger number of underutilized frequency bands outside of the TV bands, facilitating an ecosystem of dynamic spectrum access that could greatly expand available capacity and efficiency. We urge the Commission to keep this larger potential in mind as it sets the rules and delegates management of database access to this initial set of vacant channels in the TV band. We look forward in assisting the Commission as it moves forward with this important initiative.

Respectfully Submitted,

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