

**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
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COMMENTS OF WSDB, LLC

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Executive Summary

WSdb, LLC (“WSdb”) submits these comments (“Comments”) in response to the proposals submitted to the Office of Engineering and Technology (“OET”) of the Federal Communications Commission (“FCC” or “Commission”) from entities seeking to be designated as television band device (“TVBD”) database managers. These Comments address the following issues:

- As generally agreed by the applicants, OET should select multiple entities to serve as TVBD database managers, encourage such entities to use open standards in their systems designs, and refrain from requiring a particular type of database architecture. This will facilitate competition, which will, in turn, encourage efficiency, reliability, and speed of database services as well as competitive pricing for database services. Importantly, given the nascent market for TVBDs and database services, it is critical that database administrators be permitted to modify their system architectures as appropriate in response to changes in technologies, and not to be burdened by architectural requirements mandated by the FCC or a white spaces clearinghouse.
- WSdb urges OET to reject the clearinghouse model proposed by certain of the applicants. Not only does the clearinghouse approach lack widespread support among applicants, it also would inhibit competition among administrators and would vest in a third party the discretion to make critical decisions regarding the selection and management of white spaces service providers. In addition, the clearinghouse model likely would impose additional costs on database administrators and thus is likely to have a particularly harsh impact on smaller database administrators in their ability to develop sustainable, competitive businesses.
- WSdb notes that the vast majority of the applicants appear to have failed to describe clearly the level of security they will provide, especially with respect to device authentication. By contrast, WSdb’s proposal sets forth a robust security solution, which includes clearly-defined criteria for device authentication. These criteria include, *inter alia*, a process to authenticate the FCC IDs and serial numbers submitted to WSdb’s database by TVBDs by checking such information against the FCC’s equipment authorization database.

WSdb appreciates the opportunity to provide these Comments and to be considered as a potential provider of database administration services in this proceeding and urges the FCC to select it as one of multiple database administrators. In this regard, WSdb notes that it is an independent company, which was created for the specific purpose of developing a database system that would comply with all FCC rules to protect incumbents and serve channel lists on a non-discriminatory basis.

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COMMENTS OF WSDB, LLC

WSdb, LLC (“WSdb”), by its attorneys, respectively submits these comments (“Comments”) in the above-captioned proceeding in which the Office of Engineering and Technology (“OET”) of the Federal Communications Commission (“FCC” or “Commission”) is considering proposals from entities seeking to be designated as television band device (“TVBD”) database managers.¹ As explained herein, there is broad consensus among the applicants that OET should select multiple entities to serve as TVBD database managers and should encourage such entities to use open standards in their systems designs. Applicants also generally agree that TVBD database administrators should have discretion to design their database architectures in any manner that complies with FCC requirements. Notwithstanding these common themes

¹ 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 (rel. November 25, 2009 (“Public Notice”).

among the proposals submitted to OET, certain applicants propose a clearinghouse approach pursuant to which database functionality would be split among a single white spaces clearinghouse (“WSCH”) and several white spaces service providers (“WSSPs”), which would contract with the WSCH. WSdb urges OET to reject the proposed clearinghouse model. Not only does the clearinghouse approach lack widespread support among applicants, it also would inhibit competition among administrators and would vest in a third party the discretion to make critical decisions regarding the selection and management of WSSPs. Finally, WSdb notes that the vast majority of the applicants appear to have failed to describe clearly the level of security they will provide, especially with respect to device authentication. By contrast, WSdb’s proposal sets forth a robust security solution, which includes clearly-defined criteria for device authentication.

I. THERE IS BROAD CONSENSUS AMONG APPLICANTS THAT OET SHOULD SELECT MULTIPLE ENTITIES TO SERVE AS DATABASE PROVIDERS AND ALLOW ANY DATABASE ARCHITECTURE THAT COMPLIES WITH FCC REQUIREMENTS

The applicants in this proceeding generally agree that OET should authorize multiple entities to administer white spaces devices.² Indeed, no proposal advocates for the selection of a single database administrator.³ The selection of multiple database administrators will ensure competition, which will, in turn, encourage efficiency, reliability, and speed of database services

² See, e.g., Proposal of Telcordia Technologies, Inc. at page 4 (“Telcordia will provide a complete solution as one of multiple TV Band Device Database Managers”); Proposal of Google, Inc. at page 2 (stating that the FCC should avoid “limiting the number of database providers”); Proposal of Frequency Finder, Inc. at page 1 (“permitting multiple parties will achieve the greatest efficiency in development and economy”)

³ NeuStar, Inc. (“Neustar”) contends that the FCC should select a single entity to serve as a data repository in the clearinghouse model but nevertheless agrees that multiple entities should be permitted to provide database services as WSSPs. See Proposal of NeuStar, Inc. at 7. See also *supra* at Section II (discussing shortcomings of clearinghouse approach).

as well as competitive pricing for database services. Thus, WSdb agrees with other applicants that the TVBD market will be best served by the selection of multiple TVBD database administrators.

The applicants also agree that OET should not mandate a single architecture for TVBD databases,⁴ and that such databases should utilize open standards.⁵ In particular, OET should provide database administrators with flexibility to design their systems in any manner that complies with FCC requirements because “the best way for the Commission to encourage innovation is to allow each provider to choose the [architecture or] technology which best suits its business objectives.”⁶ This is especially important given the nascent market for TVBDs, where technologies are certain to evolve over time.⁷ It is critical that database administrators be permitted to modify their system architectures as appropriate in response to such changes in technologies, and not to be burdened by architectural requirements mandated by the FCC or a WSCH.

⁴ See, e.g., Proposal of Spectrum Bridge, Inc. at page 4 (the FCC “should not specify the underlying architecture or technology used to provide the solution”).

⁵ See, e.g., Proposal of Spectrum Bridge, Inc. at page 5 (stating that Spectrum Bridge will work to “create open and sustainable functions and protocols”). WSdb believes that use of open communication protocols and data formats will enable the efficient sharing of information regarding incumbent spectrum users in accordance with FCC requirements. The use of open standards are necessary to ensure portability of devices from one database administrator to another, and thus support roaming and encouraging the development of open networks. Although WSdb believes that open standards are essential to enable communications among multiple database administrators as well as between database administrators and TVBDs, the specific methods a database administrator develops to calculate white spaces and determine available channels should remain proprietary. This will enable database administrators to compete to develop systems that reduce channel query response times.

⁶ Proposal of Spectrum Bridge, Inc. at page 4.

⁷ See Proposal of Spectrum Bridge, Inc. at page 4.

II. THE CLEARINGHOUSE APPROACH PROPOSED BY CERTAIN APPLICANTS DOES NOT HAVE WIDESPREAD SUPPORT, WILL INHIBIT COMPETITION AND WOULD VEST IN A THIRD PARTY THE DISCRETION TO MAKE CRITICAL DECISIONS REGARDING THE SELECTION AND MANAGEMENT OF WSSPs

NeuStar, Inc. (“Neustar”), Google, Inc. (“Google”), and Comsearch have proposed that the FCC allow the implementation of a clearinghouse model, whereby a single entity would act as data repository and manage reference codes for interference calculations.⁸ In this model, authorized database administrators would access the clearinghouse for such information.⁹ As an initial matter, notwithstanding the assertion that there is widespread industry support for a clearinghouse model,¹⁰ the majority of applicants do not, in fact, advocate for such a model. Rather, the majority of the applicants propose to implement end-to-end database solutions that will include data repositories and channel list serving functions.¹¹ Indeed, even Google and Comsearch propose to implement such end-to-end solutions, and present the clearinghouse model as “an alternative approach” to database management.¹²

⁸ See Proposal of NeuStar, Inc. at 7-9; Proposal of Google, Inc. at 14-17; Proposal of Comsearch at 42-53.

⁹ *Id.*

¹⁰ See, e.g., Proposal of NeuStar, Inc. at 7.

¹¹ See Proposal of Comsearch at 38 (“Comsearch intends to perform all database functions as required in Section 15.715.”); Proposal of Frequency Finder, Inc. at 2 (“FFI proposes a database implementation [sic] to fulfill all requirements set forth in Sections 15.713 and 15.715 of the Rules. . .”); Proposal of Google, Inc. at 3 (“Google will provide an end-to-end solution that encompasses all required functionalities”); Proposal of KB Enterprises LLC and LS Telcom at 3 (“The KBE/LS team plans to perform the entire set of database functions required by the FCC including data repository functions, data registration, calculation and query functions, and fee collection. . .”); Proposal of Key Bridge LLC at 7 (“The Key Bridge Team’s architecture and implementation is a comprehensive, end-to-end solution. . .”); Proposal of Spectrum Bridge, Inc. at 5 (“Spectrum Bridge intends to provide a complete White Spaces Database Solution”); Proposal of Telcordia Technologies, Inc. at 3 (proposing to “provide a complete solution including all the basic components”); Proposal of WSdb, LLC at 2 (proposing to “provide a database service that performs all functions required by the FCC’s rules”).

¹² See Proposal of Comsearch at 42-58 (presenting the clearinghouse model as “an alternative approach to database manager duties and responsibilities”); Proposal of Google, Inc. at 3 (requesting that,

Importantly, the clearinghouse model is directly at odds with the Commission’s stated goal of facilitating competition among database administrators “on the basis of cost and speed and efficiency of service.”¹³ To this end, rather than prescribing a particular architecture, protocol, or other standard for database designs, the Commission simply requires that TVBD databases include certain data regarding protected services and use such data to “calculate the television channels that are available for use by [TVBDs] at their individual locations” consistent with the FCC’s interference rules.¹⁴ Accordingly, as envisioned by the FCC, each database administrator has discretion to maintain its own data repository and develop its own methods to calculate potential interference to protected services and determine available channels for TVBDs. Because different methods of interference calculations can lead to varying response times to queries for channel lists by a TVBD, database administrators can compete to provide more efficient and/or less costly service.

By contrast, the clearinghouse model proposes that all WSSPs will use the same data repository and the same reference code to perform interference calculations.¹⁵ Specifically, the

in addition to selecting it as a provider of end-to-end database solutions, the FCC consider a clearinghouse to provide data repository functions).

¹³ See *Unlicensed Operation in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, 16878 ¶ 204 (rel. Nov. 14, 2008) (“Report and Order”).

¹⁴ See Report and Order, 23 FCC Rcd at 16878-79, ¶ 205.

¹⁵ As proposed, it appears that the WSCH may have the ability to assert complete control over both the collection, maintenance and distribution of data relating to protected incumbent services and the methods for calculating interference and available channel lists. See Proposal of NeuStar, Inc. at 17-18 (proposing a “WSCH that holds all the data needed to make calculations of protected entities” and stating that “all WSSPs have the same source data, and calculate using a specified algorithm.”); Proposal of Comsearch at 48 (stating that the WSCH would (a) “responsible for aggregating, maintaining, and disseminating all data required by the TV/WS databases including incumbent and white space device registration data” and (b) “[m]aintain reference source code and data for calculating TV service contours based on FCC source code and data using industry-accepted practices” and noting that

clearinghouse model envisions that a single entity – the WSCH – will maintain the sole data repository for access by all WSSPs. Similarly, the WSCH will determine and distribute reference code to all WSSPs to perform their interference calculations.

WSdb opposes the clearinghouse model because it appears to impose additional costs on database administrators to access the data repository and obtain a reference code. It would not be in the public interest to subject database providers to the “middle-man” costs imposed by the sole WSCH for access to its data repository or reference code. These additional costs, which were not envisioned by the FCC in the Report and Order, would be particularly burdensome on smaller database administrators. Many such smaller database administrators have proposed to implement these functions themselves and have begun development of database systems to provide these functions directly without the need to pay for or use third-party clearinghouse services.¹⁶ Indeed, WSdb has already expended significant resources to develop its own data repository and code for interference calculations, and should not be burdened by the additional cost of paying a WSCH for services it can develop more efficiently and effectively itself.¹⁷

“[i]ndustry could also collaborate and agree upon a standard reference calculation code and data set that would be maintained and disseminated by the Clearinghouse.”); Proposal of Google, Inc. at 14 (“A clearinghouse approach contemplates that a clearinghouse would serve as a single or aggregated point of entry for protected entity information, and disseminate protected information to multiple TVWS database service providers who would provide the core database functions and device interface (enroll devices, take registration information, and respond to queries).”).

¹⁶ The imposition of costs for clearinghouse services also would increase expenses for smaller database administrators and could have an effect upon the ability of smaller database administrators to develop sustainable, competing database businesses. This is especially true where large corporate applicants have proposed to offer database services at no charge.

¹⁷ Even if required to download a data repository maintained by a single WSCH, WSdb nevertheless intends to maintain its own data repository and synchronize it against that maintained by the WSCH. WSdb believes that, by maintaining its own data, it can provide its database services faster and more efficiently. Interspersion of a clearinghouse between the underlying FCC data and WSdb does nothing other than raise costs and reduce efficiency.

In addition to imposing additional costs on database administrators, requiring the use of reference code distributed by the sole WSCH will hinder competition among administrators. Indeed, the ability to develop proprietary code for interference calculations will be a major source of competitive differentiation among database administrators.¹⁸ In particular, WSdb is concerned that any requirement that all database administrators use the reference code distributed by the WSCH will significantly limit the possibility for database administrators to develop varying methods for processing data and computing interference calculations. Accordingly, the adoption of such a requirement will directly and negatively effect database administrators' ability to compete on "speed and efficiency of service."¹⁹ In this way, the clearinghouse model undermines the FCC's objective of promoting competition and should be rejected as contrary to the public interest.²⁰

The clearinghouse model also does not serve the public interest to the extent it contemplates that the WSCH (and not the FCC) would be responsible for certifying and

¹⁸ As noted *supra* at 5, different methods of interference calculations can lead to varying response times to queries for channel lists by a TVBD, thereby enabling database administrators to compete to provide more efficient and/or less costly service.

¹⁹ See *supra* note 13 and accompanying text.

²⁰ Although WSdb adamantly opposes the clearinghouse model for the reasons set forth above, it nevertheless supports comments that discuss the means by which the FCC could ensure that all database administrators maintain consistent data for protected entities. See, e.g., Comments of Cavell, Mertz & Associates, Inc. (filed Feb. 4, 2010) (sharing the experience of Cavell, Mertz & Associates, Inc. with interpreting some of the anomalous features of FCC data). For example, WSdb supports the suggestion that all database providers use a common elevation dataset ("Elevation Data") as well as a standardized set of F(50,50) and F(50,90) data and interpolation methods ("50,50/50,90 Data"), which is already available for free from the FCC as implemented in its Fortran code. See Proposal of Comsearch at 45 and 48. By ensuring that all database administrators use the same Elevation Data and 50,50/50,90 Data, much of the potential for discrepancies in datasets maintained by various administrators will be eliminated, while leaving the majority of database development to the individual database administrators. The proposal to use Elevation Data and 50,50/50,90 Data is similar to WSdb's proposal to share protected contours as a means of ensuring consistent datasets among multiple administrators. See WSdb Proposal at Attachment 2(a)-6.

managing WSSPs. Specifically, as proposed, the clearinghouse model contemplates that a third party entity (*e.g.*, Neustar) will have significant discretion to (A) decide which entities are eligible to serve as WSSPs and (B) manage such entities. Neustar states that the criteria for certifying WSSPs could be established by the FCC, an industry consortium, or the WSCH itself.²¹ However, the sole decision as to whether a potential WSSP candidate meets the certification criteria rests solely with the WSCH, and thus outside of the direct control of OET. Moreover, although Neustar states that, if authorized as the WSCH, it is “willing to take complete responsibility for the performance of the [clearinghouse] and all WSSPs it serves,”²² the clearinghouse model is fundamentally different than the database model contemplated by the FCC when it adopted the Report and Order (*i.e.*, a model where database providers would be selected by the FCC and subject to the oversight and supervision of the FCC).²³ In order to ensure that the FCC has the ability to “closely oversee the development and introduction of [TVBDs] to the market and [to] take whatever actions may be necessary to avoid, and if necessary correct, any interference [to incumbent communications services] that may occur,”²⁴ it is critical that OET retains the complete discretion to determine whether a particular applicant should serve as a database administrator. Similarly, OET must maintain the ability to oversee directly all TVBD database administrators (and not cede control of such relationship to a third party WSCH such as Neustar). Because the clearinghouse model substantially mitigates or eliminates OET’s role with respect to WSSPs, it must be rejected.

²¹ See Proposal of NeuStar, Inc. at 7, note 5.

²² Proposal of NeuStar, Inc. at 20.

²³ See generally, Report and Order, 23 FCC Rcd 16807, at .

²⁴ Report and Order, 23 FCC Rcd at 16808, ¶ 1.

Finally, as Neustar acknowledges, because the proposed model would require the establishment of criteria for entities to be certificated as WSSPs, the proposed clearinghouse model likely could not be implemented without a change in the rules adopted by the FCC in the Report and Order.²⁵ Initiation of a rulemaking at this stage would significantly delay the introduction of TVBDs to market.

III. THE MAJORITY OF APPLICANTS APPEAR TO HAVE FAILED TO CLEARLY DESCRIBE THE LEVEL OF SECURITY THEY WILL PROVIDE, ESPECIALLY WITH RESPECT TO DEVICE AUTHENTICATION

There appears to be unanimous support among the applicants for the use of standard security methods at the transport layer. Indeed, the majority of applicants state that they will use Transport Layer Security (“TLS”) as the primary means of security.²⁶ Certain of the applicants also explain that they will supplement their security protocols through standard practices, such as firewalls, the isolation of functional or physical system components within the database system, intrusion detection, or audits.²⁷ However, WSdb submits that, as exemplified by a recently discovered security hole, the use of TLS and standard security practices alone likely will be an

²⁵ See Proposal of NeuStar, Inc. at 7, note 5 (“Neustar recognizes that neither the Order nor the Public Notice contemplated the need to establish criteria to become a WSSP”).

²⁶ See, e.g., Proposal of Comsearch at 39; Proposal of Frequency Finder, Inc. at 3; Proposal of Google, Inc. at 10; Proposal of KB Enterprises and LS Telecom at 32; Proposal of Key Bridge Global LLC at 205; Proposal of NeuStar, Inc. at 46; Proposal of Spectrum Bridge, Inc. at 20; Proposal of Telcordia Technologies at 21. (Certain of the applicants use different terminology for TLS, e.g., SSL or HTTPS.) In its proposal, WSdb explained that it would implement secure web interfaces as part of a variety of its database functions, including the FCC Request Function, Synchronization Function, and Billing Function. See Proposal of WSdb, LLC at 1(c)-3, 2(a)-7, 3(b)-7, 3(b)-19, and 3(b)-33. WSdb will employ TLS for all such secure web interfaces.

²⁷ See, e.g., Proposal of Comsearch at 39; Proposal of Google, Inc. at 12; Proposal of KB Enterprises LLC and LS Telcom at 32; Proposal of Key Bridge Global LLC at 187; Proposal of NeuStar, Inc. at 26; Proposal of Spectrum Bridge, Inc. at 14; Proposal of Telcordia Technologies at 23. These additional security measures are standard practices, and WSdb also intends to use similar measures in its database design.

insufficient means to ensure security of the TVBD ecosystem (*e.g.*, TVBDs and TVBD databases) or to prevent unauthorized access to television broadcast spectrum (*e.g.*, by a TVBD that has not been authorized by the FCC).²⁸ Because a potential security breach can have a material effect on the operation of incumbent communications services as well as compromise individuals' privacy, the implementation of a robust device authentication process for TVBD database services is critical. However, the majority of proposals appear to be ambiguous and provide insufficient detail with respect to the level of security they will provide, especially with respect to the approach that will be used for device authentication.²⁹ By contrast, WSdb set forth in its proposal a clearly-defined set of criteria for device authentication as a reasonable means to assure that only those TVBDs that have been authorized by the FCC can access its database.³⁰

Indeed, WSdb believes it is appropriate and necessary to take reasonable steps to authenticate the

²⁸ The risks of relying on a single protocol for security, such as TLS, were recently made clear through the discovery and verification of a security hole in many systems that use TLS. *See* Phone Factor, Inc., Renegotiating TLS (Nov. 4, 2009) *available at* http://extendedsubset.com/Renegotiating_TLS.pdf; Dan Goodin, "Researcher Busts Into Twitter Via SSL Renog Hole," THE REGISTER (Nov. 16, 2009) *available at* <http://www.securityfocus.com/news/11564>.

Notwithstanding the potential security risks of TLS, certain applicants that have stated their intention to use TLS for database system security appear to rely on the use of TLS as the preferred security protocol of financial institutions. For example, Google stated in its proposal that public key infrastructure schemes (such as TLS) are the "same technology used on the Internet to perform transactions of all types including financial transactions." Google Proposal at 9. This overstates the reliability of such methods, as financial institutions find it necessary to continually enhance TLS-protected web sites with additional security methods. *See* John De Santis, "Latest threat: 'man-in-the-middle' attacks," FINANCIAL SERVICES TECHNOLOGY, *available at* <http://www.usfst.com/article/Latest-threat-man-in-the-middle-attacks>.

²⁹ For example, a number of applicants propose to use "shared secrets" for device authentication. *See, e.g.*, Proposal of Comsearch at 40; Proposal of Google, Inc. at 10; Proposal of NeuStar, Inc. at 47; Proposal of Telcordia Technologies at 23. Others indicate they will implement TLS-PSK, virtual client certificates, or secret keys. *See* Proposal of Keybridge Global LLC at 146 (stating that the "Key Bridge / Fortinet solution employs transport layer security with pre-shared key ciphersuites"); Proposal of Spectrum Bridge, Inc. at 17 (explaining that "OEM[s] will acquire security credentials from SBI before devices are deployed in the form of a virtual client certificate."); Proposal of Frequency Finder, Inc. at 6 (discussing the use of "secret keys known only to TVBD database administrators and hardware manufacturers").

³⁰ *See* Proposal of WSdb, LLC at Attachment 3(b)-23 and Attachment 5(c)-1 to 5(c)-(2).

FCC IDs and serial numbers submitted to it by TVBDs, in addition to checking such information against the FCC's equipment authorization database,³¹ as WSdb has proposed to do.³²

IV. CONCLUSION

WSdb appreciates the opportunity to be considered as a potential provider of database administration services in this proceeding and urges the FCC to select it as one of multiple database administrators. Importantly, in addition to complying with the applicable FCC rules, WSdb's proposal sets forth a robust security solution, including specific criteria device authentication processes.

WSdb urges OET to refrain from requiring database administrators to obtain clearinghouse services from a single entity because, as described above, the clearinghouse model suffers several significant flaws and would have particularly harsh impact on the ability of smaller database administrators to develop sustainable, competitive businesses. Accordingly, the clearinghouse model should be rejected in favor of the selection of multiple database administrators who compete on cost, speed and efficiency, as envisioned by the FCC.

In this regard, WSdb notes that it is an independent company, which was created for the specific purpose of developing a database system that would comply with all FCC rules to protect incumbents and serve channel lists on a non-discriminatory basis. WSdb has assembled a

³¹ Device authentication is critical to ensuring the security and integrity of the white spaces ecosystem. Accordingly, all database administrators should incorporate reliable device authentication processes into their system designs. Moreover, database administrators that propose to offer their services at no charge should be subject to the same stringent standards for reliable device authentication processes as those administrators who intend to charge for their services.

³² In its application, WSdb proposed to define three layers of security for its database system: device authentication, relationship authentication and message authentication. *See* Proposal of WSdb, LLC at Attachment 5(b). WSdb believes this proposed approach offers a robust means to provide secure communications between TVBDs and WSdb's database.

team of experienced professionals with vast technical expertise on the design and implementation of complex database systems, and has received funding commitments from 2M Companies, Inc. (a private investment fund founded by Mr. Morton H. Meyerson³³) to permit it to operate for the five-year period specified in the FCC's rules.

Respectfully submitted,

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³³ See Proposal of WSdb, LLC at Attachment 1(a) for Mr. Meyerson's biography.