BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554

In the Matter of	)	
	)	
Unlicensed Operation in the	)	
TV Broadcast Bands	)	**ET Docket No. 04-186**
	)	
	)	
Additional Spectrum for Unlicensed	)	
Devices Below 900 MHz and in the	)	**ET Docket No. 02-380**
3 GHz Band	)	

PETITION FOR RECONSIDERATION

Pursuant to Section 1.429 of the Commission's rules, Key Bridge Global LLC ("Key Bridge") hereby respectfully submits this Petition for Reconsideration ("Petition") in response to the Commission's Report and Order ("Order") in the above referenced docket released on November 14, 2008.[1]

I. INTRODUCTION

As a potential TV Broadcast Bands geolocation database ("Database") administrator, Key Bridge is an interested party and appreciates the opportunity to provide our comments and suggestions to the Commission. We believe that unlicensed operations in the TV Broadcast Bands can enable broadband service delivery to metropolitan and heretofore un- and underserved rural American towns and regions while also stimulating innovation in mobile consumer electronics and collaborative applications. We also appreciate, however, the paramount importance of protecting incumbent, licensed services.

[1] *See Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, FCC 08-260 (2009) ("*Order*").

Key Bridge seeks reconsideration of the Commission rules described in greater detail below. We believe the revisions recommended below are necessary to ensure that competitive industry solutions can be created that provide secure, assured and commercially sustainable unlicensed use of TV Broadcast Bands while protecting licensed incumbent services and infrastructure.

II. SECURITY

The Order has not adequately addressed security risks, and Key Bridge urges the Commission to implement information security and device authentication rules. The primary security risks likely to affect an operational unlicensed TV Broadcast Bands regime and the necessary rule revisions to mitigate these risks follow below.

A. Unauthorized Transmitters

Although Section 15.711(e)(1) of the current rules requires both Fixed and Mode-II TV band devices ("TVBDs") to transmit "identifying information" when they initialize and connect to the database, only Fixed TVBDs are required to register in the Database.[2] We fear this creates easy opportunity for a malicious user to present forged credential information (FCC Identifier and serial number) from an uncertified TVBD transmitter to access the Database and receive a valid channel assignment. We therefore urge the Commission to require registration in the Database for all Mode-II capable devices.

As a practical matter we recommend that Mode-II TVBDs be pre-registered en-bulk by the manufacturer, and call out as a successful example the current process for operating system registration on new computers. Where en-bulk registration is not possible, for example: OEM, test-units and others, ad-hoc self-registration can be enabled with a secure web portal.

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[2] 47 C.F.R. § 15.711(e)(1); *see also* 47 C.F.R. § 15.713(f), which expressly requires fixed TVBD devices to register.

To require Mode-II TVBD registration we request that the Commission add a new, second paragraph within 15.713 (g) stating:

> *Personal / Portable TVBDs capable of Mode-II operation shall be registered with a database administrator prior to [consumer] activation.*

The term "end user" could be substituted for "consumer" at the FCC's discretion.

B. Phantom Databases

Without strong counter-party authentication Fixed and Mode-II TVBDs have no method to verify the integrity of a received channel assignment. A critical security flaw exists in the TV Band system as described, where malicious operators could hijack a legitimate database administrator's identity via man-in-the-middle attacks (colloquially called a phishing attack), issuing false channel assignments and deliberately cause incumbent interference.

Data integrity, strong user authentication, confidentiality, auditing, and access controls are among the technical controls needed to ensure the validity of diverse TVBDs and to prevent fraudulent access to or hijacking of the Database. We note that many effective commercial technologies exist for counter party authentication on the Internet that provide assured, secure transactions supporting e-commerce, banking and private network access. Strong user authentication, optionally employing software or hardware-based tokens, ensures that authorization decisions are based on the true identities of users and online service providers, eliminating the risk of un-authorized transactions for both parties.

We therefore do not recommend the FCC require a specific technology or security solution architecture. Rather, we request that the FCC require "strong counter party authentication" between Database administrators and Fixed plus Mode-II TVBDs. With this requirement in place, industry retains needed flexibility to design and implement a technically sound and cost effective security framework.

Our recommendation is to require and encourage an industry-best-practice security solution with the following rule changes:

Revise section 15.713 (e)(1) to read as follows:

> *Fixed and Mode-II TVBDs must provide their location, required identifying information and strong counter-party authentication certificates to the TV bands database in accordance with the provisions of paragraph (b) of this section.*

Revise section 15.713 (e)(2) to read as follows:

> *(2) Fixed and Mode-II TVBDs shall not transmit unless they receive, from an authenticated, FCC licensed TV bands database, a list of available channels.*

III. IN SERVICE MONITORING

The Commission describes its intent to accommodate future devices that rely on sensing alone based on a proof of performance standard.[3] At other points in the Order the Commission also establishes the immaturity of current spectrum sensing capability.[4] Further, the Order requires all TVBDs (Fixed and Personal/Portable) to implement spectrum sensing but makes no provision for the collection or analysis of this sensing data to gauge the development of the technology

We believe the spectrum sensing data, properly sanitized and stripped of specific manufacturer or device identification, could be of tremendous value to the Commission and the American public for purposes of interference identification, trending analysis and spectrum occupancy and monitoring. We also suggest this information could provide an objective measure to track the maturity and efficacy of spectrum sensing for the purposes of establishing future TVBD performance standards and certification criterion.

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[3] *See* 47 C.F.R. § 15.717.

[4] *See, e.g.*, Order at ¶ 257. The Commission notes that it does "not appear that the [prototype TVBDs] were designed to cope with certain real-world conditions such as strong adjacent channel signals or the challenges of operating in noisy environments. This made it particularly difficult to fully validate the performance of the technology and develop standards that would ensure a high degree of confidence that devices relying on sensing alone would not interfere."

We believe it is in the public's interest for the FCC to require the reporting of in-service monitoring data from all sensing TVBDs and request the addition of a new section 15.711 (c)(8) stating:

> *(8) TVBDs capable of spectrum sensing shall promptly and regularly report sensed signal and channel occupancy information to the database system.*

IV. DEVICE REGISTRATION AND FEES

While Section 15.713(f) describes a registration procedure for Fixed TVBDs, and Section 15.713(g) discusses identifying information a Mode-II device must provide to the database, the Order does not discuss registration requirements for Mode-II devices.[5] Section 15.714(a) describes fees a database administrator may charge but states only that fees may be charged for the "provision of lists and for registering Fixed TVBDs …." The net effect of these rules is that Fixed and Mode-II devices may be charged for channel link inquiries but only Fixed devices may be charged for registration. Industry anticipates that the number of Mode-II capable devices will eventually greatly outnumber Fixed devices as TV band frequencies are incorporated into home gateway routers, laptops and other consumer electronics. The practical effect of this will be that a Database administrator's only opportunity for cost recovery supporting Mode-II devices will be to create, directly or via proxy, a customer/vendor relationship with every active Mode-II owner and to institute a per-transaction charge with that end user. We are concerned that such retail arrangements will create a nuisance to consumers, who must establish a separate business relationship with the database administrator or pay a surcharge to their own network service provider. This will also increase operational cost and complexity for the Database administrator and divert resources unnecessarily.

We interpret current rule language to preclude creative arrangement between Database administrators and TVBD manufacturers that would allow for efficient deployment of consumer devices

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[5] Please see Section II for comments on Mode-II device registration.

while ensuring reasonable cost recovery for supporting those devices over time. We therefore request that Database administrators and TVBD manufacturers be enabled to negotiate mutually advantageous commercial relationships for the registration and continuing support of Mode-II devices by updating Section 15.714 (a) to read as follows:

> *(a) A TV bands database administrator may charge a fee for provision of lists of available channels to fixed and personal/portable TVBDs and for registering fixed and personal/portable TVBDs.*

V. BROADCAST CHANNEL SELECTION

The TV Bands docket makes little accommodation for information and status reporting. Given that the Commission envisions more than one database administrator, it is important that situational awareness and a common operating picture are available to ensure issued channel lists are consistent between the Database services.

Section 15.713 (b)(3) describes how Fixed and Mode-II devices receive channel lists but there is currently no requirement to report their selected and active transmitting channel. This omission limits the Commission's ability to rapidly detect and identify errant transmitters including unauthorized and/or authorized but incorrectly configured and interfering TVBDs. Moreover, this omission, coupled with the absence of sensing data, also makes it near impossible for database administrators to support near-real-time synchronization or create a meaningful common operating picture. To ensure that the rules are sufficiently flexible to allow Database administrators to develop features that the TVBD community may desire in the future, including to meet potential industry demand for enhanced spectrum monitoring and management, we request the addition of a new Section 15.711 (b)(3)(v) to read as follows:

> *15.711 (b)(3)(v) Fixed and Mode-II TVBDs shall report their active transmitting channel(s) to the database.*

VI. FCC DATA REQUESTS & REMOVAL

Section 15.713(i)(1)-(2) obligates a database administrator to provide or delete, when requested by the FCC, any information in the database. We request that the Commission confirm and clarify this requirement is limited to publicly available data provided by the FCC or other Government sources (e.g. CDBS, ULS) and the fields enumerated in section 15.713.

VII. CONCLUSION

Key Bridge applauds the Commission's efforts to develop rules that introduce new devices in TV broadcast bands while ensuring that incumbent operators receive meaningful interference protection. Key Bridge urges the Commission to incorporate the revisions described above to its final rules concerning the TVBD geolocation database to better enable the database administrator to facilitate secure, assured and commercially sustainable unlicensed use.

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