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

In the Matter of	)	
	)	
Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and	)	ET Docket No. 14-165
	)	
Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap	)	GN Docket No. 12-268
	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	

REPLY COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS

I. Introduction

The National Association of Broadcasters (NAB)[1] provides reply comments in this proceeding that proposes more liberalized rules for unlicensed device operation in the 600 MHz band.[2] NAB supports unlicensed device operation so long as such operation does not interfere with licensed services, including broadcast television. Experience with unlicensed operation in the TV band thus far, however, has demonstrated that the system is not on

[1] NAB is a nonprofit trade association that advocates on behalf of local radio and television stations and broadcast networks before Congress, the FCC and other federal agencies, and the courts.

[2] *Notice of Proposed Rulemaking* in ET Docket No. 14-165 and GN Docket No. 12-268 (rel. Sept. 30, 2014) (*Notice*).

sound footing. It is imperative that the Commission address the fundamental flaws in its treatment of TVWS devices before expanding their operation to potentially millions of new users. The Commission should not overlook here its original and primary mission of preventing harmful interference among spectrum users.

Currently, the TVWS database does nothing to ensure the accuracy of information users provide. This flaw is systemic and cannot be fixed through specific enforcement alone. If the Commission is committed to protecting all licensed services in the band – including broadcast TV, licensed microphone users, WMTS and public safety – it must adopt standards that *automate* accurate data, most importantly location data, thus eliminating the potential for human error or malfeasance. NAB specifically recommends that the Commission do away with the unfortunate myth of "professional installation," require all devices to include geolocation capability and hold unlicensed device operators and database administrators strictly liable for the accuracy of the information in the database.

Absent these fundamental fixes, nearly all of the proposals in the present Notice to allow higher power unlicensed device operation and/or operation closer to licensed services are guaranteed to amplify the interference challenges posed by the existing database. This problem will only be magnified following the incentive auction, with far fewer available open channels in the TV band, shrinking significantly the margin for error between compatible operation and interference. It is critical that the Commission correct the TV bands database rules now, and ensure that devices are operated properly and provide accurate information to the database going forward, before the number of interfering devices grows larger than the Commission can reasonably police.

Further, as we explained in our initial comments, several of the proposals fail to meet any standard of technical review, even assuming an accurate database.[3] In particular, no commenter provides proper technical support for the proposal that would allow unlicensed fixed device operation on channels adjacent to existing TV services or for the proposal that would allow unlicensed operation where there are only a minimum of two vacant contiguous channels, *i.e.*, a guard band of only 3 MHz on an adjacent channel.

Finally, the Commission should reject Google's impractical and technically unjustified "fast polling" proposal. The proposal does not properly account for wireless microphone needs during major events and breaking news, and wildly overstates the burden of unlicensed devices more frequently checking in with the TVWS database.

II. The Current TV Band Device/Database System is Flawed Fundamentally and Requires Immediate Systemic Improvements

As NAB noted in its initial comments, the TVWS database, governing which channels are available for unlicensed device use in any given market, is only as good as the data contained within. Inaccurate data – especially location information – undermines the essential purpose of the database: to prevent TVWS devices from operating in locations and/or at powers that they should not.

Very few parties addressed the current ability of the database to protect licensed services, and, importantly no party provided any specific evidence showing that the database is actually working as intended.[4] Nonetheless, multiple parties expressed

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[3] For example, Microsoft, in its comments, asserts that "Wi-Fi politeness protocols" would prevent multiple simultaneous TV white space transmissions in the same vicinity eliminating concern about aggregate interference from multiple devices. However, no TVWS device approved to date by the FCC employs such protocols nor are they required to do so under the rules. *See* Comments of Microsoft Corp., in ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 4, 2015), at 21.

[4] Instead, certain parties merely claimed or assumed that the database functioned properly. *See e.g.,* Comments of The WhiteSpace Alliance in ET Docket No. 14-165 and GN Docket No. 12-268

confidence that the capabilities of the TVWS databases could be expanded to provide more granularity to locations and frequencies where TVWS devices might operate. For example, some parties suggested that the database could account for TVWS device antenna patterns, greater antenna height, or varying power levels to calculate protections for licensed services.[5]

NAB is committed to helping the Commission find a way forward that both enables TVWS to flourish and protects licensed users in the TV band. While an accurate database might be capable of providing more granular permissions for TVWS operations, it is ever-more critical that the Commission find effective ways to minimize the potential for users to undermine the system.

This can be accomplished with three basic steps. *First*, the Commission should eliminate professional installation as an option for verifying the accuracy of location information. *Second*, the Commission should require all white spaces devices to incorporate geolocation capability and to provide that information automatically to the database whenever devices connect to the database. *Third*, the Commission should make database administrators strictly liable for the accuracy of at least some certain non-location information entered in the database.

Preventing interference and ensuring the efficient, rather than chaotic, use of spectrum is a core FCC responsibility, dating back to the establishment of the Federal

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(filed Feb. 4, 2015), at 20 ("It has been demonstrated today that database driven white space devices do not cause interference to incumbent services.").

[5] *See, e.g.,* Comments of the WiFi Alliance in ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 4, 2015), at 43; Comments of Adaptrum, Inc. in ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 4, 2015), at 5.

Radio Commission in 1927. To realize the true promise of white space devices, the FCC must first act to reform the basic framework under which they operate.

III. Even with Systemic Database Improvements, the Commission Should Reject Proposals to Allow Fixed Operation Adjacent to Occupied TV Channels and to Reduce Frequency Separation from 6 MHz to 3 MHz

In our initial comments, NAB demonstrated multiple reasons why fixed operation on channels adjacent to occupied TV services would cause harmful interference to licensed operation.[6] We also showed how the Commission's own calculations undermined the proposal to allow unlicensed operation where there are two empty television channels instead of the presently required three empty channels.[7]

Unsurprisingly, TVWS advocates largely embraced the proposals that would allow unlicensed operation closer to licensed services. Equally as unsurprising, they offered zero technical evidence that the proposals would prevent harmful interference. For example, Google asserts that "in light of experience" and the Cape Town study cited in the *Notice,* the Commission should allow fixed unlicensed devices adjacent to occupied TV services and to reduce the frequency separation between unlicensed and television service to 3 MHz.[8] It is not clear what "experience" Google is referencing here because no devices, personal/portable or fixed, currently operate on channels adjacent to occupied TV services in the United States. Further, as we noted in our initial comments, the Commission should not rely on the foreign studies it cites as support for adjacent channel operation because

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[6] *See* Comments of The National Association of Broadcasters in ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 4, 2015), at 3-7 ("NAB Comments").

[7] NAB Comments at 7-10.

[8] *See* Comments of Google Inc. in ET Docket No. 14-165 and GN Docket No 12-268 (filed Feb. 4, 2015), at 43-44 ("Google Comments"); *Accord* Comments of The Wireless Internet Service Providers Association in ET Docket No. 14-165 and GN Docket No 12-268 (filed Feb. 4, 2015), at 8 (arguing that "affording TV stations a full six megahertz of protection on both sides of a TV channel is overly conservative.").

both South Africa and Ghana were operating on 8 MHz analog channels and using different television systems (e.g., PAL).[9] To do so would patently be arbitrary and capricious. Even more critically, we previously noted that the unlicensed devices in the cited trial were carefully engineered to ensure that there would be no television receivers in the potential interference area around the devices and that the South African study found the potential for interference to TV reception in a 1,352,636 square feet area around a TVWS device.[10]

No TVWS proponent offered any technical evidence that suggested these studies – which are really apples-to-oranges comparisons – could substitute for real world testing between TVWS devices and *digital* television operations. Similarly, the Commission should not rely on these inapposite studies to enable adjacent channel operation likely to increase harmful interference to DTV services.

IV. Commission Should Reject Google's "Fact Polling" Proposal

The *Notice* proposes rules requiring TVWS devices to make more frequent database checks, *i.e*., every 20 minutes, to protect licensed low power operations such as wireless microphones used to cover breaking news events. Google, in its comments, asserts that breaking news can be accommodated by creating two "fast polling" channels for wireless microphones.[11] According to Google, only unlicensed devices operating on these two channels would be required to check with the database every 20 minutes.[12]

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[9] NAB Comments at 9-10.

[10] *Id.*

[11] Google Comments at 47-51.

[12] *Id.*

Google's proposal should not be adopted. Unlicensed devices are required to protect all licensed operations. At any time, including during emergencies and breaking news, licensed wireless microphones and other Part 74 devices can register and operate on any white space channel. Many events, such as a professional sports events or a national political debate, require significantly more spectrum than two television channels. Breaking news events such as the Boston bombing or southern tornadoes may have news crews from distant areas with equipment that operates on channels different from those specified for "fast polling" in a particular area. Licensed operations, moreover, should not be impeded from operating because of unlicensed devices, especially considering that unlicensed operators have access to substantial dedicated spectrum elsewhere, such as 2 and 5 GHz, and the Commission has proposed to allow operation in the 600 MHz guard bands that cannot be used by wireless microphones.

Google's technical justifications for "fast polling" are also fallacious and without merit. Google absurdly states that the FCC's proposal for more frequent contacts (every 20 minutes or 72 times a day) would increase the cost of administering an established database by approximately the same 72 times.[13] The TVBD database is required to include all of the required fields for each device, including the device's serial number, location, and owner and operator information. The *entire* February 19, 2015 TVBD database of 560 devices is contained in a 128 kB file,[14] so the registration information for a single device amounts to less than a kilobyte of data. Once a device is registered, the amount of information necessary for rechecking can be abbreviated, *e.g.*, FCC ID, serial

[13] *Id.* This is akin to Google suggesting that if fewer people used Google's search engine the costs of a Google inquiry would be millions and millions of times less.

[14] *See* Registered Fixed TV-band White Space devices at https://www.google.com/get/spectrumdatabase/data/.

number and location. Automatically updating a 128 kB file every 20 minutes has little or no incremental cost. Indeed, the whole purpose of a database is for it to be updated and accessed randomly as often as necessary. Google has provided no support for its claim that the *Notice's* proposal would dramatically increase administrative costs.

Google's assertions that increased rates of database contact will shorten the battery life of a portable white space device are also farfetched and unsupported.[15] White space devices are designed to communicate, whether with each other, with the Internet, or with their authorizing database. That is their sole function. As shown above, the entire registration information for a device is less than a kilobyte and recheck information can be even less. Assuming that this recheck information constitutes 10 kB per device and the device transmits at 5 MB/s, the total transmission time is 0.002 seconds. In the unlikely event that each recheck takes three communication attempts, the total transmission time for a portable device in an entire 24 hour period is less than 0.5 seconds. One hopes that a white space device would be designed to operate with a significantly greater duty cycle; otherwise, the utility of the device would be little more than a paperweight. A total of less than one-half second transmission a day hardly supports Google's dire prediction of impaired battery life diminishing the value of white space devices to consumers and the utility of white spaces a whole.

V. Conclusion

The TVWS experiment will prove a failure if the Commission does not correct the systemic flaws inherent in the database rules. The Commission should eliminate the "professional installation" loophole and require geolocation mechanisms in every device,

[15] Google Comments at 48.

as well as hold unlicensed device operators and database administrators strictly liable for at least some types of inaccurate data. NAB looks forward to working with the Commission to build a better TVWS system that works for all stakeholders.

Respectfully submitted,

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