

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

Amendment of Part 15 of the Commission's)	
Rules for Unlicensed White Space Devices)	ET Docket No. 16-56
)	RM-11745
)	

**COMMENTS OF THE
NATIONAL ASSOCIATION OF BROADCASTERS**

I. INTRODUCTION AND SUMMARY

The National Association of Broadcasters (NAB)¹ submits these comments in response to the Commission's Notice of Proposed Rulemaking in the captioned proceeding.² NAB commends the Commission for initiating this proceeding, and strongly supports efforts to improve the accuracy and reliability of the TV White Spaces (TVWS) database.

NAB petitioned the Commission for changes to its rules governing unlicensed operations in the television band to reduce the potential for unlicensed TVWS operations to cause harmful interference to licensed television operations.³ NAB's petition demonstrated that the TVWS database contained numerous errors and inaccurate data, including, most

¹ The National Association of Broadcasters is a nonprofit trade association that advocates on behalf of free local radio and television stations and broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.

² *Amendment of Part 15 of the Commission's Rules for Unlicensed White Space Devices*, Notice of Proposed Rulemaking and Order, ET Docket No. 16-56, RM-11745, FCC 16-23 (Feb. 26, 2016) (Notice).

³ NAB Emergency Motion for Suspension of Operations and Petition for Rulemaking, RM-11745 (March 19, 2015) (NAB Petition).

troublingly, inaccurate information concerning the location of fixed TVWS devices registered in the database.⁴ Subsequently, a number of TVWS device manufacturers worked cooperatively with NAB to address these concerns, and joined NAB in proposing a solution that will improve the accuracy of the information in the database by incorporating automatic geolocation capability in all TVWS devices.⁵

Eliminating the professional installation option for determining a device's location will strengthen the database, protect licensed users from harmful interference, and facilitate further deployment of TVWS technology by making TVWS devices more consumer friendly and making installation simpler and less expensive. We urge the Commission to move forward with its proposal expeditiously.

II. THE COMMISSION SHOULD ELIMINATE PROFESSIONAL INSTALLATION AS AN OPTION FOR DETERMINING TVWS DEVICE LOCATION

The first sentence of the Notice sets forth the fundamental precept which must guide commenters and the Commission itself in this proceeding: "Accurate location information is the linchpin for minimizing the risk of harmful interference in the white space spectrum sharing scheme."⁶ Without accurate location data, the database cannot possibly function as intended to prevent interference to licensed users.

Experience has confirmed that the Commission's current rules cannot ensure that the location information entered into the database is accurate. NAB has amply demonstrated

⁴ NAB Petition at 2-3, 10-12.

⁵ Letter from Haiyun Tang, Adaptrum, Inc., James Carlson, Carlson Wireless Technologies, Inc., Larry W. Koos, Koos Technical Services, Inc., Jordan Du Val, MELD Technology, Inc., and Rick Kaplan, NAB, to Julius P. Knapp, FCC, RM-11745 (July 17, 2015) (Joint Letter).

⁶ Notice at ¶ 12.

numerous instances of plainly inaccurate information in the database.⁷ Most troublingly, NAB demonstrated that even well-intentioned professionals with every incentive to include accurate information in the database still made errors.⁸

The Commission itself undertook a thorough review of the database, and the Office of Engineering and Technology has actively worked with database administrators to disseminate the FCC's database validation requirements.⁹ Nevertheless, the Commission concluded that, "Under the current rules, we have seen numerous instances where questionable location data have been provided to the databases for fixed white space devices, and this undermines the integrity of the interference protection scheme we adopted."¹⁰

Fortunately, industry stakeholders have agreed upon a workable solution to this problem. NAB, working cooperatively with TVWS device manufacturers representing roughly 95 percent of TVWS devices actually deployed to date, has proposed the simple, workable and economical solution of incorporated automatic geolocation capability in fixed TVWS devices.¹¹ Consistent with this recommendation, we support the Commission's proposal to eliminate the professional installation option for determining location and require that fixed white space devices instead include geolocation capability that can automatically determine the devices' location without manual intervention.¹² The Commission's proposal will substantially reduce the risk of harmful interference to licensed operations by dramatically increasing the accuracy

⁷ See, e.g., Reply of NAB to Oppositions to Its Petition for Rulemaking at 10-12, RM-11745 (May 18, 2015); Letter from Scott Goodwin, NAB, to Marlene H. Dortch, FCC, RM-11745 (June 11, 2015).

⁸ Letter from Patrick McFadden, NAB, to Marlene H. Dortch, FCC, RM-11745 (June 25, 2015).

⁹ Notice at ¶ 13.

¹⁰ *Id.*

¹¹ See Joint Letter.

¹² Notice at ¶ 20.

of the most important information included in the TVWS database – a device’s geographic coordinates. We agree with the Commission that, in the long run, this approach will significantly streamline installation and registration of fixed TVWS devices while also reducing the risk of interference.¹³

For this reason, the benefits of elimination of the professional installation option, and incorporation of automatic geolocation capability, far outweigh the potential costs.¹⁴ The cost of incorporating geolocation capability may be as little as a few dollars per unit – which is likely to be *far* less expensive for a consumer than hiring a “professional installer” to determine a device’s location. Ultimately, incorporated automatic geolocation capability could allow consumers to self-install devices while also significantly reducing the risk for harmful interference. This could significantly reduce costs and consumer inconvenience, which may speed adoption and deployment of TVWS technology. Automatic geolocation capability is a win-win for consumers, manufacturers and licensed operators.

III. TVWS DEVICES SHOULD AUTOMATICALLY DETERMINE ANTENNA HEIGHT

Because GPS technology generally is less reliable for determining vertical height than horizontal location, the Notice seeks comment on whether devices should automatically determine their installed height or rely on professional installation and allow users to manually enter the antenna height above ground.¹⁵ The Commission should require TVWS devices to automatically determine antenna height, and also require the database to use

¹³ *Id.*

¹⁴ The Commission specifically seeks comment on the costs and benefits of its proposals, and whether the benefits will outweigh the costs. *Id.* at ¶ 33.

¹⁵ *Id.* at ¶ 21.

assumed values in the event the automatically determined antenna height is clearly erroneous.

Maintaining an option for manual data entry of antenna height will simply perpetuate the same risks and errors associated with the professional installation option today. The Commission's goal should be to eliminate the need for human intervention wherever possible. Accordingly, to keep installation costs low and to make the process as simple as possible for consumers, the FCC should require TVWS devices to automatically determine and report their antenna height.

The Commission is correct that GPS and other automatic geolocation systems can be less accurate with respect to height than with respect to geographic coordinates. However, it is also true that antenna height accuracy is generally a less critical factor than geographic coordinates. In part this is because correct coordinate information will provide correct elevation – which can be far more significant than whether an antenna is mounted 10 or 30 meters above ground.

For example, NAB examined the effect of assuming an antenna height above ground of 10 meters as opposed to 30 meters in 40 cities using the Google TV white space database. This review demonstrated that in 35 of 40 city centers, the same channels were available for unlicensed operation regardless of whether antenna height above ground was 10 meters or 30 meters.¹⁶ In four of 40 cities, only one additional channel was available at the lower

¹⁶ These 35 cities were: New York, Los Angeles, Chicago, Philadelphia, San Francisco, Houston, Dallas, Washington DC, Baltimore, Boston, Oakland, San Jose, Atlanta, Tacoma, Phoenix, Tampa, Minneapolis, Miami, Denver, Cleveland, Orlando, St. Louis, Portland, Pittsburgh, Raleigh, Salt Lake City, Omaha, Milwaukee, Las Vegas, Albuquerque, New Orleans, Charleston, South Carolina, Billings, San Diego and Indianapolis.

antenna height.¹⁷ Overall, differences in antenna height are significantly less important than correct geographic location of the device.

As a safeguard, if the antenna height the device determines is plainly inaccurate, the database should automatically assume a reasonable height. For example, if a device reports an antenna height that is lower than the elevation at the device's location, the database could automatically assume an antenna height of 10 meters above ground. If, on the other hand, a device reports an antenna height above the maximum permitted height of 30 meters, the database could automatically assume a height of 30 meters.¹⁸ This will ensure that the process is automatic and simple for the user of the TV white space device and eliminate the need for professional installation or manual intervention.

IV. THE COMMISSION SHOULD REQUIRE DAILY LOCATION CHECKS

The Notice proposes to modify the FCC's current rules to require devices to check their coordinates every day, except when not in operation, and to report these coordinates to the database when they make their daily requests for available channels.¹⁹ The FCC should adopt this proposal.

Daily location checks will reduce the risk of harmful interference in at least two ways. First, as the Commission recognizes, multiple location observations will reduce the uncertainty of a device's location.²⁰ Second, and more importantly, daily location checks will ensure that a device has not been moved or tampered with, and that the database is

¹⁷ These cities were Seattle, Kansas City, Buffalo and Nashville. The 40th city, Detroit, had nine channels available at 10 meters and only four channels available at 30 meters.

¹⁸ In the event a particular installation is operating pursuant to a waiver, the installer could enter the actual antenna height. These circumstances are likely to be rare and, critically, are most likely not to be typical consumer installations.

¹⁹ Notice at ¶ 22.

²⁰ *Id.*

continuing to provide the device with a list of available channels appropriate for the device's actual location.

Critically, as the Commission notes, this requirement will not prove unreasonably burdensome for TVWS device users, because daily location checks will be performed automatically, without the need for user intervention. Indeed, daily location checks should prove transparent to users unless a device is moved – in which case channel availability may be affected.

V. THE COMMISSION SHOULD NOT PERMIT WIRELESS CONNECTIONS FOR EXTERNAL GEOLOCATION SOURCES

The Notice recognizes that there may be some cases where built-in geolocation capability is ineffective; such as where a device is located deep within a building.²¹ The joint proposal submitted by TVWS device manufacturers and NAB addressed this potential problem by allowing devices unable to determine their location using built-in geolocation capability to determine their location from a connection to an external source.²² The joint proposal would permit use of an external geolocation device, which could serve multiple TVWS devices, located within 100 meters of the external device and connected by an Ethernet, USB, serial port or other manufacturer proprietary wired connection.

The Notice endorses the potential for an external connection, but seeks comment on whether this connection must be a physical connection, or whether it could be a wireless connection.²³ Allowing a wireless connection would fatally undermine the entire point of this

²¹ *Id.* at ¶ 23.

²² Joint Letter, Appendix at 1.

²³ Notice at ¶ 24.

proceeding, by reintroducing the very same potential for erroneous or falsified location information the Commission is seeking to correct.

A physical, wired connection of 100 meters or less obviously limits the potential inaccuracy of geolocation information to 100 meters or less. But there is no way to guarantee a similar accuracy using a wireless connection. For example, a wireless signal could be retransmitted, resulting in location data that could be inaccurate by tens of miles or more. Permitting TVWS devices with additional operational flexibility should not come at the expense of ensuring that the location of these devices is accurately reflected in the database. Again, accurate location information is the irreducible minimum requirement for the database approach to interference protection.

VI. RULES FOR LOW POWER FIXED DEVICES SHOULD BE TIGHTLY CONSTRAINED

The joint proposal NAB and TVWS manufacturers submitted included a special provision for low power (40 mW or less) fixed TVWS devices that operate indoors where their automatic geolocation capability does not function. This provision would allow a user to establish the device's location outside, and then install and register the device within 30 minutes using the coordinates determined outdoors.²⁴ This is a workable, realistic solution that balances the potential inaccuracy that could be introduced if a device was transported elsewhere during the 30 minute interval with the need for additional flexibility for low power devices that are used indoors. NAB does not believe this provision would require the de-installation and re-installation of devices every day. Rather, NAB would support permitting such devices to operate using the coordinates established outside for up to 30 days, or until they are moved or disconnected from their power supply.

²⁴ Joint Letter, Appendix at 2; see *also* Notice at ¶ 26.

The Notice seeks comment on various potential expansions of this provision, including applying it to 100 mW devices, or allowing the transfer of location information from an outdoor sensor to an indoor TVWS device using an SD Card or USB memory stick.²⁵ These expansions are unnecessary and readily subject to abuse. First, this provision was developed solely to accommodate very low power fixed devices intended to operate only indoors, such as Meld Technology's device that is used primarily to transmit video to conventional digital television sets and other devices used for internal communications. Second, there is no effective mechanism to ensure the accuracy of information transmitted by SD Card or USB memory stick. Such a provision could introduce new risks, such as the failure to erase previous location data which could be erroneously applied to a new TVWS device.

VII. CONCLUSION

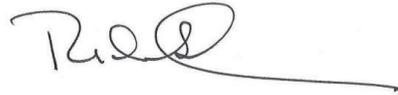
The Commission's database-driven interference protection regime for unlicensed operations in the television band rests on the assumption that the database will include accurate information. Experience with the TVWS database to date has confirmed that allowing installers to determine and register the location and other information for TVWS devices leads to unacceptably high error rates which create unnecessary risks. The Commission should promptly move forward with its proposal to eliminate "professional installation" as an option for determining the location of TVWS devices, and adopt the joint proposal submitted in the record of this proceeding to require fixed TVWS devices to include automatic geolocation capability. This approach will reduce costs associated with installation while simultaneously improving accuracy and reliability.

²⁵ Notice at ¶ 28.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Rick Kaplan", with a long horizontal line extending to the right.

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