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

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	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	GN Docket No. 12-268

PETITION FOR RECONSIDERATION OF THE NATIONAL ASSOCIATION OF BROADCASTERS

December 23, 2015

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SUMMARY

The National Association of Broadcasters continues to support unlicensed services, including unlicensed operations in TV white spaces. Pursuing additional opportunities for expanded unlicensed operations should not, however, come at the expense of existing licensed services. While NAB supports certain of the Commission's decisions in its recent order revising the rules for unlicensed operation in the television bands, certain of the rules the Commission adopted create an unacceptable risk of harmful interference to licensed operations. In some cases, the new rules appear simply to reflect an incomplete effort to give effect to the intent of the Commission's order. In other cases, the Commission has created an unwieldy and unworkable set of requirements that will fail in operation and will frustrate growth of the white space industry by fragmenting the market. On reconsideration, the Commission should reconsider these rules, and provide needed clarity regarding their operation.

First, NAB continues to urge the Commission to correct fundamental flaws regarding the operation of the database used to prevent white space devices from causing interference to licensed television services. In particular, the current regime for determining the location of a white space device, and thus the channels on which the device may operate, allows users to enter incorrect or incomplete information that undermines the central purpose of the database. Nine months ago, NAB filed a petition for rulemaking asking the Commission to correct these flaws. Five months ago, with the assistance of the Commission, NAB brokered a compromise with white spaces device manufacturers, reflected in a joint proposal to adopt rules addressing NAB's petition. While we expect the Commission to address this matter separately, NAB respectfully submits that all parties would be better served by a more holistic

approach laying out a comprehensive set of new rules at one time, rather than the piecemeal approach the Commission is taking.

Second, the FCC should reconsider its rules requiring that the database "push" information to white space devices in areas where licensed wireless microphones have notified the database they are or will be operating. While NAB has no objection to this "push" framework in theory, the rules the FCC adopted will not work to prevent interference. There is no way of ensuring that white space devices cease transmitting on occupied channels once they receive a notification. The rules thus provide no assurance that any pushed messages will actually be received, and no assurance that licensed wireless microphones will be protected. While NAB continues to believe it would be simpler, cheaper and more effective to simply increase the frequency with which devices are required to query the database, if the FCC insists on maintaining its push notification framework, it must amend the rules to make its new system work. That means requiring that white space devices provide verification they have received and complied with any notifications.

In addition to being ineffective as written, the new push requirement will immediately render obsolete most, if not all, existing white space devices. This change places a significant burden on device manufacturers and service providers, which are generally small businesses. Because most existing devices can easily be reprogrammed to check available channels more frequently, and because there are so few existing devices in operation, the Commission should grandfather existing devices as long as they are reprogrammed to query the database more frequently.

Third, NAB requests reconsideration of the rules regarding the change in location accuracy for a white space device. The new rules allow location uncertainty to be taken into account in determining the available channels for a white space device. On reconsideration,

the Commission should also adopt a reasonable cap on the amount of location uncertainty that is permitted for a white space device. Allowing devices to be registered with excessive location uncertainty will make it challenging if not impossible to determine the cause of harmful interference, or to resolve such interference, by examining the database.

Fourth, the FCC should reconsider its rules permitting low power fixed devices to operate within the contour of an adjacent channel TV station similar to personal/portable devices. This change fails to recognize the significant differences between fixed and personal/portable devices in terms of the potential to cause harmful interference to viewers.

Finally, to ensure that the white space database functions as intended, the Commission should reconsider and provide clarification on additional technical rules it has modified. In particular, the FCC should require devices to provide operating channel and transmit power information to the database, eliminate the rule allowing white space devices to continue to operate for 48 hours in cases where the device cannot contact the database, and clarify details of the information required in a white space device registration.

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PETITION FOR RECONSIDERATION OF THE NATIONAL ASSOCIATION OF BROADCASTERS

The National Association of Broadcasters (NAB)[1] hereby seeks reconsideration of the Commission's Report and Order in the above-captioned proceeding regarding unlicensed white space device operation in the television bands.[2] While NAB takes no issue with certain

[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 Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37; 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; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 30 FCC Rcd 9551 (2015) (Report and Order).

of the Commission's modifications to the white spaces rules, many of these modifications create an unacceptable risk of harmful interference.

I. THE COMMISSION SHOULD INCORPORATE CHANGES TO THE WHITE SPACE DATABASE AS PART OF A HOLISTIC REVIEW OF THE WHITE SPACE RULES

NAB continues to support a vibrant TV white spaces ecosystem that permits shared use of broadcast television spectrum while not interfering with licensed operations.[3] NAB has supported increases in power and transmitter antenna heights for TV white space (TVWS) devices to permit Wireless Internet Service Providers (WISPs) to better serve their customers. We have worked cooperatively and productively with TVWS device manufacturers on equipment approvals and have not objected to waivers of certain technical requirements to permit expanded unlicensed operations. NAB remains committed to continue working with unlicensed manufacturers and other unlicensed proponents to allow flexibility for unlicensed operations while at the same time ensuring that licensed operations are fully protected and not subject to harmful interference.

These two goals – permitting flexible unlicensed operations while protecting television stations and their viewers – are not incompatible. In order for sharing to work, however, the regime for preventing interference must be robust and sound. In this case, the regime relies on a database that determines which TV channels unlicensed devices can use without creating interference to TV viewers or other licensed operations. If the location information of the TV white space device in the database is unreliable or invalid, the entire TV white space approach fails.

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[3] Under the Commission's rules, unlicensed operations "shall not have any vested or recognized right to continued use of any given frequency" and are "subject to the conditions that no harmful interference is caused" to the "operation of an authorized radio station." 47 C.F.R. § 15.5.

Unfortunately, to date, that database has proven unreliable. NAB has repeatedly and thoroughly documented widespread false registration information and incorrect device location data. On March 19, 2015, NAB filed a Petition for Rulemaking seeking to amend the FCC's rules to ensure that the FCC's precedent-setting spectrum-sharing database would operate as the Commission intended.[4] Subsequently, thanks in large measure to the efforts of the Commission's Office of Engineering and Technology, NAB and a number of TVWS device manufacturers worked cooperatively to address the issues raised in the petition. These negotiations resulted in a joint proposal from NAB and several TVWS device manufacturers, including Adaptrum, Inc., Carlson Wireless Technologies, KTS Wireless and MELD Technology.[5] This proposal will vastly improve the accuracy of the TVWS database and eliminate many of the device and database problems identified in the NAB petition.[6]

It has been more than nine months since the filing of NAB's petition, and more than five months since the submission of the joint proposal to address the concerns identified in that petition. Before allowing additional TVWS operations that require even more precise location information, such as allowing white space devices to operate closer to a TV station's protected contour or to operate at higher power levels in rural areas, the Commission should ensure the database is functioning as intended to minimize the potential for harmful interference. That means acting on NAB's petition to eliminate professional installation as a

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[4] National Association of Broadcasters Emergency Motion for Suspension of Operations and Petition for Rulemaking, RM-11745 (March 19, 2015).

[5] TV band devices manufactured by Adaptrum, Carlson Wireless Technologies, KTS Wireless and MELD Technology represent well over 95% of deployed devices registered in the TVWS databases.

[6] Letter from NAB and TV Band Device Manufacturers to Julius P. Knapp, RM-11745 (July 17, 2015).

means for determining the location of a device, and requiring devices to incorporate automatic geolocation capability.

II. THE COMMISSION'S NEW "PUSH" NOTIFICATION REQUIREMENT WILL NOT PREVENT INTERFERENCE

The Commission's rules allow for the registration of licensed Part 74 wireless microphones used for electronic newsgathering with a database administrator to ensure that white space devices do not interfere with these licensed operations. Under the previous rules, white space devices were only required to contact the database once every 24 hours. There was thus no guarantee that the devices would not cause interference to unplanned breaking news operations.[7] To better protect licensed microphone users, the Commission proposed to require database administrators to share wireless microphone registration information between databases within 10 minutes, and to require white space devices to contact the database every 20 minutes to confirm channel availability. The effect of these proposals would be to ensure that a white space device ceases operation on a channel used by a wireless microphone within 30 minutes after the registration is entered into the database.[8]

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[7] Because TV white space devices only had to check the database every 24 hours, the Commission set aside and reserved two additional TV channels in every market to accommodate wireless microphones used for ENG operations. The Commission has since eliminated these reserved channels and identified 4 MHz in the wireless duplex gap for such use. Unfortunately, the Commission subsequently indicated that television stations could be stranded on channels in the 600 MHz band including the duplex gap. This effectively makes the 4 MHz in the duplex gap unusable for licensed wireless microphones. Thus, the Report and Order's claim that wireless microphones will have exclusive spectrum and "(i)n all cases, licensed wireless microphones will be able to operate in four megahertz of the duplex gap," is simply wrong. Report and Order at ¶ 39, n. 81.

[8] Report and Order at ¶ 272.

In its Report and Order, however, the Commission adopted a new requirement that the white space database "push" information to devices in areas where licensed wireless microphone users have registered operations in the database.[9] Thus, rather than requiring that devices check the database more frequently to determine whether channels are unavailable due to wireless microphone registrations, the Commission will require the database to provide that information directly to white space devices.[10]

Unfortunately, as written, these rules will not work to protect licensed services from harmful interference. The rules provide no assurance that white space devices will actually receive such messages and cease to operate on channels registered for use by licensed wireless microphones. Additionally, while the existing white space rules allow fixed devices without a direct connection to the Internet to begin operations on a channel,[11] the rules do not contemplate how such devices will determine that a channel is no longer available and cease transmitting. Similarly, white space devices may be used in internal private networks protected by firewalls that prevent external messaging. How would such devices receive database notifications? Moreover, how does a white space device receive a message if Internet access is unavailable during, for example, an emergency (when breaking news coverage may be most vital)?

The Commission has not addressed these questions. While the Report and Order suggests that the push requirement could be implemented as a simple software change or

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[9] The term "licensed wireless microphones" is used generically here to include all Part 74 auxiliary devices used in ENG operations.

[10] Report and Order at ¶ 256.

[11] *See* 47 C.F.R. § 15.711(c)(2)(iv).

upgrade to existing TV white space devices, it provides no basis for this confidence.[12] Some white space devices contact the database over the Internet only at set times, generally once a day, to get available channel information; they do not maintain continuous Internet connectivity. Indeed, if a device did maintain continuous connectivity, there would be no reason not to simply require the device to query the database more frequently.

NAB's suggested approach, where white space devices contact the database to check on channel availability more frequently, has been adopted by Ofcom and other regulators. Coupled with a requirement that devices cease operation if they cannot contact the database, it is far simpler, more efficient, and more cost-effective. It will provide greater protection from interference for licensed wireless microphones, without requiring white space device manufacturers to redesign devices. It will also promote global harmonization of white space operating requirements. White space rules in the U.K. and elsewhere have no push notification requirement, and instead rely on more frequent polling by devices. Thus, devices manufactured for the U.S. market under the Commission's approach cannot be certified for use outside the U.S. and vice-versa, resulting in market fragmentation that will frustrate harmonization and keep device prices high.

White space databases and devices have been designed around a device-initiated protocol. Switching to a protocol which allows for either device- or database-initiated communications will likely require a major redesign of both components. By contrast, simply increasing the polling frequency of the devices can be much more easily implemented and less likely to obsolete existing white space devices and designs. Accordingly, the Commission should reconsider its rules and require devices to contact the database every 20 minutes (or

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[12] Report and Order at ¶ 280.

more frequently) for updated channel information. If, however, the Commission insists on maintaining its push notification approach, it must modify its rules to require that white space devices be capable of receiving such notifications, including when the devices are not in operation or are not connected to the Internet, and that devices send the database a confirmation that devices have actually received and complied with the push notification. Otherwise, as written, the Commission's rules effectively eliminate any requirement that TVWS devices confirm channel availability with the database.

Finally, if the Commission does insist on maintaining this approach, it should consider grandfathering existing equipment. In over five years since the adoption of the TVWS rules, only a few hundred fixed TVWS devices have actually been deployed. The manufacturers of these devices and the companies deploying these devices tend to be small companies with limited resources. The handful of cases where service has actually been deployed using TVWS devices are typically in rural areas, and consumers have generally been required to purchase devices at substantial costs. Rather than rendering these devices and deployments obsolete, the Commission should, at a minimum, allow existing devices to comply with the rules by being modified to contact the database on a more frequent basis.

III. THE COMMISSION SHOULD MODIFY ITS RULES REGARDING LOCATION UNCERTAINTY

The Commission's new rules will allow fixed and Mode II personal/portable devices to determine their location using location technologies that are unable to meet the current ±50 meter requirement, and will require such devices to specify their location uncertainty with a 95 percent confidence level when requesting a list of available channels.[13] The rules also

[13] Report and Order at ¶ 77.

require that the database consider this uncertainty in determining the list of available channels.[14] As a general matter, NAB supports these rules. However, the Commission should modify the rules in certain respects to ensure they function as intended.

The rules provide no requirements or guidance as to how a white space device must determine its location uncertainty, and no requirement for actual testing to confirm that devices can meet the 95 percent standard during the equipment authorization process. To give effect to this standard, and ensure that devices can actually meet it, the Commission should require such testing and specify testing procedures. In adopting the 95 percent confidence standard, the Report and Order noted that "this is consistent with the standard adopted for use across Europe and implemented by Ofcom in the United Kingdom."[15] Accordingly, the Commission should require use of ETSI EN 301 598, which is used in Europe and the UK and provides test procedures for geo-location capability. The FCC should also require that a manufacturer seeking equipment authorization for a white space device submit results of such testing to the Commission.

Further, while NAB has no objection to relaxing the requirements for location accuracy as long as the database takes the uncertainty of location information into account in assigning channels, there should be some limits to the degree of allowable uncertainty. A device should not be able to register in the database with its location as "somewhere in Kansas." Unlimited location uncertainty would make determining the cause of harmful interference essentially impossible, as there would be no practical way to locate an individual device or determine if it was the cause of interference.

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[14] Id.

[15] Report and Order at ¶ 77.

The Commission should establish a reasonable location accuracy limit of ±100 meters. Establishing a device's location ±100 meters would double the uncertainty permitted under the existing rules, would provide significant flexibility in the design of the geolocation technology used in white space devices, and is well within the current state of the art in geolocation technology. A 100 meter requirement would also have the advantage of being consistent with other sections of the Commission's rules, which require that for Mode II personal/portable devices must access a white space database to obtain an updated list of available channels if their location changes by more than 100 meters.[16]

IV. THE COMMISSION SHOULD CLARIFY THE INFORMATION THAT MUST BE PROVIDED WHEN A TVWS DEVICE IS REGISTERED

While the Commission's rules require a device user to provide specific information to the database when initially registering a device, there is considerable confusion with regard to who is responsible for the information that must be provided. The new rules add to this confusion. For example, the new rules provide that, where a TVWS device is professionally installed, the party who *registers* the fixed device will be responsible for ensuring the accuracy of the coordinates entered in the database.[17] However, the same rule section also provides that if the device is moved to another location, the *operator* shall re-establish the device's location. As another example, a device manufacturer, which may be located thousands of miles from a device that may have been installed years ago, may not be the appropriate contact person to resolve a local and immediate interference issue. Given the significant issues identified by NAB with the current database, the Commission should clarify the roles and responsibilities of the owner, operator, installer, contact person, and

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[16] 47 C.F.R. § 15.711(d)(2).

[17] 47 C.F.R. §15.711(c)(1).

responsible party for a white space device, as well as what information should be provided to the database for each party.

V. THE COMMISSION SHOULD NOT PERMIT LOW POWER FIXED DEVICE OPERATION WITHIN THE CONTOUR OF ADJACENT CHANNEL TELEVISION STATIONS

The Report and Order amended the Commission's rules to permit fixed white space devices to operate at 40 mW within the contour of an adjacent channel TV station, reasoning that such operation would be consistent with the rules allowing such operation for personal/portable devices.[18] In comments in this proceeding, NAB demonstrated that there are substantial differences between personal/portable devices and fixed devices, such as antenna height, body absorption and duration of use, that make personal/portable devices less likely to cause harmful interference. In response, the Commission limited antenna height for fixed low power devices to no more than 10 meters, which is the same antenna height assumed in OET Bulletin 69 (OET-69) for television antennas. The Commission reasoned that this would help minimize potential interference to television service while providing increased opportunities for white space operation.[19]

The technical analysis provided in the Report and Order is flawed and incomplete. The potential interference to viewers from low power fixed devices is substantially greater than suggested. The Commission should reconsider its decision to permit low power fixed operation within the protected contour of an adjacent channel TV station.

As an initial matter, neither the fixed white space device power limit of 40 mW nor the 10 meter antenna height limit are practically enforceable under the Commission's rules.[20]

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[18] Report and Order at ¶ 29.

[19] *Id.* at ¶ 30.

[20] 47 C.F.R. § 15.711(c).

The rules simply provide that "(o)peration is permitted only on channels and at power levels that are indicated in the database as being available …" In reality, channels and power levels are chosen manually at the time of installation. To give effect to the rules, the Commission should require TVWS devices to provide the database with the power level and channel on which a device operates. This will help ensure that devices will only operate on available channels at the power level designated by the TVWS database administrator.

Further, the Commission's about face from its earlier distinction between person/portable operations and fixed operations is perplexing. In its original decision permitting personal/portable devices to operate within the contour of an adjacent channel television station, the Commission recognized the significant differences between fixed and personal/portable operation and appropriately applied different technical considerations to its interference analysis of fixed and personal/portable devices. For example, the Commission assumed that free space propagation would apply between a fixed TVWS device transmit antenna and TV receive antenna.[21] For personal/portable devices, however, the Commission did not assume that free space conditions would apply, due to likely losses from scattering objects such as furniture, persons, or ground clutter.[22]

In the Report and Order, however, while the FCC continues to acknowledge that there will be fewer losses due to ground clutter for a fixed device, it now concludes that limiting the fixed device antenna height to 10 meters will prove adequate to limit interference.[23] The

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[21] *Unlicensed Operation in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, ¶ 172 (2008).

[22] *Id*. at ¶ 173.

[23] Report and Order at ¶ 30.

explanations the Commission provides for this conclusion are unavailing. The Report and Order asserts that because a TV receive antenna has directionality in the vertical plane and has lower gain at angles below the horizontal plane, there will still be discrimination between white space and television signals even where a white space device and TV receive antenna are pointed towards one another in substantially the same horizontal direction.[24] However, OET-69 assumes the very same antenna height for TV receive antennas as the new height limit for a fixed TVWS device: 10 meters. There is thus no basis for the assertion that the TV receive antenna will operate at lower gain.

The Commission's analysis also assumes that both white space device transmit antennas and TV receive antennas are highly directional and that the probability that they are both pointed at one another is low.[25] In fact, a number of TVWS devices have been approved with omni-directional antennas and there is nothing to prevent a device from being placed in line with the main beam of a TV receiving antenna. Further, OET-69 assumes a beamwidth for a TV receiving antenna of about 46 degrees; contrary to the Commission's assertion, the probability that a TV antenna will be pointed directly at a fixed TVWS device somewhere within 46 degrees is significant.

Even assuming that both the TVWS device and TV receive antenna are directional, a fixed TVWS device at 10 meters will have direct line of sight to a viewer's TV receive antenna.[26] This means that the unlicensed signal will be subject to the full gain of the TV receive antenna. In adopting the rule that permits personal/portable devices to operate

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[24] Id at ¶ 31, n. 58.

[25] *Id.* at ¶ 31.

[26] Id at ¶ 31, n. 57.

inside the contour of an adjacent channel TV station, the Commission's analysis assumed a 16 meter separation distance between the 40 mW personal/portable device and the TV receive antenna.[27] Applying this same analysis to fixed devices but using the technical characteristics for fixed white space devices that the Commission put forth in that same document, the required separation distance between a 40 mW fixed device with an antenna height at 10 meters and TV receiver would be *160 meters or more*. Accordingly, any fixed TV white space device with an antenna height of 10 meters located anywhere within a *10,400 square meter area* in front of the TV antenna would likely cause interference to TV reception near the edge of the TV contour.[28] Given these large distances and areas, potential harmful interference to TV reception certainly cannot be called a "low probability event."[29]

Even assuming that a DTV viewer is using an antenna of with 0 dB gain in the direction of the white space device, the interference distance can be more than 67 meters, an unprecedented potential interference distance for unlicensed operations. If white space devices become more ubiquitous, as white space proponents fervently anticipate, the probability of interference to TV reception will be substantial. On reconsideration, the Commission should not permit low power fixed operations to operate within the contour of adjacent channel TV stations. This change will place only a minimal burden on unlicensed

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[27] The analysis assumed a 16 meter ground separation distance and a slant angle distance of 18 meters.

[28] This analysis assumes flat terrain for both the TV receiving antenna and the TV white space device. The method of FCC/OET TM-91-1 (Equation 6) was used, assuming 10 meter antenna heights, 40 mW EIRP, 3 dB cross-polarization mismatch, and no building penetration loss, solving for an interfering field strength of 29 dBuV/m. The 10 meter antenna height limit for the TV white space device is based on height above ground. If the TV white space device were located at an elevated location the interference distances would be significantly larger.

[29] Report and Order at ¶ 31.

operations, as personal/portable devices, which represent a much lower interference threat, will still be able operate within the contour of adjacent channel stations.

VI. THE COMMISSION SHOULD MODIFY ITS RULES TO ENSURE THAT WHITE SPACE DEVICES OPERATE ONLY ON AUTHORIZED CHANNELS AND AT AUTHORIZED POWER LEVELS

The Commission's new rules will allow TVWS devices greater flexibility to operate over a wide range of powers and antenna heights. Under the old rules, the database provides the device with a list of available channels based on its registered location and antenna height above ground. The device (or operator or installer) can select any available channel and transmit at maximum power on any or all available channels. Under the new rules, the database will provide devices with an expanded list of channels along with the specific transmit power permitted on each individual channel. While NAB has no objection to this change in principle, and while the separation distances adopted by the Commission are generally acceptable, the FCC must adopt additional rules to give effect to these changes.

The recently adopted rule changes provide no guidance or mechanisms to ensure that TVWS devices will actually operate as required.[30] Even with accurate and automatically-determined geolocation data, permitting devices to operate at varying power levels and

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[30] This problem also applies to Mode I personal/portable devices. For example, new section 15.711(e) of the rules provides that a Mode I device may only transmit upon receiving a list of available channels from a fixed or Mode II device, and in general the list of channels provided is required to be the same as those provided by the database to the fixed or Mode II device. Section 15.711(e)(3) states that a fixed device may obtain and provide to a Mode I device a separate list of channels that includes adjacent channels that are not available for fixed devices. Such adjacent channel use is limited to 40 mW, but there is no requirement that the Mode I device provide the fixed device with its power nor for the fixed device to provide the Mode I device with the power limitations associated with each channel. A similar problem exists with regard to the contact verification signal requirement contained in new section 15.711(e)(4) of rules. To continue operating, a Mode I device must receive a contact verification signal from a fixed or Mode II device every 60 seconds. But there is no requirement that the fixed or Mode II device cease sending such a contact verification signal if the fixed or Mode II device must cease operating or reduce power because a particular channel is no longer is available.

varying distances from protected licensed services creates a risk of harmful interference if devices are not limited to the power levels authorized for a given channel. The new rules include no requirements that devices confirm they operate only on available channels at the appropriate power levels for their antenna heights. The devices do not report to the database, nor are they controlled by the database to operate on specific frequencies at specified power levels.

NAB, therefore, requests that the Commission require white space devices to provide the database with actual operating channel and power information. Having this information in the database will allow more expeditious resolution of any harmful interference that may arise. Such an approach would be consistent with Ofcom's requirements for white space devices in the UK, which require that white space devices report back to the database actual channels and power levels on which they are operating.[31]

VII. THE COMMISSION SHOULD ELIMINATE THE POTENTIAL FOR 48-HOUR CONTINUED OPERATION WHERE A DEVICE CANNOT CONTACT THE DATABASE

Section 15.711(b)(3)(iii) of the Commission's rules provides that, if a TVWS device cannot establish contact with the database during its daily required database check, the device may continue to operate until 11:59 PM the following day.[32] This rule permits devices to operate for up to 48 hours even if they are unable to check the database to confirm the continued availability of channels.

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[31] See http://www.out-law.com/en/articles/2015/february/use-of-white-spaces-sanctioned-for-delivering-wireless-data-services-in-the-uk/. For example, Sections 5.10 and 5.11 of the Ofcom requirements provides, "A WSD must report back to the database the actual channels and powers that it intends to use (we refer to these as the 'channel usage parameters') and must only transmit in accordance with the channels and powers that it reports to the database."

[32] 47 C.F.R. § 15.711(b)(3).

The Report and Order declined to eliminate this rule, concluding that the adoption of the push notification requirement, combined with the preservation of the requirement that devices check the database daily, would ensure that devices receive appropriate available channel information.[33] As discussed above, NAB disagrees that the push notification approach the FCC adopted will adequately protect licensed wireless microphone operation. More fundamentally, however, the Commission's logic is flawed and contradictory. The Commission is assuming, on the one hand, that communications from a white space device to the database over the Internet can be so unreliable that the device may be unable contact the database in an entire 24 hour period. Yet, on the other hand, the Commission assumes that communications from the database to the device over the Internet are so dependable that the database can instantaneously contact any device, even those not connected to the Internet, and send a push notification to stop transmitting.

Both of these assumptions cannot be simultaneously true. As described above, NAB favors a simpler approach that would require white space device to contact the database to determine available channels more frequently as has been done by other regulators. But, if the Commission accepts that contact between the database and the device is reliable enough that instantaneous push messages can be received so that devices will immediately cease operation, there is absolutely no rationale for the 48 hour continued operation rule, because a device should always be able to contact the database for a list of available channels. If, however, the Commission accepts that a device may not be able to establish contact with the database, the Commission should require that such devices immediately

[33] Report and Order at ¶ 278.

cease operations after two failed scheduled checks (*i.e.*, after 40 minutes), as they will be unable to receive push notifications.

Finally, the Commission should clarify that TVWS devices are required to use the latest available channel list from the database. As written, the Commission's rules appear to require a device to contact the database at least once a day, but use the channel availability information provided by the database for the 48-hour period from the time the device last accessed the database. While the Commission's intent was likely to retain the existing TVWS requirements, the re-wording of rule is unclear and subject to misinterpretation if the 48 hour list of available channels happens to differ from a newer list of available channels.

VIII. CONCLUSION

The rule changes the Commission adopted in the Report and Order lack a solid technical foundation and are inconsistent with previous Commission technical analysis. Other sections of the rules appear incomplete – such as the requirement that database administrators send push notifications to protect licensed users, without requiring that TVWS devices be able to receive such notifications, confirm receipt, and immediately cease operations. Left in place, these rules will not protect licensed users. On reconsideration, the Commission should modify its rules as described above to allow the continued development and deployment of white spaces technology while still preventing harmful interference to licensed services.

Respectfully submitted,

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