Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band	)	WT Docket No. 08-166
	)	
Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television Transition	)	WT Docket No. 08-167
	)	
Amendment of Parts 15, 74, and 90 of the Commission's Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones	)	ET Docket No. 10-24

To: The Commission

REPLY COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS

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March 12, 2013

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REPLY COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS

The National Association of Broadcasters ("NAB")[1] hereby replies to certain comments on the *Public Notice* seeking to refresh the record in the wireless microphones proceeding.[2]

[1] NAB is a nonprofit trade association that advocates on behalf of local radio and television stations and broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.
[2] *Public Notice*, "The Wireless Telecommunications Bureau and the Office of Engineering and Technology Seek to Update and Refresh Record in the Wireless Microphones Proceeding," WT Docket Nos. 08-166 and 08-167 and ET Docket No. 10-24, DA 12-1570 (Oct. 5, 2012) ("*Public Notice*"). Concurrent with the filing of these comments, NAB is submitting reply comments in the Commission's incentive spectrum auctions proceeding, GN Docket No. 12-268. Those comments address certain issues raised in this proceeding, and NAB incorporates them by reference here.

I. INTRODUCTION AND SUMMARY

As the record in this proceeding makes clear, licensed wireless microphones — and other Part 74 operations — are essential in enabling broadcasters to serve the public interest. Stations use their Part 74 authorizations to support electronic newsgathering activities and to perform numerous critical internal operations. Without protection for these operations, broadcasters would be unable to provide on-the-scene coverage of breaking news, emergency information, political events, and other time-sensitive incidents. Moreover, the spectrum available for these essential operations is already congested, and likely to become more so in the future.

To safeguard the important services allowed by licensed wireless microphones and other Part 74 operations, the Commission should preserve the two safe harbor channels that it set aside to shield these operations from interference caused by unlicensed devices. Registration in a TV bands database is not an adequate substitute for the safe harbor channels. It takes time to register in a database and for the updated database to share its new registrations with all other databases, and most importantly, additional time for unlicensed devices to check with the databases to receive updated information about channel availability. The latter is the most critical delay that makes the safe harbor channels the only realistic means of ensuring that broadcasters can provide real-time coverage of breaking news and other unplanned, live events.

Broadcasters, moreover, have reasonably relied on the Commission's decision to establish the safe harbor channels, recently investing substantial sums to acquire new wireless microphone equipment. It would be arbitrary and capricious for

the Commission to reverse its decision on the need for the safe harbor channels without taking account of broadcasters' serious reliance interests.

If the Commission nonetheless reduces or eliminates the safe harbor channels, then it must offset the loss of interference protection provided by those channels by enhancing other interference protections for licensed wireless microphones. Two mechanisms that would help provide needed interference protection from unlicensed devices are (1) real- or near real-time exchange of registrations and other changes among white spaces database administrators, and (2) frequent checking of the database by unlicensed white space devices (*e.g.*, every twenty minutes, instead of every 24 hours).

There also is no basis at this time for the Commission to require a transition to digital wireless microphones. The record demonstrates that digital wireless microphones may be little or no more spectrally efficient than analog microphones for many reasons, including latency and interference reduction.

Finally, the Commission should not reduce co-channel coordination requirements. In some circumstances, the engineering professionals involved in frequency coordination may determine that allowing co-channel operations at less than the usual separation distance would not cause harm. But the fact that it is possible to do so, under limited circumstances and subject to professional guidance, does not support a generalized reduction of the coordination distance for *all* wireless microphone operators. Retention of the current requirements would help avoid interference to essential broadcast operations and to television reception.

II. LICENSED WIRELESS MICROPHONE OPERATIONS AND OTHER PART 74 OPERATIONS ARE ESSENTIAL.

The record demonstrates broad consensus among broadcasters, other users of licensed wireless microphones, other low power auxiliary stations, wireless microphone manufacturers, and technical experts that the Commission should safeguard licensed wireless microphones and other low power auxiliary station operations authorized under Part 74 of the rules. Such operations include the in-ear monitors and intercoms used in news gathering, program production and creation, and other television station operations. Interference to these operations caused by unlicensed devices would pose serious risks to essential electronic newsgathering (ENG) operations and to in-station production of broadcast programming. As The Walt Disney Company ("Disney") states, "[s]uch use is not occasional, fleeting use but rather is an absolute necessity to ensure that the sounds of events are heard by viewers, as well as to facilitate seamless communications between producers and talent."[3]

Broadcasters' Part 74 operations are intensive and important. For example, Los Angeles station KABC, which produces seven hours of local news per day, "operates between twenty-five and one hundred wireless microphones and other itinerant communications links each day. KABC also uses UHF television spectrum to employ a two-way radio communication system to support its 'in-the-field' coverage efforts."[4] On an average day, Chicago station WLS uses its wireless microphones to enable coverage of 30-50 breaking news events.[5] WLS also utilizes eight to twelve

[3] Comments of Disney, GN Docket No. 12-268 (Jan. 25, 2013) at 40.
[4] *Id.* at 41-42.
[5] *Id.* at 42 (adding that WLS also uses "wireless IFBs on six channels on an ongoing basis throughout each day to send cues and program audio to talent on the set").

wireless microphones that use UHF spectrum to produce seven in-studio programs throughout the day. Radio stations likewise make intensive use of wireless microphones, which help stations produce live, on-location remotes for news and other local coverage. Also, demand for spectrum is intensified by non-broadcast licensees, such as cable networks like ESPN, which, for example, utilize wireless microphones that use 40 frequencies over 12 channels to produce its Monday Night Football coverage.[6] Radio and television broadcasters and others employ even larger numbers of frequencies at typical NFL games.

Numerous commenters agreed that wireless microphones and other Part 74 operations are essential not only for the important services that local broadcasters provide every day, but also for coverage of major events, emergencies and breaking news.[7] For events such as the Presidential Inauguration, demand for spectrum is high — more than can be accommodated within authorized frequencies — and broadcasters and other news organizations must engage in complex coordination procedures to

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[6] *Id.* at 43.

[7] *See, e.g.*, Comments of Sennheiser Electronic Corporation ("Sennheiser"), WT Docket No. 08-166, *et al.* (Jan. 25, 2013), at 2 ("Wireless microphones operating in the TV bands are an essential tool for the creation of nearly all entertainment, news, and sports programming and motion picture production"); *id.* at 3 (explaining that wireless microphones are key in the production of broadcasts that "routinely attract millions of viewers," such as the Super Bowl, the Democratic and Republican political conventions, the Oscar Awards show, the Olympics, and "and on-the-scene news reporting of all kinds"); Comments of Engineers for the Integrity of Broadcast Auxiliary Services Spectrum ("EIBASS"), WT Docket No. 08-166, *et al.* (Jan. 25, 2013), at 1 ("Over the history of broadcasting, both radio and TV, the trend in the past twenty years has been to replace wired microphones, earphones, and intercom systems with wireless systems"); *id.* at 2 (noting reliance on wireless microphones for "[v]irtually every broadcast production ranging from a casual news stand-up… to an event like Americas Cup or the Super Bowl").

serve the public. News organizations used hundreds of frequencies (over 108 MHz of bandwidth, spread over 25 channels) to support their coverage of the Inauguration.[8]

Broadcasters also use wireless microphones and other Part 74 operations to enable communications between stations' studios and/or news trucks and live, on-the-scene reporters. These operations allow reporters to know when to start broadcasting their reports, provide reporters with a means of transmitting their reports, and enable reporters to receive safety information while reporting during severe weather events. Wireless microphones and other Part 74 operations enable broadcasters to provide the public with crucial emergency information, such as coverage of Superstorm Sandy's impact on the Eastern seaboard.[9] As the New York State Broadcasters Association, Inc. ("NYSBA") attested, New York stations stayed on the air around the clock for days to provide life-saving information, including detailed information on shelters and emergency numbers.[10] Part 74 operations on the safe harbor channels were "critically important" to these efforts.[11]

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[8] Comments of Disney at 44. Even with coordination beginning months in advance of the Inauguration, there was insufficient supply of spectrum to meet the demand. *Id.*

[9] Broadcaster were praised for their efforts to provide timely, life-saving information. *See* John Eggerton, "Broadcast First Informer Role Cited in FCC Sandy Hearing: TV, Radio Help Keep Lines of Communications Open, People out of Harm's Way," MultiChannel News (Feb. 5, 2013), available online at http://www.multichannel.com/technology/broadcast-first-informer-role-cited-fcc-sandy-hearing/141582. For more on broadcasters Sandy coverage, see NAB's "Licensed to Serve" page on Hurricane Sandy, at http://www.nab.org/xert/2012Emails/publicservice/sandyLTS.html.

[10] Comments of NYSBA, Docket No. 12-268 (Jan. 25, 2013), at 5.

[11] *Id.* at 13.

III. NAB SUPPORTS A LIMITED EXPANSION OF ELIGIBILITY FOR PART 74 LICENSED WIRELESS MICROPHONES.

Several commenters have proposed limited expansion of the categories of wireless microphone operators eligible for Part 74 licenses. The Broadway League, Inc. (the "League") urges the Commission to permit registration for the producers of live theatrical productions and entities that support such productions, *e.g.*, venue owners, audio engineers, and sound designers.[12] The League notes that wireless microphones in this context are used within enclosed and controlled environments to ensure safe and professional theater operations.[13] The John F. Kennedy Center for the Performing Arts ("Kennedy Center") similarly asks that large venues and multi-theater presenters be added to the list of eligible Part 74 entities, pointing out that "on a typical Saturday at the Kennedy Center, the Center uses close to 200 wireless frequencies, which includes not only wireless microphones, but wireless in-ear monitors, wireless speakers and wireless intercoms."[14] The Kennedy Center states that if it cannot license its wireless microphones and other communication devices, interference from other unlicensed devices could ruin performances and create safety risks for performers, staff, and audience members.[15]

NAB reiterates its previous support for expansion of Part 74 licensing eligibility to allow theaters, entertainment and live music venues and productions, government bodies, and houses of worship to license their wireless microphone use (subject to restricting unlicensed wireless microphone operations in the television band,

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[12] Comments of the League, WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 25, 2013).
[13] *Id.* at 4-5.
[14] Comments of the Kennedy Center, WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 25, 2013), at 3.
[15] *Id.* at 4.

to avoid additional spectrum congestion and interference).[16] This limited expansion of the categories of eligible Part 74 licensees is justified in light of the professional nature of such operations, opportunity for advance coordination, and the low risk that they will cause interference to reception of television signals, as these venues are not typically located in residential areas where most broadcast receivers are found.

IV. THE RECORD STRONGLY SUPPORTS PRESERVING THE TWO SAFE HARBOR CHANNELS AND OTHER MEANS OF ENSURING AN INTERFERENCE-FREE ENVIRONMENT FOR LICENSED WIRELESS MICROPHONES AND OTHER PART 74 OPERATIONS.

Because broadcasters' wireless microphones and other Part 74 operations are critical in ENG activities and in the production of local news, emergency journalism, and other programming, the Commission should safeguard these operations from interference caused by unlicensed devices. NAB therefore disagrees with the Consumer Electronics Association ("CEA"), which supports reducing the number of safe harbor channels from two to one, without explaining how licensed communications and wireless microphone operations can still be protected from harmful interference.[17] NAB also disagrees with commenters calling for elimination of both safe harbor channels entirely, in order to make more spectrum available for unlicensed use.[18]

It is important to emphasize here that providing two safe harbor channels was a critical component of the Commission's 2010 white spaces program and that the

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[16] Large entertainment venues would include amusement and theme parks and other large recreational facilities.

[17] *See* Comments of CEA, GN Docket No. 12-268 (Jan. 25, 2013), at 5 (urging the Commission to "open one of the two TV channels currently reserved to wireless microphones for general unlicensed use"); *id.* at 28.

[18] *See, e.g.*, Comments of Motorola Mobility LLC ("Motorola"), GN Docket No. 12-268 (Jan. 25, 2013), at 14-15 and Comments of the Wireless Internet Service Providers Association ("WISPA"), GN Docket No. 12-268 (Jan. 25, 2013), at 17.

reasons for the decision remain entirely valid today. The white spaces order correctly recognized the importance of preventing interference from unlicensed white space devices to incumbent services.[19] The Commission determined that the two safe harbor channels were necessary to meet this goal.[20] As discussed in detail below, these safe harbor channels remain necessary today for the same reasons: (1) Part 15 unlicensed devices are required to protect licensed operations; (2) spectrum sensing is a technically infeasible means of protecting licensed wireless microphones from unlicensed device interference; and (3) registration in white space databases is not a viable alternative because it does not ensure interference protection for coverage of unscheduled and fast-breaking news.

Part 15 unlicensed devices clearly are required to protect licensed operations.[21] Those commenters, however, seeking elimination of the two safe harbor channels fail to explain how licensed operations would be protected from interference from unlicensed devices in the absence of any channels reserved for Part 74 operations. Indeed, even the Public Interest Spectrum Coalition, proponents of

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[19] *See Unlicensed Operation in the TV Broadcast Bands,* Second Memorandum Opinion and Order, ET Docket Nos. 04-186 and 02-380, 25 FCC Rcd 18661 (2010) ("*Second Memorandum Opinion and Order*"), para. 5 ("[o]peration under Part 15 is subject to the condition that a device does not cause harmful interference to authorized services"), and para. 15 (the Commission's white spaces rules include "safeguards to prevent harmful interference to incumbent communications services").

[20] *Id.* at para. 29.

[21] *See Second Memorandum Opinion and Order* at para. 5; *id.* at para. 55 ("unlicensed devices operate on a non-interference basis, meaning they may not cause interference to authorized services"); 47 C.F.R. § 15.5(b)-(c).

unlicensed usage, recognized that the white spaces database must protect licensed operations.[22]

Moreover, while the Commission in the *Second Memorandum Opinion and Order* in the white spaces proceeding expressed hope that "spectrum sensing will continue to develop and improve,"[23] it ultimately rejected spectrum sensing as a means of ensuring protection by white spaces devices, and, at the same time, adopted the safe harbor channels for wireless microphone operations.[24] As Audio-Technica explains, the Commission's decision to establish the two reserved channels for wireless microphone use on a nationwide basis was a quid pro quo for its decision to relieve white spaces devices from their obligation to protect microphones by incorporating effective spectrum sensing capabilities into portable/personal WSD equipment.[25] Indeed, the Commission made clear that the safe harbor channels "accommodate LPAS operations that are not at fixed locations *that would have been protected under the spectrum sensing provisions we are eliminating herein*."[26] It further recognized that reserved channels on

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[22] *See, e.g.*, Comments of the Public Interest Spectrum Coalition ("PISC"), GN Docket No. 12-268, *et al.* (Jan. 25, 2013), at 50 ("Under the Commission's Part 15 rules governing unlicensed access to white space, the TV Bands Database must block access to channels based on 'TV station information from station license or license application records'"); *id.* at 56 ("The TV Bands Databases certified by the Commission are designed precisely to govern opportunistic access by unlicensed devices that must seek permission each 24-hour period to continue using a particular channel – a permission that the TV Bands Database can withhold when a primary licensee is ready to commence service").
[23] *Second Memorandum Opinion and Order* at para. 54.
[24] *Id.* at para. 54 (eliminating the sensing requirement); *id.* at para. 29.
[25] Comments of Audio-Technica U.S., Inc. ("Audio-Technica"), WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 25, 2013), at 8-9 (adding that "[t]he interference concerns that underlay the current White Space rules, in particular the need to ensure that wireless microphones have some spectrum in each market that is free from WSD interference, remain as valid today as when those rules were originally adopted.").
[26] *Second Memorandum Opinion and Order* at para. 132 (emphasis added).

which unlicensed devices "will not be allowed to operate" will "ensure that there are frequencies on which licensed microphones used in roving applications such as electronic news gathering can operate."[27]

Many commenters explained why the Commission should preserve, not eliminate, the two safe harbor channels it recently determined were necessary in the white spaces proceeding.[28] SBE points out that in order for broadcasters to be able to "cover breaking news events in real time… [i]t is critical for broadcasters that there be at least two reserved channels, totaling at least 12 MHz, exclusively for licensed wireless microphone operations."[29] The two existing safe harbor channels are very congested at times, and are insufficient when demand is high (such as to enable ENG activities permitting broadcast coverage of major news events such as the Presidential Inauguration, political conventions, and even on other, day-to-day occasions).[30]

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[27] *Id*. at para. 55.

[28] *See, e.g.*, Comments of the Society of Broadcast Engineers, Inc. ("SBE"), Docket No. 12-268 *et al.* (Jan. 24, 2013), at 6 (explaining importance of two safe harbor channels); *id.* at 9 (raising concerns about broadcasters' ability to produce real-time ENG and news, sports, and entertainment programming, if spectrum for wireless microphones and other Part 74 is further eroded); Comments of Audio-Technica at 8-9; Comments of Shure, Inc. ("Shure"), WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 25, 2013), at 15 ("The two reserve channels must be preserved for the exclusive use of wireless microphones and related professional audio equipment").

[29] Comments of SBE at 12 (also urging the FCC to expand the safe harbor by adding two more 6 MHz channels).

[30] *See, e.g.*, Comments of the National Football League ("NFL"), GN Docket No. 12-268, *et al.* (Jan. 25, 2013), at 2 (spectrum is "already congested with intensive use by television stations and their newsgathering operations"); Comments of Disney at n.130 (indicating that congestion "often" affects local news operations); Comments of Shure at 7 ("professional wireless equipment supports a myriad of events in the U.S. every day—from local to international in profile"); *id.* at 16 (noting that "[t]he demand for clean, interference-free spectrum continues to skyrocket"); Comments of EIBASS at 4 ("Particularly in large metros, where many studio operations have gone wireless, licensed users are now receiving interference from unlicensed users near their studios.").

The two safe harbor channels are particularly important in light of the fact that — as the Commission has acknowledged — "[t]he repacking of television stations may result in a reduced amount of spectrum being available in the core television bands for use on a secondary basis by licensed wireless microphones under the LPAS rules."[31] This prospect follows the recent elimination of channels 52-69 as possible channels for wireless microphone use.[32] NAB agrees with commenters that the prospect that the Commission will further *diminish* the total amount of spectrum available for licensed wireless microphone use makes it increasingly important to *preserve* the modest number of channels reserved under the safe harbor.[33] As the NFL explains, there is significantly less spectrum available for wireless microphones at NFL games today, as mobile broadband devices increasingly consume more UHF spectrum. Often, no spectrum is available for microphones other than the two designated channels, and repacking will lead to even less white space for wireless microphones.

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[31] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, FCC 12-118 (*rel*. Oct. 2, 2012), at para. 224.

[32] *See* Comments of Shure at 10 (noting that the 700 MHz frequencies, which had been available for wireless microphone operations for 30 years, constituted one-third of all of the available bandwidth for such operations).

[33] *See, e.g.*, Comments of SBE at 12; Comments of the Screen Actors Guild-American Federation of Television and Radio Artists, AFL-CIO ("SAG-AFTRA"), WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 31, 2013) ("More and more consumer device transmissions flood the airwaves every day. Moreover, the Commission has stated in its Incentive Auction proceedings that reorganizing the UHF-TV bands may reduce the spectrum available in those bands for all devices. As more devices squeeze into fewer channels, shared space like 'guard bands' are a less viable alternative, as the shared space becomes increasingly crowded, with the potential for interference set to increase over time. Dedicated channels are the only sure-fire way to avoid that interference.").

"Accordingly, the two designated wireless microphone channels will be more important than ever."[34]

With spectrum congestion among licensed Part 74 operators already significant, and intensifying, it would be arbitrary and capricious for the Commission to reverse course on the need for the safe harbor channels. The *Second Memorandum Opinion and Order* making clear that the safe harbor channels were necessary was released in September 2010 — after years of comment and consideration, and after the March 2010 release of the National Broadband Plan (which recommended a major reduction of the spectrum available to broadcast stations).

Moreover, the Commission's 2010 decision on the safe harbor channels has engendered substantial reliance by wireless microphone users. As the Supreme Court has stated, "change that does not take account of legitimate reliance on prior interpretation may be 'arbitrary, capricious [or] an abuse of discretion.'"[35] At minimum, when an agency's "prior policy has engendered serious reliance interests that must be taken into account," the agency must provide a more detailed justification for changing course, because "it would be arbitrary or capricious to ignore such matters."[36]

Here, the record is clear that broadcasters (and others) have relied on the establishment of the safe harbor channels in making equipment and other investments. Shure explains that, following the 700 MHz transition, wireless microphone users undertook "an industry-wide effort to retire fully functional equipment and re-deploy in the new 'safe harbors' that were identified in the White Space rules. Taken together,

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[34] Comments of NFL at 3-4.
[35] *Smiley v. Citibank (South Dakota), N.A.*, 517 U.S. 735, 742 (1996) (citations omitted).
[36] *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009).

the 700 MHz transition and the White Space rules have resulted in significant capital outlay and retraining for the country's wireless audio users, distributors, and manufacturers."[37] SBE similarly observes that since late 2010, broadcasters have "invested heavily in wireless microphones that will operate near TV channel 37 because of the location of the reserved channels specified by the Commission."[38] Wireless microphone users have specifically expressed concerns to the Commission about the substantial capital outlays required to purchase wireless microphones after the 700 MHz transition.[39]

The substantial reliance by broadcasters on the 700 MHz transition and the establishment of the safe harbor channels is further documented in the Declaration of David Folsom, Vice President and Chief Technology Officer for Raycom Media, Inc. ("Raycom").[40] Mr. Folsom explains that, following the mandate requiring wireless microphones to vacate the 700 MHz band by June 12, 2010, and based on the reasonable assumption that operation in the safe harbor channels would remain protected from interference caused by unlicensed Part 15 devices, Raycom spent approximately $161,000 in 2010 to purchase wireless microphones that could operate in the post-digital transition television band. This included more than $30,000 spent on new wireless microphones for multi-media journalist kits ("MMJ Kits"), which Raycom's journalists use to cover breaking news. Since then, Raycom has made additional investments in wireless microphones, totaling over $25,000, with plans to spend at least $70,000 more on wireless microphones for MMJ Kits in 2013. It would be arbitrary and

[37] Comments of Shure at 10-11.
[38] Comments of SBE at 6-7.
[39] *See id.* at 12.
[40] *See* Attachment A.

capricious for the Commission to ignore these "legitimate"[41] and "serious reliance interests" of broadcasters across the country.[42]

Finally, NAB agrees with those commenters that support granting licensed wireless microphones (and other Part 74 devices) access to the guard bands and duplex gap to be created in the repacking of the television band following the proposed incentive auction. As amply described in the record, the increasing shortage of spectrum for broadcasters' wireless microphones and other essential Part 74 operations will compromise the public's ability to rely on broadcasters for coverage of breaking news, sports, severe weather and other emergencies, and major events. The expected repacking of television stations will shrink the UHF television band and further reduce the amount of spectrum available to broadcasters for critical ENG activities and other Part 74 operations. Continued access to the spectrum that becomes the guard band and duplex gap could partially mitigate those losses and the spectrum congestion caused by the previous loss of channels 52-69 for Part 74 operations. Certainly if the Commission permits unlicensed devices to operate in the guard band and duplex gap, then licensed wireless microphones should be allowed to operate on these channels under the same conditions that are available today under the white space rules. We additionally observe that licensed operations generally operate at low power and are subject to controls, mitigating the risk of interference to operations in adjacent bands.[43]

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[41] *Smiley,* 517 U.S. at 742.
[42] *FCC v. Fox*, 556 U.S. at 515.
[43] *See* Comments of Qualcomm Incorporated, GN Docket No. 12-268 (Jan. 25, 2013) at v ("should the FCC decide to place some operations within the duplex gap or lower guard band, wireless microphones are much preferred because their geographically-contained operations likely will pose far less pervasive interference than TV white space devices"); Comments of AT&T, Inc., GN Docket No. 12-268 (Jan. 25, 2013) at 22-23
(continued…)

V. IF THE COMMISSION ELIMINATES OR REDUCES SAFE HARBOR CHANNELS, IT SHOULD IMPROVE WHITE SPACES DATABASE PROTECTIONS FOR LICENSED WIRELESS MICROPHONES.

NAB agrees with Disney that "[a]ny reduction in wireless spectrum assets without a corresponding action to offset these losses would have a detrimental impact on local broadcasters' ability to serve their viewers as well as upon the other entertainment venues that rely on UHF television spectrum to support their wireless needs."[44] If the safe harbor channels are reduced (or eliminated), then it is imperative that the loss of interference protection that the safe harbor channels provide be offset with a corresponding increase in other forms of protection from unlicensed white space devices. In fact, NAB submits that, even if the two reserve channels are retained, changes in the television white space rules are warranted to make the database approach adopted by the Commission more efficient and meaningful.

NAB has suggested two mechanisms for accomplishing this goal: (1) real- or near real-time exchange of registrations and other changes among white spaces database administrators, and (2) frequent checking of the database by unlicensed white space devices (every twenty minutes, instead of every 24 hours).[45] These proposals are designed to address the fact that, as the Commission recognized in establishing the safe harbor channels, coverage of live news events occurs at unpredictable times and locations:

(urging that "to the extent the Commission permits unlicensed uses in the guard bands… the Commission should adopt appropriately low power limits and controls on out-of-band-emissions").

[44] Comments of Disney at 45.

[45] *See* Comments of NAB, WT Docket Nos. 08-166 and 08-167, *et al.* (Jan. 25, 2013), at 8-9.

> Reserving two channels nationwide will ensure that at least two channels remain available for wireless microphones in all markets. . . . These reservations will provide channels to accommodate LPAS operations that are not at fixed locations that would have been protected under the spectrum sensing provisions we are eliminating herein. Such LPAS operations include electronic news gathering and other temporary on-site applications, where *the operating channels and locations are not known sufficiently far in advance to register them in the database*.[46]

Under the existing rules, TV band database administrators only have to exchange information every 24 hours. The database administrators have already agreed to a standard that provides for real-time or near real-time exchange of this information. However, TV white space devices are only required to contact the data base every 24 hours and can continue to operate if such contact fails for another 24 hours. Reliance on the database alone, in the absence of safe harbor channels, is therefore insufficient, especially when reporters are covering breaking news events or disasters and emergencies. The database by itself will ensure protection for licensed wireless microphones (and other Part 74 operations) only if the Commission requires database registrations to be propagated quickly throughout the network of databases, and requires the unlicensed devices themselves to consistently contact the database at more frequent intervals to provide protection to licensed operations. Provided that broadcasters' news and other operations are given sufficient flexibility, limits on registering an excessive number of channels and/or registering for an excessive length of time would be appropriate.

Unlicensed wireless microphones should be subject to the rules applicable to all unlicensed devices that operate in the television band. This requirement will be particularly important if the Commission expands the classes of wireless microphone

[46] *Second Memorandum Opinion and Order* at para. 132 (emphasis added).

users that are eligible for Part 74 licensees, and in light of increasing congestion in the available spectrum. This will also ensure sufficient spectrum for other unlicensed white space devices.

VI. THE RECORD DOES NOT SUPPORT A TRANSITION TO DIGITAL MICROPHONES AT THIS TIME.

The comments responding to the *Public Notice* generally dispel assertions that digital wireless microphones are substantially more efficient than analog wireless microphones at this time.[47] Commenters agreed with NAB's position that spectrum efficiency is complicated to assess, and must take into account latency, interference reduction, and other factors. For example, Shure states that "[w]hile digital technology has improved, there are important tradeoffs vis-á-vis analog transmission" and in some cases, "digital wireless microphones are less spectrally efficient than the leading analog models for the same audio quality and working range."[48] Sennheiser explains that digitization and compression can increase spectrum efficiency but have the effect of causing loss of fidelity and an increase in latency — major problems when considering that wireless microphones users employ this equipment for applications requiring high

[47] WISPA asserts that analog wireless microphones are "very inefficient," citing to newer digital wireless microphone technology manufactured by Shure and Sennheiser that, WISPA asserts, is more spectrally efficient. Comments of WISPA at 20. PISC makes similar claims; *see* Comments of PISC at 39-40. Yet Shure and Sennheiser themselves explain, as noted herein, that digital wireless microphones are *not* necessarily more spectrally efficient than their analog counterparts.

[48] Comments of Shure at 28 (adding that "[t]he interplay of various design elements (audio coding, error coding, compression, modulation, intermodulation distortion ('IMD') and receiver selectivity) makes it difficult to simultaneously achieve high spectrum efficiency and robustness against interference, while providing the low latency necessary for live performances"); *id.* at 30 ("[w]ith digital wireless technology… there is a tradeoff between spectrum efficiency and interference protection").

fidelity and low latency (delay).[49] Audio-Technica similarly notes that "[d]igital compression schemes can decrease range and battery life, increase latency and significantly decrease overall audio quality which could make such systems unsuited for particular applications, such as musical performances, where audio quality is of paramount concern."[50] It also points out that the *Public Notice* may have underestimated the number of analog wireless microphones that can operate per 6 MHz channel.[51]

Further, as explained above by other commenters, and in NAB's initial comments, broadcasters recently undertook an involuntary transition in their wireless microphone use, vacating channels 52-69. In connection with this process, many broadcasters were required to make major investments in new equipment. Broadcasters purchased *analog* equipment (digital equipment is, as the Commission noted, only just coming on the market). The Commission should not strand the substantial equipment investments that broadcasters made when vacating channels 52-69 by imposing a premature decision to require a transition to digital equipment.

[49] Comments of Sennheiser at 10-11.
[50] Comments of Audio-Technica at 12.
[51] *Id.* (pointing out development of technology permitting 25 or more analog wireless microphones to operate on a single 6 MHz channel).

VII. THE COMMISSION SHOULD NOT REDUCE CO-CHANNEL COORDINATION REQUIREMENTS.

With respect to another technical issue raised in the record, NAB opposes any reduction of the co-channel coordination requirements, such as that supported by PISC.[52] Sections 74.803 and 74.24 of the rules already allow the use of frequencies by Part 74 users on a non-interference basis at shorter co-channel distances when necessary.[53] Broadcasters and SBE spend time and effort to coordinate the use of frequencies by Part 74 licensees for coverage of news and special events. The professionals involved in this process understand the complexities of frequency coordination and when co-channel operations may be safely used at shorter distances, such as inside studios or buildings, without creating interference to other protected operations. The Commission should not reduce the coordination distance for *all* wireless microphones, and open the door to co-channel operations when the conditions that ensure interference-free operations are not present. Reduction of the coordination distance for all users would create a serious risk of interference to Part 74 operations and to viewers, and the Commission should reject calls to do so.[54]

VIII. CONCLUSION

For the reasons stated above, NAB respectfully requests that the Commission safeguard licensed wireless microphones from interference by preserving the existing two safe harbor channels and improving the database registration and checking procedures. We also support a limited expansion of eligibility for Part 74

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[52] *See* Comments of PISC at 5 ("PISC believes the Commission should reduce the separation distance for co-channel microphone operation").
[53] 47 C.F.R. §§ 74.803 and 74.24.
[54] *See* Comments of NFL at 5 (objecting to proposal to reduce co-channel separation distance, on basis that it would increase already substantial interference problems).

wireless microphone licenses, and agree with commenters that the Commission should not mandate a transition to digital wireless microphones at this time.

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