

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

<b>Amendment of Parts 15, 73 and 74 of the Commission’s Rules to Provide for the Preservation of One Vacant Channel in the UHF Television Band For Use By White Space Devices and Wireless Microphones</b>	)	<b>MB Docket No. 15-146</b>
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<b>Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions</b>	)	<b>GN Docket No. 12-268</b>
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**To: The Commission**

**COMMENTS OF THE SOCIETY OF BROADCAST ENGINEERS,  
INCORPORATED**

The Society of Broadcast Engineers, Incorporated (“SBE”)<sup>1</sup> hereby respectfully submits its Comments in response to the Commission’s *Notice of Proposed Rulemaking* in the above-captioned proceeding.<sup>2</sup> The Notice tentatively proposes to make available one channel at or above TV Channel 21 in the ultra-high frequency (“UHF”) band in all areas in the United States that would not be assigned to a television station in the repacking process, so as to preserve one television channel for shared use by wireless microphones (WMs) and unlicensed “white space” devices (WSDs).<sup>3</sup> This proceeding is separate from and independent of the issue of possible replacement spectrum for WMs that is now under consideration in Docket 14-166. In this proceeding, the Commission notes that the specific vacant channel that is supposed to be

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<sup>1</sup> SBE is the national association of broadcast engineers and technical communications professionals, with more than 5,000 members worldwide.

<sup>2</sup> *Notice of Proposed Rulemaking*, FCC 15-68, 30 FCC Rcd.1611, 80 Fed. Reg. 38158 (released June 16, 2015) (the “*Notice*”).

<sup>3</sup> The Commission uses the term “wireless microphones” to refer generally to wireless microphones and other low power auxiliary stations licensed pursuant to Part 74, subpart H, and similar devices authorized on an unlicensed basis. “White space” devices refer to unlicensed devices operating on television channels pursuant to Part 15, subpart H, as discussed further below.

preserved for WM and WSD use may vary depending on the particular area. Under the instant Notice proposal, post-incentive auction, a party wishing to construct a new, displacement, or modified broadcast television station on one of the UHF channels would perform a technical study to determine channel availability and the other operating parameters for the proposed television facility and would include this study with its application to demonstrate that white space devices and wireless microphones operating within the same area as the proposed broadcast or BAS station will, after grant of the proposed television station application, have access to at least one UHF channel in the same market, (determined using the current criteria for determining where wireless white space devices and microphones can operate).

1. The Notice proposal in this proceeding signals the latest in a continuing, short-term series of unreasoned reversals and technically unsound retreats of the Commission with respect to reaccommodation of licensed, Part 74 WMs which were displaced from the 700 MHz band and those which now stand to be displaced from the 600 MHz band by the incentive auction. Worse, this proceeding, *sub silencio*, abandons the Commission's longstanding spectrum allocations policies relative to the priorities of unlicensed Part 15 devices versus licensed stations operating in allocated frequency bands. To the extent that there is a prioritization of any Part 15 WSD over a licensed broadcast or broadcast auxiliary station in spectrum allocated to broadcast and broadcast auxiliary services, the Commission's proposal is flatly untenable. Furthermore, the Commission should take no comfort that this Notice proposal provides any substantive accommodation for displaced Part 74 licensed WMs in the UHF television broadcast band going forward in any market. It does not. For the reasons set forth hereinbelow, therefore, SBE urges that the Commission not proceed with the instant proposal for making available a single television UHF channel for combined WM and WSD operation at the potential expense of

disaccommodating a displaced television broadcast station, LPTV station or TV translator.

Instead, the Commission should make other accommodations for WMs at UHF, including but not limited to providing exclusive access for licensed WMs in at least 4 megahertz of the “duplex gap” at 600 MHz; and making other allocations for WMs in other spectrum in Docket 14-166.

For its comments on the instant notice proposal, SBE states as follows:

2. As the Commission has previously noted, among many ubiquitous applications throughout the United States, WMs play an important role in enabling broadcasters and other video programming networks and entities to serve consumers, including delivery of breaking news, emergency information and broadcast live sports events. In a series of orders establishing repeatedly modified band plans for the UHF television allocations, the Commission has serially, in a very short period of time, reduced the available spectrum for UHF WMs in the band. Given this, it is certainly timely for the Commission to make available a reasonable amount of reserved spectrum in each market for WMs and low power broadcast auxiliary devices in particular.

3. Recent rulemaking proceedings, starting with the Commission’s effort to implement commercial and public safety broadband and interoperable narrowband public safety spectrum at 700 MHz have heretofore, separately and cumulatively, had a significantly adverse effect on the availability of spectrum for WMs and other low power auxiliary service (LPAS) devices.

Without actually implementing any of these incremental regulatory changes, the Commission has repeatedly changed the UHF reaccommodation plan for WMs, and in the process has eliminated all certainty about the future ability of broadcasters to conduct broadcast, cablecast or satellite broadcasts of urgent news, and sports and entertainment programming due to a completely inadequate amount of residual spectrum for these devices.

4. On January 14, 2010, the Commission adopted a *Report and Order and Further Notice of Proposed Rule Making* in Docket 10-24, addressing the rules for wireless microphones and other low power auxiliary devices that operate in the TV bands.<sup>4</sup> In that proceeding, the Commission prohibited the manufacture, import, sale, lease, offer for sale or lease, or shipment of wireless microphones and other low power auxiliary stations intended for use in the 700 MHz Band (TV channels 52-69, 698-806 MHz) in the United States. It was required that all LPAS facilities, including WMs<sup>5</sup> cease operations in the 700 MHz band no later than June 12, 2010. The Commission acknowledged that WMs are used for important functions, and noted that many WMs were being operated by non-broadcast entities and persons ineligible for a Part 74 license. Therefore, along with the migration of full-power TV stations, Class A TV stations, TV translators, TV boosters and Low-power TV stations to available channels below 698 MHz, LPAS' and WMs had to migrate downward as well.<sup>6</sup> This greatly reduced the number of channels available for WM and LPAS operation, and the downward migration was completed less than five years ago. A very large number of WMs were operating in the 700 MHz band and that equipment had to be modified or replaced with equipment that was not capable of operation above 698 MHz at great expense to broadcasters and video production companies.

5. Meanwhile, at the low end of the UHF TV band, channels 14-20 (470-512 MHz) are used in thirteen major markets in the United States for important land mobile radio communications. That band is fully deployed for that purpose in those markets. There is a plethora of additional uses made of the television broadcast band, including medical telemetry

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<sup>4</sup> See *Report and Order and Further Notice of Proposed Rule Making* in WT Docket Nos. 08-166 and 08-167 and ET Docket No. 10-24, 25 FCC Rcd 643 (2010).

<sup>5</sup> Low power auxiliary stations are short-path transmit devices. They are, in addition to wireless microphones and wireless intercoms, used for purposes such as cue and control communications, and synchronization of TV camera signals. 47 C.F.R. § 74.801 *et seq.*

<sup>6</sup> TV channels 2-51, excluding channel 37.

equipment (on an unlicensed basis on any vacant TV channel in the range of channels 7-46), and unlicensed remote control devices (on any TV channel above 70 MHz except for channel 37). TV channel 37 (608-614 MHz) is allocated for radio astronomy and the wireless medical telemetry service (WMTS) and is not used for TV broadcasting. The Offshore Radiotelephone Service uses channels 15-17 in certain regions along the Gulf of Mexico. The compression of all of these uses into the band 512-698 MHz, plus the addition of WSDs and the accommodation (essentially legalization) of unlicensed WM users in that same spectrum has made the frequency coordination of WMs and LPAS' exceptionally difficult, despite real-time channel sharing procedures developed and utilized by SBE frequency coordinators. "TV White Spaces" was as a practical matter a misnomer from the outset. There never really were any white spaces in the UHF television band.

6. However, as recently as September of 2010, at least some protection for WMs and LPAS operation was offered. Specifically for the purpose of accommodating WMs after the reallocation of the 700 MHz band, the Commission noted that it had previously limited use of TV channels 2 and 5-20 to communications between fixed TVBDs, and it had also previously reserved two channels in the range 14-51 in the 13 markets where PLMRS and CMRS systems operate "to make sure that frequencies are available for wireless microphones."<sup>7</sup> Most importantly, the Commission held in September of 2010 that it was "...*expanding the reservation of two channels in the range 14-51 to all markets nationwide as suggested by several petitioners. This will provide frequencies where a limited but substantial number of wireless microphones can be operated on any basis without the potential for interference from TV bands devices. It will also ensure that frequencies are available everywhere for licensed wireless*

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<sup>7</sup> See *Second Report and Order*, 23 FCC Rcd 16860 at ¶ 151. With regard to channels 2 and 5-20, the Commission stated that restricting use of channels 2 and 5-20 to communications by fixed devices with other fixed devices would limit the number of TVBDs that could potentially conflict with wireless microphone use.

*microphones used on a roving basis to operate without risk of receiving harmful interference from TVBDs.”*<sup>8</sup> The Commission also provided for a nominal separation distance between WSDs and sites of venues and events where large numbers of unlicensed wireless microphones are used by permitting such sites to be registered in the TV bands databases. It noted that, at any particular location, a number of TV channels would not be available for TVBDs due to the application of the various interference protection requirements under the rules. Therefore, the Commission concluded, “a significant amount of spectrum will be available on which wireless microphones can be operated as they have in the past without concern for interference from TVBDs. We believe that this spectrum will provide sufficient frequencies to support wireless microphone operations at the great majority of events.” Because of these accommodations, and specifically because of the reservation of the two channels per market for WM and LPAS operation,<sup>9</sup> broadcasters and video production companies were confident that they could continue to conduct ENG and event production activities as necessary. Broadcasters, since late 2010, invested heavily in wireless microphones that will operate near TV channel 37 because of the location of the reserved channels, in reliance on the Commission’s firm commitment to provide two reserved UHF channels for WM operation.

7. The Commission’s accommodation for WMs in the TV White Spaces Docket was no panacea. As the Commission has acknowledged,<sup>10</sup> there is at any given news or entertainment

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<sup>8</sup> *Second Memorandum Opinion and Order*, 25 FCC Rcd 18661 at 18674 (2010).

<sup>9</sup> *See*, 47 C.F.R. §15.707(a) (prohibiting white space devices on the first channel above and the first channel below channel 37 that are available, or if a channel is not available above and below channel 37, prohibiting white space devices on the first two channels nearest to channel 37).

<sup>10</sup> A good primer on WM and LPAS use of UHF television broadcast bands was provided at paragraph 223 of the *Incentive Auctions NPRM*. The Commission stated that:

Licensed LPAS may operate on vacant channels allocated to television broadcasting. In the UHF band, co-channel LPAS operations must be separated by a distance of at least 113 kilometers (70 miles) from the television station. Unlicensed wireless microphones are permitted similar types of operations on this unused spectrum. Wireless microphones operate in a relatively narrow bandwidth

event the need for more than 100 WMs and LPAS devices.<sup>11</sup> Because, in a given broadcast market there are many unlicensed WMs as well as licensed WMs, and because the Commission has not limited the reserved channels in a given market to only licensed WMs, not all of the two reserved channels could have been used in any given market. Because of the need for broadcast-quality audio for broadcast applications, and for use of WMs in theatrical productions, WMs have historically required approximately 200 kilohertz of occupied bandwidth.<sup>12</sup> While the next generations of WMs may have narrower bandwidths, this equipment is not now universally available. Manufacturers of WMs have a very substantial investment in research and development of the current generation of WMs. Broadcast licensees (and other video production entities) have a substantial investment in purchased UHF equipment with a very long usable life. There is a large base of embedded equipment which has very recently been acquired by broadcasters in reliance on the continuation of the availability of the accommodations created in the White Spaces Docket; *especially* the two reserved channels for WMs.

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*and often are technically capable of choosing different frequencies among multiple vacant channels available for operation* (emphasis added). Many wireless microphones are used regularly and predictably (*e.g.*, at television studios, movie studio lots, or major sporting events facilities), but at times the location of their operation changes (*e.g.*, covering news events in different places). The nature of wireless microphones and their use is such that they operate for relatively short intervals at different times, and the specific frequencies they use for operation often change, even when used at one location. Theatrical and sports productions and other major events often use more than 100 wireless microphones, which in certain locations could use most if not all of the UHF channels available to them in the television bands.

<sup>11</sup> At the largest sporting events and at political conventions, there are typically more than 120 WMs and LPAS devices in use, often simultaneously. For example, at a recent Formula One automobile race in Texas, held at a venue well away from the metropolitan area of Austin, Texas, there was an acute shortage of WM spectrum and well over 120 WMs were in use at any given time, due to the presence of non-U.S. broadcasters as well as local broadcast and video production entities. At the NFL Super Bowl each year, and during political conventions, extraordinary efforts are made to accommodate the number of WMs necessary to provide coverage of these events that the public expects, using a series of television broadcast channels. Event frequency coordinators are required at these events to make sure that the most efficient use is made of the limited amount of spectrum available now for WMs in real time. Reserving one broadcast channel for shared WM/WSD operation per market is, without more, no accommodation whatsoever for individual, real-time breaking news events, much less planned sports and major news events. Without more, the public will be deprived of the ability to have these events brought to them as they are now.

<sup>12</sup> This occupied bandwidth is necessary to assure broadcast quality audio and dynamic range without any latency or delay.

8. The *Incentive Auction* proceeding then proposed a radical change of direction for WM and LPAS operations. The Commission scrapped the two reserved channels for WMs near Channel 37 and noted that, depending on the outcome of the incentive auction, there may be no channels available for WM operation in a given market which would not be shared with TVBDs, and no channels where unlicensed (and therefore uncoordinated) WMs would be excluded. The Commission made no proposal for any reaccommodation spectrum for any WMs elsewhere, noting that there is generally no replacement spectrum offered for displaced secondary users in reallocated spectrum.

9. SBE argued in that proceeding that a minimum of 24 MHz of UHF spectrum should be available for WMs in each market. This number could be reduced over time, as narrowband WM technology evolves, but it would be completely unreasonable for the Commission to mandate a short-term narrowband conversion of WM technology. By abandoning the minimal accommodations adopted in the 2010 White Spaces proceeding, the Commission created in effect a “bait and switch” situation in less than two years. Broadcasters and video production companies have very recently invested heavily in current generation UHF equipment in reliance on the availability of the two reserved channels. If there are no channels reserved for WMs and LPAS devices which are not to be shared with WSDs, WM users, and especially licensed broadcasters and video production entities simply cannot provide interference-free service to the viewers that expect the same and receive it now. The registry established for WSDs will not protect WMs used in breaking news reporting activities.

10. Allowing WM operation in at least 4 megahertz of the duplex gap offers some relief, if that segment is available and if reserved for WMs used in breaking news events in real time. It is, however, seriously inadequate and insufficient as re a stand-alone reaccommodation for

WMs. *It is critical for broadcasters that there be at least two reserved channels, totaling at least 12 MHz, exclusively for WM operation.* What happens at a breaking news event is that multiple broadcast entities converge on the same geographic area. Some are local, some are not. Each entity usually requires at the very least two WM channels (one for the WM and one for the IFB). One broadcast entity may have several reporters on site (depending on the nature of the news event), necessitating several channels. Four megahertz in the duplex gap would not provide the opportunity to cover these events. Nor would a single TV channel shared with WSDs.

11. SBE continues to maintain that there is a firm need for the foreseeable future to have available for video production of news, sports and entertainment events -- regardless of the means of multicasting those events to the viewing public -- at least 24 MHz of spectrum available at UHF which is not shared with WSDs. In addition, there should be bands available for operation pursuant to Special Temporary Authority for the inevitable sports or newsworthy events which can be planned in advance. This would provide a total of 120 channels for WM operation. Over time, it would be reasonable to pare down this 24 MHz of spectrum for WMs in each market to something less, due to changed technology. Taking a cue from the Land Mobile Radio Service, which is in the midst of a two-part narrowbanding conversion in the VHF and UHF land mobile radio bands from 25 kHz technology to 12.5 kHz and, later, 6.25 kHz technology, it is necessary to plan for and to allow a reasonable transition to more narrowband WM technology over a period of years. Also as noted above, broadcasters, in reliance on the Commission's adopted plan for the availability of the two reserved channels for WMs in each market, have made large expenditures for equipment that will function adequately.

12. It is patently obvious to broadcast engineers who are involved in the SBE's frequency coordination effort that the reservation of a single UHF TV channel per market, to be shared

between WMs and WSDs, is an inadequate accommodation for incumbent WM licensees who are about to be displaced from the 600 MHz band. Nor is it fair to require applicants for LPTV, TV translator, and BAS facilities to demonstrate that their proposed new, displacement, or modified broadcast facilities would not eliminate the last available vacant UHF television channel for use by WSDs and WMs in an area. There is a vast difference between licensed WMs and unlicensed, Part 15 WSDs in terms of the entitlement of the latter to commence operation in a band allocated to a licensed radio service (in this case broadcast and broadcast auxiliary services). WSDs are entitled to no priority over any licensed broadcast or BAS facilities.

13. For many years, the Commission has utilized as a means of spectrum management the allocation and licensing processes. The domestic table of allocations in Part 2 of the Commission's rules provides a functional hierarchy of types of uses of various frequency bands that is modified from time to time by rulemaking. Within those spectrum allocations, the principal tool for interference prevention and frequency assignments is the requirement in Section 301 of the Communications Act of 1934 that anyone who wishes to operate a device that emits radio frequency (RF) energy first obtain a license from the Commission. 47 U.S.C. § 301. Section 301's licensing requirement contains no exceptions. That section forbids the "use or operat[ion of] any apparatus for the transmission of energy or communications or signals by radio [in or affecting interstate commerce], except . . . with a license[.]" Nevertheless, since 1938 the Commission has permitted the use without a license of certain devices that radiate extremely low levels of radio frequency energy, as long as that use does not cause harmful interference to licensed operations and provided that the operator of the device is willing to accept any interference created.<sup>13/</sup> While the Commission's statutory justification for permitting

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<sup>13/</sup> See Certain Low Power Radio Frequency Electrical Devices, 3 Fed. Reg. 2999 (December 14, 1938).

these unlicensed devices shifted somewhat in the early years,<sup>14/</sup> the Commission soon settled on the rationale that a device transmitting too little RF energy to interfere with licensed uses does not constitute an “apparatus for the transmission of energy” under section 301.<sup>15/</sup> The Commission has adopted rules governing the use of unlicensed devices, which are codified in Part 15 of the agency’s rules (47 C.F.R. Part 15) which prescribes technical standards for particular types or classes of unlicensed devices.<sup>16/</sup> These are backed up by an overriding command that unlicensed devices may be operated *only* to the extent that they do not harmfully interfere with licensed operations. This command is embodied in three rules. First and foremost, the “operation of a [Part 15] device is subject to the condition... that no harmful interference is caused.” 47 C.F.R. § 15.5(b). Second, operators of Part 15 devices must accept any interference “that may be caused by the operation of an authorized radio station.” *Id.* Finally, “[t]he operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference.” *Id.* at § 15.5(c). Consistent with the Commission’s legal rationale for allowing unlicensed devices under Section 301, the agency’s principal obligation with respect to such devices is to ensure that their operation will predictably not interfere with (or, by logical inference, preclude) licensed radio services.<sup>17/</sup>

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<sup>14/</sup> Early decisions suggested that unlicensed low-power devices are permissible under Section 301 because these devices have no interstate effects. *See, e.g.,* Low Power Communication Devices, 13 R.R. 1546e, 1546g–1546h (1957); Restricted Radiation Devices, 13 R.R. 1543, 1544 (1956). However, it was determined in various court decisions (e.g. Fisher’s Blend Station, Inc. v. Tax Commission of Washington State, 297 U.S. 650, 655 (1936), and clarified in the Communications Amendments Act of 1982, P.L. 97-259 (1982) that all radio communications constituted interstate commerce and that the FCC has exclusive jurisdiction over intrastate as well as interstate communications. H.R. Report No 765, 97<sup>th</sup> Cong., 2d Sess., at 33 (9182).

<sup>15/</sup> *See* Ultra-Wideband Transmission Systems, 19 F.C.C.R. 24,558, at ¶ 68.

<sup>16/</sup> *E.g.,* 47 C.F.R. subpart B (unintentional radiators); *id.* subpart C (intentional radiators).

<sup>17/</sup> Unlicensed devices have no allocation status in any frequency band; they operate on an “at sufferance” basis. In one instance, the FCC protected the interests of unlicensed Part 15 users against interference from licensees in the Location Monitoring Service (“LMS”). *See* Report and Order, *Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, 10 FCC Rcd 4,695 (1995). However, LMS was a

14. A corollary to that regulatory structure is that a displaced, licensed station in either the broadcast service or the broadcast auxiliary service seeking a reaccommodation channel in a band allocated domestically to the broadcast and broadcast auxiliary services cannot be subjected to a requirement that the licensed station protect an unlicensed service that has was not operating on that channel heretofore. SBE rejects the concept embodied in the Commission's proposal to obligate displaced, licensed broadcast and auxiliary stations to make a showing that there is room in a band allocated to broadcast and broadcast auxiliary facilities to provide for Part 15 WSDs as a condition for reaccommodating the former. If in the incentive auction process, something has to give, it is going to have to be the WSDs, because they have no allocation status, no license, and no entitlement to operate to the extent that they preclude, interfere with, or preempt the continued operation of a pre-existing licensed broadcast or broadcast auxiliary service station.

15. In summary, the Commission in this proceeding has made a proposal that is at once insufficient to accommodate displaced wireless microphone facilities; inadequate as a means of continuing the service that broadcasters and video production companies have provided to the public for many years which the public expects; and most of all, an untenable spectrum management plan that places unlicensed Part 15 white space devices ahead of licensed broadcast stations and licensed broadcast auxiliary stations in spectrum that is allocated to the broadcast service. That constitutes an unreasoned departure from longstanding Commission policy with respect to unlicensed devices and therefore the Notice proposal is arbitrary and capricious. The Commission should permit broadcasters and video production companies to operate wireless microphones in the duplex gap and should further make accommodation both within and outside the residual UHF television band for wireless microphones displaced from the 600 and 700 MHz

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new licensed service created by the FCC *after* "millions of Part 15 devices," such as cordless telephones, were already operating in the bands in question. *See id.* at ¶ 32.

band. At any given time in any market, there should be not less than 24 megahertz of wireless microphone spectrum available at UHF and not shared with WSDs. If that cannot be accommodated, the Commission should ensure that replacement spectrum is made available which provides similar transmission paths and which is not encumbered by incompatible, incumbent radio service sharing partners.

Accordingly, for good cause having been shown, the Society of Broadcast Engineers urges the Commission to revisit the issue of UHF wireless microphone spectrum post-incentive auction and make reasonable accommodation for wireless microphones displaced from the 600 and 700 MHz band consistent with these comments.

**THE SOCIETY OF BROADCAST ENGINEERS,  
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