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

Comments of
The Association for Maximum Service Television, Inc. and
The National Association of Broadcasters

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SUMMARY

The Association for Maximum Service Television, Inc. (MSTV) and the National Association of Broadcasters (NAB) hereby respond to the Report and Order and Further Notice of Proposed Rulemaking in this proceeding concerning the regulatory status of licensed and unlicensed wireless low power auxiliary stations, including wireless microphones, in the TV broadcast band.

The proposal to open the TV band to a new universe of untraceable wireless audio devices, on an unlicensed basis under Part 15 of the Commission's rules, may result in substantial harmful interference to digital television service. The same harmful interference that the Commission seeks to prevent for the new commercial wireless services to be installed in the 700 MHz band is likely if wireless audio devices are relocated in the core TV band. Digital television service in the TV band is no less vulnerable to interference from such wireless audio devices and wireless microphones than the new wireless services in the 700 MHz band. There is no technical reason for such disparate treatment and access to important, potentially life saving information could be at stake in either situation. There is also no need to open the core TV band to such unlicensed operations because these wireless devices can operate on an unlicensed basis under Part 15 in other, less congested frequency bands.

The proposal to allow operation of wireless microphones in the TV band on an unlicensed basis under Part 15 is unsound policy for several reasons. First, it would result in an influx of new wireless devices that are wholly unsuitable for the TV band, such as baby monitors, home intercom systems, and voice-activated, remote-controlled toys. Second, unlike the wireless microphone applications that have coexisted with

television service to date, the unlicensed services invited by the Commission's proposal are not operated in controlled settings at locations sufficiently distant from residential television viewing. Third, these unlicensed wireless audio devices are of relatively lesser quality than licensed wireless microphones, and are not installed, monitored or maintained by professional engineers or technicians, thereby raising the risk of interference due to faulty operations. Finally, the proposed technical restrictions on such wireless audio devices in the TV band, including the suggested power limits and out-of-band emission levels, are inadequate to prevent unwanted interference to digital television service.

MSTV and NAB support a more conservative expansion of Part 74 eligibility to enable licensed operations of certain additional wireless audio devices in the core TV band, including by theaters, live music productions, government bodies, and houses of worship. These kinds of wireless microphone applications are typically operated under conditions that sufficiently safeguard digital television service from undesired interference (e.g., in controlled, professional facilities that are sufficiently distant from residential areas). Most importantly, these licensed operations are identifiable and thus may coordinate use in the TV band with other services.

Finally, MSTV and NAB suggest that there should be only limited relocation of unauthorized low power auxiliary stations now operating in the 700 MHz band to the TV band during the pendency of this proceeding. Permitting unlimited relocation prejudges the outcome of the Further Notice of Proposed Rulemaking because once unauthorized, unidentifiable entities are permitted in the TV band, it will be impossible to resolve interference problems caused by these operations. Instead, MSTV and NAB would

support a temporary, narrow extension of Part 74 eligibility to allow the above-listed wireless microphone applications to operate in the TV band on a licensed basis, during the pendency of this proceeding. This would allow a controlled, reversible approach while the Commission considers the record generated in response to the Further Notice.

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To: The Commission

Comments of
The Association for Maximum Service Television, Inc.
and The National Association of Broadcasters

The Association for Maximum Service Television, Inc. (MSTV)[1] and the National Association of Broadcasters (NAB)[2] respectfully submit these comments on the above-captioned Report and Order and Further Notice of Proposed Rulemaking regarding the regulatory status of licensed and unlicensed wireless low power auxiliary stations,[3]

[1] MSTV is a nonprofit trade association of local broadcast television stations committed to achieving and maintaining the highest technical quality for the local broadcast system.

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

[3] 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

including wireless microphones, in the TV broadcast band (TV Channels 2 – 51, excluding Channel 37).

The Further Notice proposes changes to FCC rules to permit entities ineligible for a Part 74 low power auxiliary station license to operate wireless microphones in the core TV bands on an unlicensed basis under Part 15 of the rules. The Commission also seeks comment on expanding eligibility under Part 74, Subpart H of the rules to create additional licensed opportunities to operate wireless microphones in the TV bands. The Commission further seeks comment on any technical advances such as digital technology that could enhance the long-term efficiency of wireless microphones and management of the relevant spectrum. Further Notice at ¶ 107.

As discussed in detail below, MSTV and NAB, because of the inevitable disruption to television service, respectfully oppose the proposal to open under Part 15 the core TV bands to a new universe of untraceable, unlicensed wireless audio devices. MSTV and NAB do support a more conservative extension of Part 74 eligibility to certain categories of professional, identifiable users of wireless microphones.

I. Television Viewers Could Lose Access to Important Services, Including Public Safety Information, if the Commission Moves Forward with the Current Proposal for Clearing the 700 MHz Band

Since the Commission launched this proceeding in 2006, the goal has been to leverage the digital television (DTV) transition to clear the 700 MHz band for

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of Parts 15, 74 and 90 of the Commission's Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones, ET Docket No. 10-24, *Report and Order and Further Notice of Proposed Rulemaking,* FCC 10-16 (*rel*. Jan. 15, 2010) (Report and Order or Further Notice).

"unencumbered" use by new public safety and other wireless services.[4] Broadcasters have consistently supported this effort.[5] Broadcasters cannot support the proposal in the Further Notice, however, to eliminate the potential interference between wireless microphones and the new 700 MHz wireless services by moving wireless microphones to the core TV bands. As explained below, this proposal would harm TV viewers because digital television service is no less vulnerable to interference from wireless microphones than the new services that will occupy the 700 MHz band. Additionally, the Further Notice proposes to create an entirely new category of unlicensed services under Part 15 of the rules in the core TV band, termed "Wireless Audio Devices." Further Notice at ¶ 112. Such an approach would have similar harmful effects on TV viewers.

The Commission has expressly determined that wireless microphones pose a significant risk of co-channel interference to both public safety and commercial services in the 700 MHz band, even when microphones are operated at low power levels. Report and Order at ¶¶ 24, 37. The record largely supports this conclusion.[6] V-COMM, for example, provided data to demonstrate that wireless microphones, CMRS and public safety services are incompatible in the same frequency band.[7] The Commission also found that wireless microphones may cause other types of interference, "such as adjacent channel interference, due to out-of-band emissions and intermediation

[4] Report and Order at ¶¶ 5 – 7.
[5] Comments of the Association for Maximum Service Television and the National Association of Broadcasters, WT Docket No. 08-166, WT Docket No. 08-167 (filed Oct. 3, 2008) (MSTV/NAB Comments).
[6] Report and Order at ¶ 24 note 52.
[7] *Id*. at ¶ 24 citing Comments of V-Comm, LLC, WT Docket No. 08-166, WT Docket No. 08-167 (filed Oct. 3, 2008), at 5.

interference caused by emissions from multiple devices," which can occur when multiple low power auxiliary transmitters are used in close quarters with commercial wireless or public safety operations in the 700 MHz band. *Id*. at ¶ 38.

The Commission thus decided to clear the 700 MHz band of wireless microphones as of June 12, 2010. *Id.* at ¶ 2. In doing so, the Commission relied heavily on its concern that wireless microphones may cause interference to public safety operations in the band, and what this could mean for the protection of Americans' life, health or property. *Id*. at ¶¶ 37, 49. The Commission should be similarly concerned about the impact of the current proposal. The potential harmful interference that unlicensed wireless microphones and audio devices operating in the core TV bands may cause to television service could disrupt access to the primary means by which Americans receive vital life-saving information during times of emergencies.[8]

The evidence demonstrates that there is no significant technical difference in the potential of low power auxiliary stations, including wireless microphones, to interfere with digital television reception than with the new wireless services in the 700 MHz band. The Commission concludes in the Report and Order that low power auxiliary stations have the potential to cause co-channel interference, adjacent band

[8] Broadcasters have been the backbone of the national warning system for over 50 years, and through the use of live news and other coverage, broadcasters have been the principal source of in-depth, ongoing access to critical and often life-saving information, both before and after disaster strikes. Often at their own peril, broadcasters have provided on-the-spot, continuous coverage of emergencies and recovery operations, even when all other media outlets failed. For example, during Hurricane Katrina, when the floods disrupted electricity, battery-powered radio and television receivers were the only information lifeline for many of the stranded population, and during September 11th, when cellular telephone networks clogged, New Yorkers and residents in the Washington, DC metro area relied on broadcasters for vital information. Subjecting the reception of such critical information to potential interference from new wireless audio devices is unwise.

interference, out-of-band emission interference and intermediation interference to commercial and public safety base stations and mobile devices.[9] MSTV and NAB agree, especially if such operations are not appropriately licensed and coordinated. However, there is little or no difference in such potential interference from wireless devices to DTV reception. Both DTV and the new 700 MHz wireless operations rely on digital modulation schemes that have similar signal level thresholds and are equally susceptible to the types of interference the Commission notes. Indeed, DTV service may be more susceptible to interference from a new class of wireless audio devices. DTV reception is based on an outdoor antenna with antenna gain and height. This same gain and height advantage also applies to signals coming from Part 15 wireless audio devices, thereby causing DTV reception to be vulnerable to potential interference from a new class of consumer applications based unlicensed wireless audio devices.

Accordingly, there is no technical rationale for disparate treatment of DTV viewers.[10] The Commission cannot correctly conclude that unlicensed wireless microphones operating in the core TV band pursuant to Part 15 of the rules will not cause disruption to DTV viewers but would cause interference to commercial wireless services in the 700 MHz band. On the other hand, if the Commission decides that unlicensed wireless devices will cause interference to DTV reception, then such operations should be prohibited from both bands. MSTV and NAB also stress that there is no need to open the core TV band to unlicensed wireless devices, as there are

[9] Report and Order at ¶ 38.

[10] It is axiomatic that similarly situated entities be treated similarly, or at least that the Commission fully explain its reasons for disparate regulation. *See, e.g., Melody Music, Inc. v. FCC,* 345 F.2d 730 (1965); *White Mountain Broadcasting Co. v. FCC*, 598 F.2d 274 (1979).

other, less congested frequency bands in which these devices can operate on an unlicensed basis under Part 15 of the rules. For example, various parties have suggested frequencies in the 900 MHz,[11] 2.4 GHz,[12] and 49 MHz bands,[13] and elsewhere.[14]

II. Operation of Wireless Microphones in the Core TV Bands on an Unlicensed Basis under Part 15 Is Unsound Policy

A. The Definition of "Wireless Audio Devices" Is Overly Broad

The Further Notice proposes to allow low power wireless devices to operate on an unlicensed basis in the core TV bands, as well as technical rules intended to prevent co-channel and other interference among services in the band. Further Notice at ¶¶ 109 – 123. Unfortunately, the proposal to relocate wireless devices from the 700 MHz band to the core TV band may create more problems than it cures. The proposal is especially troubling because it will be irreversible, as it will be impossible to remove untraceable, unlicensed wireless devices from the core TV band once they enter.

MSTV and NAB acknowledge there are thousands of wireless microphones already in use by entities ineligible for a license under Part 74 of the rules. PISC, for instance, cited estimates of more than 400,000 wireless microphones in the United States as of 2006, and possibly many more unlicensed microphones.[15] However, the

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[11] Thomas C. Smith Comments at 6; Society of Broadcast Engineers, Inc. Comments at 3-4;
[12] *Id*.
[13] Sennheiser Electronic Corporation Comments at 8.
[14] PISC Petition at iv-vi, 16.
[15] Informal Complaint and Petition of the Public Interest Spectrum Coalition (PISC) Petition (July 16, 2008), at vi (quoting Paul D. Lehrman, "Can You Hear Me Now? The Wireless Crunch Is Coming," Mix Magazine, May 1, 2006, available at http//mixonline.com/mag/audio_hear_2/index.html (last visited July 9, 2008)); Report and Order at ¶ 72.

current presence of wireless microphones does not justify opening the TV bands to thousands, or perhaps millions, of additional unlicensed wireless microphones and other unlicensed devices that will exponentially increase the risk of interference to DTV reception.

The Commission proposes to create a new category of wireless microphones as unlicensed devices under Part 15 of the rules, and term them "Wireless Audio Devices," which would be defined as "intentional radiators used to transmit voice, music or other material over short distances." *Id*. at ¶ 112. Such transmissions would be allowed in either analog or digital format, but would not be permitted for data transmissions other than short data strings needed to maintain a device's function. This definition is overly broad, as it would allow an explosion of new wireless devices that are wholly misplaced in the core TV bands, including such common gadgets as baby monitors, voice-controlled remote-controlled toys, wireless microphones for video game consoles, and wireless audio speakers and surround sound systems, as well as household devices like home intercom systems and wireless door bells. Of course, this is just an abbreviated list of the devices that would be allowed in the core TV bands, and does not include the plethora of future devices that are difficult to envision at this time.

To date, television service and wireless microphones have coexisted without significant interference, due to a variety of factors. But these mitigating factors would be absent under the proposal to permit a new class of wireless audio devices in the TV band, especially given the breadth of the proposed definition of Wireless Audio Devices.

Most significantly, the overwhelming majority of existing wireless microphones are used in controlled, professional settings that are sufficiently distant from residential

television reception. For instance, most wireless microphones are used at locations such as religious institutions, theaters, educational facilities, and sporting events, where broadcast television viewing is uncommon.[16] Interference from out-of-band emissions has not been a substantial problem because the distance separations between wireless microphones and consumers' DTV receivers are generally in the hundreds of meters. For the most part, simple geographic separation, such as between a theater and residential households, has prevented interference to TV reception from wireless microphones. Additionally, television viewing is largely an indoor activity. Thus, any undesired signal interference from nearby wireless microphones, for example, at a neighborhood church, is significantly attenuated by the church building and the homes of television viewers.

However, many of the additional unlicensed wireless devices, including microphones, proposed to be allowed in the core TV bands would not be used at locations sufficiently distant from most television viewing. The unlicensed wireless devices identified above are commonly used within homes, and frequently in the same bedroom, family room or living room as a digital television, meaning that no signal attenuation due to buildings or walls would be of help. At power levels proposed by the Commission, such wireless devices are likely to cause harmful interference to digital television reception.

The Commission itself has acknowledged this situation. In the White Spaces Second Report and Order, the Commission referenced a technical report, released July 31, 2007, by the Office of Engineering and Technology, describing direct pick-up

[16] *See, e.g.*, MSTV/NAB Comments at 9-11.

interference tests of three digital cable ready television receivers. In these tests, three digital cable ready (DCR) TV receivers connected directly to cable service were examined for their vulnerability to interference from commercial wireless operations like those that may operate within the TV white spaces. Tests were performed with the interfering wireless signal source separated from the DCR receiver by distances of two meters or ten meters and, in most cases, also by a residential wall. The Commission observed that a signal as low as 6.3 dBm EIRP could cause interference to the DTV receiver at a distance of two meters and that a signal as low as 15.3 dBm could cause interference at a distance of 10 meters.[17] The Commission stated: "While these tests were limited in scope (only three receivers were tested), they nonetheless provide an empirical demonstration of the potential for such interference at relatively low power levels."[18]

Also, the majority of existing, identifiable wireless microphone systems can cost upwards of $100 to $1000, and have been professionally installed and maintained. As a result, their power levels, cords and connections, power sources, and internal mechanisms are typically monitored and kept in working order. Theaters usually employ professional audio engineers, and schools, government institutions and

[17] The tests for two meters separation were conducted both with and without an intervening wall between the interferer and the TV receiver. The tests with ten meter separation distances were only conducted with an intervening wall between the interferer and the TV receiver.

[18] Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band, ET Docket No. 02-380, *Second Report and Order and Memorandum Opinion and Order*, 23 FCC Rcd 16807, 16819 ¶ 26 (2008) (White Spaces Order) *recons. pending* citing Office of Engineering and Technology "Direct-Pickup Interference Tests of Three Consumer Digital Cable Television Receivers Available in 2005," OET Report FCC/OET 07-TR-1005, July 31, 2007 (Direct Pickup Report).

churches usually have access to engineers or audio technicians on at least a part-time or contract basis. One byproduct of the efforts of these professionals to properly maintain their own equipment is that wireless microphones at these establishments infrequently cause interference to television reception due to equipment failure or improper use.

Conversely, the consumer-grade unlicensed wireless microphones in the gadgets and devices mentioned above are inexpensive and lower quality, and are less likely to meet or be operated in accordance with FCC technical requirements. They are more susceptible to breaking, and relatively less worthwhile to maintain. Further, consumers using voice-controlled toys and the like may not always use them as instructed, leading to more frequently damaged devices, and may be less likely to comply with the Commission's proposed technical limits designed to prevent interference to television reception. As a result, these kinds of unlicensed wireless microphone applications pose much greater risks of interference to digital television viewing, especially when used in close quarters with the family television set.

Moreover, the professional, identifiable wireless microphones in use today are typically used for relatively short periods of times, such as during a theater performance or weekly sermon or football game. Compare this to the use of common devices with unlicensed wireless audio devices, such as baby monitors, which may be used overnight, or home intercom systems or wireless door chimes that are always on. The odds of co-channel interference are greatly increased.

Still another mitigating factor is that Part 74 licensed wireless microphones generally far exceed the out-of-band requirements set forth in Part 74. This occurs

because wireless microphones licensed under Part 74 are battery-operated and are designed to conserve the use of power to provide the user with the longest possible battery life. Licensed wireless microphones, therefore, are designed to minimize most out-of-band emissions, well beyond what is required under the rules.

In contrast, the unlicensed Part 15 wireless devices proposed to be introduced into the core TV band may be designed to operate on 120 VAC household electric service with no concern about expiring power or limiting out-of-band emissions. Consumers using such devices will not realize that these devices are causing interference to television reception, or how to eliminate such interference.

Finally, the use of wireless microphones originated at a time when there was significantly more available spectrum for broadcast television and more vacant channels and space available for use. The current core TV band is less able to bear thousands of additional unlicensed wireless microphones. As Shure Incorporated explained, most of the spectrum in the core TV band is already occupied by full power, Class A, low power and translator stations, or is inappropriate for wireless microphone applications.[19] Of course there is also the concern that introducing wireless microphones into the core TV bands will crowd out unlicensed devices.[20]

MSTV and NAB strongly oppose permitting uncontrolled unlicensed operation in the core TV spectrum. The proposed approach of permitting a new class of unlicensed wireless audio devices under Part 15 of the rules will allow applications that will be commonly used in the home and other environments where the potential for

[19] Comments of Shure Incorporated, WT Docket No. 08-166, WT Docket No. 08-167 (filed Oct. 3, 2008), at 11-14.
[20] Comments of the White Spaces Coalition, WT Docket No. 08-166, WT Docket No. 08-167 (filed Oct. 3, 2008), at 3-4.

interference to DTV reception is significantly greater than current wireless microphone use.

B. The Proposed Technical Rules Are Inadequate to Prevent Harmful Interference to Television Reception and Other Licensed Operations in the Core TV Band

The Further Notice proposes adoption of technical rules similar to those applicable to wireless microphones licensed under Part 74.[21] However, such an approach is insufficient and inapt for operation under Part 15 of the rules. Operations pursuant to Part 74 of the rules are subject to frequency coordination, a critical factor in band sharing according to the Commission.[22] For instance, regarding revisions to its Part 74 broadcast auxiliary service rules, the Commission stated that frequency coordination "rules are necessary to promote spectrum efficiency and to minimize the potential for any system to cause harmful interference to other systems in the same frequency band."[23]

The unidentifiable and unlicensed wireless audio devices the Further Notice proposes to introduce into the core TV band are inherently unpredictable and unable to coordinate frequency management of the band with television operations. Furthermore, unlike the existing wireless microphones that are utilized by current licensees and other professionals, unlicensed wireless audio devices are used by consumers with no expertise or incentive to comply with proper frequency selection or coordination

[21] Further Notice at ¶ 114.
[22] *See, e.g.*, Review of Quiet Zones Application Procedures, WT Docket No. 01-319, *Report and Order*, 19 FCC Rcd 16258 (20040 (encouraging Quiet Zone applicants to use advance notification procedures).
[23] Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78, and 101 of the Commission's Rules, ET Docket No. 01-75, *Notice of Proposed Rulemaking*, 16 FCC Rcd 10556, 10570 (2001).

techniques. Thus, while the Part 74 rules have worked to prevent intra-band interference in the current professional environment, they are inappropriate for uncontrolled Part 15 use.

The proposed technical rules limit the power of these devices to 50 mW. Further Notice at ¶ 116. However, the only safeguard from co-channel interference is a proposed rule requiring that co-channel operation of unlicensed devices be located at least 60 to 80 miles away from a television transmitter, pursuant to the channel and zone parameters prescribed under Part 74.[24] While this requirement is appropriate for equipment that is licensed under Part 74 and subject to professional use and/or frequency coordination, it is wholly unworkable and unenforceable for an unlicensed, untraceable Part 15 consumer device. It is unrealistic to rely on a consumer to recognize whether she is far away enough from a television transmitter, to realize what television frequency is being used by that station,[25] or to understand if the operational frequency of the Part 15 consumer device is within a particular television channel. The technical proposals therefore will be ineffectual, as there is nothing to prevent consumers from using a wireless microphone application on a TV channel that is in use in their area.

Inevitably, consumers will inadvertently operate wireless audio devices on frequencies that are being used for television service, which will cause harmful interference to television reception service. It is also inevitable that disrupted

[24] Further Notice ¶ 115.
[25] This is compounded by the fact that viewers see the channel number broadcast in the DTV station's PSIP, which may not be the actual RF channel number.

consumers will direct their frustration at their local television broadcasters, rather than the (likely unknown) manufacturer of the wireless device that caused the interference.

Finally, while the proposed cap of 50 mW of wireless microphone transmission power may seem reasonably low, co-channel interference to DTV reception from a 50 mW transmitter can be significant. In fact, during the Commission's testing for the White Spaces proceeding, co-channel interference was reported from a white space device, at a distance of 360 meters, that was transmitting at only 5 mW, or one-tenth of the power limit proposed for unlicensed wireless audio devices in the core TV band.[26] Obviously, harmful interference from an unlicensed device operating at 50 mW can potentially go much further and cause more disruption. In addition, there is nothing in the proposed rules that would prevent a device, such as a stereo or surround sound system, from having multiple Part 15 transmitters of 50 mW each, effectively doubling or multiplying by several times the power of the interfering signals on a TV channel.

The Further Notice also proposes to apply Part 74 out-of-band emission requirements to unlicensed wireless audio devices operating in the core TV bands pursuant to Part 15. Further Notice at ¶ 118. Such an approach is completely insufficient. Among other things, these limits require that on any frequency removed from the operating frequency by more than 250%, the signal level must be attenuated or

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[26] See *Evaluation of the Performance of Prototype TV-Band White Space Devices Phase II*, OET Report FCC/OET08-TR-1005, Technical Research Branch, Laboratory Division, Office of Engineering and Technology, Federal Communications Commission (Oct. 15, 2008), at vii:

> "The Adaptrum device's transmitter was characterized in the laboratory and was used to investigate interference potential to DTV signal reception. Anecdotal tests demonstrated that co-channel interference would occur at line-of-sight distances of up to 360 meters at an EIRP of approximately +7 dBm . . . ."

reduced by 43 +10 log P dB, where P is the mean power in watts. For the proposed limit of 50 mW transmitter power, this means that the wireless device signal must be attenuated only by 30 dB, at which level co-channel interference to DTV viewers and other licensed operations will occur. For example, this requirement would permit emissions of -61 dBm at ten meters from 50 mW Part 15 unlicensed transmitters.[27] Such emissions would be permitted on any TV channel and would result in co-channel interference.[28] While other factors such as antenna cross-polarization effects may occur in certain instances and mitigate interference, there is a significant threat of interference from unlicensed operations with such limited out-of-band technical restrictions.

Out-of-band emissions from Part 74 wireless microphone operations previously have not been an interference problem for a number of reasons. First, wireless microphones are generally used at locations far enough away from TV viewing and TV reception.[29] Second, Part 74 wireless microphones are designed to minimize most out-of-band emissions well beyond what is required.[30] Furthermore, if interference

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[27] This is based on a 10 meter free space propagation path. 50 mW is equivalent to 17 dBm. A 30 dB attenuation requirement and 48 dB propagation loss, yields a signal level of -61 dBm or (17 dBm - 30 dB - 48 dB).

[28] DTV receivers provide error-free reception down to a signal level called the threshold of visibility (ToV). For most DTV receivers this is a value of -84 dBm. For good reception when interference is present, the DTV signal level must be more than 15 dB greater than the interfering signal. Therefore, if the out-of-band signal from the Part 15 device is at -61 dBm, successful DTV reception would be available only if the DTV signal level was above -46 dBm, a situation that occurs in less than half of the protected service area of a DTV station.

[29] This distance separation is not tens of meters but generally hundreds of meters or more with building attenuation also present in many situations.

[30] This is because Part 74 wireless microphones are battery operated and are designed to conserve the use of power to provide the user with the longest possible battery life. New Part 15 devices, on the other hand, may be designed and built to operate on

problems occur, Part 74 licensees are knowledgeable and can respond quickly and responsibly to eliminate any interference. Consumers using unlicensed wireless audio devices will not know that they may be causing interference to themselves and others and certainly will not have any knowledge to eliminate such interference.

Accordingly, the technical rules proposed in the Further Notice may be acceptable for operations licensed under Part 74, but are wholly inadequate and inappropriate for devices to be operated in the core TV bands on an unlicensed, unidentified basis under Part 15 of the rules.

III. MSTV and NAB Support a Conservative Extension of Part 74 to Certain New Categories of Wireless Operations in the Core TV Band

Like the Hippocratic Oath, the goal in this proceeding should be "Do No Harm." Unfortunately, the proposal in its present form would break this pledge as it merely transfers the risk of interference from wireless services in the 700 MHz band to DTV services by relocating wireless microphones to the core TV band. Even more problematically, the Further Notice opens the door for thousands of unlicensed wireless microphones to enter the TV band, thereby exponentially increasing the threat of interference to DTV viewing. Further Notice at ¶¶ 109 – 122.

Alternatively, the Commission also seeks comment on extending eligibility under Part 74 for licenses to operate wireless services in the TV bands to certain additional entities, such as nuclear power plants, large theaters, entertainment complexes, sporting arenas, and religious facilities. Further Notice at ¶¶ 127 - 128. The Commission correctly states that some of these users bear important similarities to

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120VAC household electric service where there is no need to be concerned about running out of power or limiting out of band emissions.

those already permitted on a licensed basis under Part 74, including AM, FM and TV stations, broadcast networks, certain cable television operators, and certain producers of motion pictures and television programs.[31] Generally, the Commission seeks comment on where to draw the line on additional users that should be eligible for Part 74 licenses, and the potential impact on the primary users of the TV bands, as well as on unlicensed wireless microphones and TV Band Devices (defined as unlicensed devices permitted to operate in the TV bands pursuant to the White Spaces Order). *Id*. at ¶¶ 132 – 135.

As the Commission notes, MSTV and NAB among others support this alternative approach, to various degrees.[32] Specifically, we propose a narrow expansion of the class of users eligible for wireless microphone licenses under Part 74 of the rules to those entities likely to use wireless microphones in controlled, professional settings that are typically located a sufficient distance from residential areas. We also urge the Commission to emphasize the critical role that frequency coordination plays in alleviating interference to primary licensees.

MSTV and NAB support the addition of four specific categories to the list of entities eligible for Part 74 licenses to operate wireless microphones in the TV bands: theaters, live music producers, government bodies, and houses of worship. As the Commission recognizes, these types of facilities are similar to those already approved by the Commission. Some of these users, such as theaters and music producers, conduct activities similar to the currently authorized users, including distributing

[31] Further Notice at ¶¶ 125, 129; 47 C.F.R. § 74.832(a).
[32] *See, e.g*., MSTV/NAB Comments at 9; Ex Parte Letter from Steve B. Sharkey, Motorola, to Marlene Dortch, WT Docket No. 08-166, WT Docket No. 04-186 (Aug. 6, 2009), Attachment; White Spaces Coalition Comments at 6; Shure Comments at 6.

entertainment and artistic performances. Further, many religious institutions are already licensees of AM, FM, TV, or LPTV stations, and as the Commission explains, other religious facilities similarly may require multiple vacant TV channels to accommodate all of the wireless microphones they use. Further Notice at ¶ 130. MSTV and NAB would also support extending Part 74 eligibility to government bodies for purposes of local government meetings, state and federal town hall meetings, and similar events.

These additional categories of users, like currently authorized low power auxiliary station licensees, should be able to operate in a way that minimizes or prevents harmful interference to the primary users of the TV band. First, the venues in which they operate (*e.g.*, Broadway theaters, sports stadiums, movie studios, and town halls) are typically located some distance from residential areas. Second, television receivers are unlikely to be used in these types of venues. Third, all of these potential licensees employ or have access to professional technicians to properly install and maintain their wireless microphone equipment. Fourth, these identifiable, professional entities will continue to coordinate their microphone use pursuant to Part 74.[33]

Similarly, MSTV and NAB would not object to a limited extension of Part 74 eligibility to nuclear power plants, assuming they comply with all frequency coordination and other relevant obligations of use. Further Notice at ¶ 139. In 2007, MSTV, NAB and the Society of Broadcast Engineers completed a consensus plan with

[33] MSTV and NAB recognize there is a relationship between this proceeding and the protections afforded to entities that are registered in the database created under the FCC's TV Whitespaces rules. We believe the nature and scope of such protection should be addressed in that proceeding. 47 C.F.R. § 15.711; Office of Engineering and Technology Invites Proposals from Entities Seeking to be Designated TV Band Device Database Managers, *Public Notice*, DA 09-2479, ET Docket No. 04-186 (Nov. 25, 2009).

representatives of commercial nuclear power plants to allow occasional, limited use of wireless headsets and intercom devices at plant sites, which are by design remote from residential areas.[34] While a limited exemption was provided for coordination when microphones are operated inside the heavy, concrete nuclear power plants, coordination of outdoor use in the plant area has successfully avoided interference. Moreover, these nuclear power plants were restricted by their status as secondary users in the band to prevent interference to primary users, and acknowledged the risk that primary uses may interrupt or prevent their use of the spectrum at any time.

A narrow extension of Part 74 eligibility to the additional categories of licensed users described above would maintain the successful *status quo*. As noted above, there are other, less congested frequency bands (including 900 MHz, 2.4 GHz and 49 MHz) in which unlicensed wireless microphones can operate under Part 15, without needlessly opening the core TV band. Nevertheless, based on very limited analysis, the Further Notice proposes introducing unlicensed wireless microphones into the core TV band. MSTV and NAB respectfully ask the Commission to explore these

[34] Request of Nuclear Energy Institute and Utilities Telecom Council for Waivers to Permit Use of Certain Wireless Headsets and Intercom Devices at Nuclear Facilities, ET Docket No. 05-345 (NEI/UTC Request); Supplement to Petition for Waiver (May 15, 2007). On July 15, 2009, NEI and UTC filed a Petition for Waiver of Parts 2 and 90 of the rules to allow nuclear power plants to obtain licenses under Part 90 to allow indoor use of certain intercom and headset equipment certified under Part 74. Although MSTV and NAB are skeptical about the nuclear industry's efforts to identify equipment that complies with the Commission's existing rules, we are amenable to the waiver request if approval would be consistent with the terms of our proposed extension of Part 74 eligibility to certain wireless microphone users, as set forth above.

alternatives for unlicensed wireless microphones before deciding to subject broadcast DTV viewers to undesired potential interference.[35]

IV. The Commission Should Permit Only Limited Operation of Low Power Auxiliary Stations in the TV Band During the Pendency of This Proceeding.

MSTV and NAB submit that the Commission should limit the operation of low power auxiliary stations, including unauthorized wireless microphones, now operating in the 700 MHz band (until June 2010), on TV channels 2-51 during the pendency of this proceeding. As noted previously, the interference likely to arise in the 700 MHz band is also likely to affect TV viewers and potentially disrupt access to important services, including emergency information. Such disparate regulatory treatment is inconsistent with basic principles of administrative law requiring similar treatment of similarly situated entities.[36]

In addition, we note that allowing unauthorized operation under the auspices of Part 15 during the pendency of this proceeding effectively dictates the outcome. Once unauthorized entities are allowed in the band, it may be impossible resolve interference caused by such devices. Indeed, the approach taken by the Commission in this

[35] In the event the Commission does ultimately approve the operation of unlicensed wireless microphones in the TV band pursuant to Part 15 of the rules, it is imperative that expansion be restricted exclusively to the lower power Part 74 wireless microphones in use today. Such devices should be limited to 10 Mw, as this is the transmission power of most popular wireless microphone applications, and must include a requirement that the device be battery-powered. Devices must also be subject to strict requirements prohibiting the transmission of audio material: (1) to the public switched telephone network and private and commercial wireless systems; (2) for the transmission of audio or voice commands used with remote-controlled toys, computers and gaming consoles; and (3) for baby monitors and other monitoring systems. These limits are absolutely necessary to prevent harmful interference to the primary users of the TV band, full-power television stations.

[36] *See supra* note 10.

proceeding demonstrates the real world difficulty of removing such unauthorized operations once they commence operation in the band.

Allowing such unauthorized operation to continue during the pendency of this proceeding creates immediate potential for additional interference in the band. These harmful effects could extend for months or even years, depending on the amount of time it takes to resolve issues in the Further Notice.

We believe a more appropriate approach to take during the pendency of this proceeding is to temporarily expand the definition of users that would be eligible to operate under Part 74 of the Commission's rules. In effect, this would provide a temporary, narrowly tailored path for those specific groups using certified Part 74 equipment. As noted previously, these user groups would include theaters, live music productions, government entities and nuclear power plants. This approach would provide a controlled and consistent approach to allow wireless microphones to continue operation during the pendency of this proceeding, while avoiding such uses that may result in harmful interference to television viewers.

V. Conclusion

For the reasons set forth above, MSTV and NAB support a conservative expansion of Part 74 eligibility to certain additional, licensed users of wireless microphones, but oppose permitting unlicensed wireless microphones to operate in the core TV bands pursuant to Part 15 of the rules.

Respectfully submitted,

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