

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

In the Matter of

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)	
Amendment of Part 15 of the Commission's)	ET Docket No. 14-165
Rules for Unlicensed Operations in the)	
Television Bands, Repurposed 600 MHz)	
Band, 600 MHz Guard Bands, and Duplex)	
Gap, and Channel 37, and)	
)	
)	
Amendment of Part 74 of the Commission's)	
Rules For Low Power Auxiliary Stations in)	
The Repurposed 600 MHz Band and 600 MHz)	
Duplex Gap)	
)	
Expanding the Economic and Innovation)	GN Docket No. 12-268
Opportunities of Spectrum Through Incentive)	
Auctions)	

PETITION FOR RECONSIDERATION OF SHURE INCORPORATED

Mark Brunner
Senior Director, Global Brand Management

Edgar Reihl
Director, Spectrum Policy

Ahren Hartman
Senior Director, Engineering

Catherine Wang
Timothy Bransford

Morgan, Lewis & Bockius LLP
2020 K Street, N.W.
Washington, DC 20006
Bus.: 202.373.6000
Fax.: 202.373.6001

Counsel to Shure Incorporated

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SUMMARY

The Commission, through the instant and other recent proceedings, has substantially restructured the technical and operating rules that apply to licensed and unlicensed wireless microphones. These sweeping changes result from the Commission's repurposing of significant portions of UHF TV band spectrum for high power cellular services, and making the remainder of VHF and UHF TV bands available pursuant to relaxed rules for low power White Space Devices. Under this revised regulatory framework, unlicensed wireless microphones have at best very limited access to interference-free TV band spectrum. Moreover, wireless microphone end users that only recently retired large inventories of 700 MHz equipment bear the additional heavy burden of yet another costly displacement of equipment much of which has a decade or more of useful operational life remaining.

Shure appreciates the significant challenges, complexities and necessary trade-offs between interested parties that accompany such a sweeping regulatory overhaul of TV band spectrum, and herein seeks reconsideration or clarification of discrete issues that will help assist unlicensed wireless microphone manufacturers and end users to weather this difficult transition without undermining the Commission's goal of making spectrum available for new services. Specifically, Shure seeks reconsideration or clarification of the following:

Clarify that Antenna Connector Limitations Do Not Apply to Unlicensed Wireless Microphones - Shure urges reconsideration, or clarification as appropriate, that unlicensed wireless microphones can continue to use external antennas without proprietary connectors. Use of such antennas will not undermine the Commission's principal policy goals with respect to connector limitations for other Part 15 devices, will not increase the likelihood of future interference, and will support the Commission's goal of maintaining alignment between Part 74 and Part 15 wireless microphones in the TV bands while promoting a timely migration of unlicensed wireless microphone users from soon to be repurposed 600 MHz frequencies

Wireless Microphones Operating in the Guard Bands and the Duplex Gap Should Be Subject to a 50 mW Power Limit - The record confirms that a 50 mW power limit for wireless microphones in 600 MHz guard bands and duplex gap protects wireless licensees and incumbent TV stations from interference. The present 20 mW limit diminishes the utility of the guard bands for wireless microphone use, and makes the development and manufacture of equipment uneconomical and impractical.

Permit Radiated OR Conducted Power Measurements for Part 15 Wireless Microphones - The record does not support limiting power measurements for unlicensed microphones to radiated measurements only, which would create an unnecessary hardship for manufacturers during certification testing. Manufacturers should have the flexibility to undertake radiated or conducted measurements depending on the device under test.

Do Not Apply Marketing and Operation Cut-Off Dates to Microphones that Tune Permitted Frequencies - The Commission should reconsider its rigid retirement dates for wireless microphones that operate in repurposed 600 MHz frequencies but have sufficient tuning range to continue operation in remaining TV band spectrum. The retirement of such a significant amount of new 600 MHz hardware will impose a heavy burden on the wireless microphone community, when labeling and outreach can adequately inform end users about frequencies that remain available for use.

Reinstate a Channel Reservation Process for Unlicensed Wireless Microphones - The Commission grossly overestimates the availability of clean spectrum for unlicensed microphone use, and the expansion of licensing eligibility still falls far short of encompassing important classes of professional audio wireless microphone users. Reinstating the ability of unlicensed users to reserve spectrum through the geolocation databases improves the likelihood of such end users gaining access to modest amounts of clean spectrum, at a minimum, for special circumstances.

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PETITION FOR RECONSIDERATION OF SHURE INCORPORATED

Shure Incorporated (“Shure”), by its undersigned counsel, hereby submits this Petition for Reconsideration of the Commission’s August 11, 2105 order (“Order”) in the above-captioned proceeding.¹ The Commission’s Order, and together with the Commission’s decision in the auction proceeding and related decisions, substantially restructured the technical and

¹ See *In the Matter of Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission’s Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap*, ET Docket No. 14-165, GN Docket No. 12-268, Report and Order, 30 FCC Rcd 9551 (rel. Aug. 11, 2015) (“Order”); see also *In the Matter of Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission’s Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap*, ET Docket No. 14-165, GN Docket No. 12-268, Notice of Proposed Rulemaking, 29 FCC Rcd 14781 (rel. Dec. 10, 2014) (“Notice”).

operating rules that apply to wireless microphones, unlicensed and licensed, as a consequence of making significantly more UHF spectrum available for high power mobile use and low power White Space Devices (“WSDs”). As a result of these decisions, unlicensed wireless microphones no longer have access to interference-free spectrum previously available through the two reserved channels. Further, the Order makes sweeping changes to the spectrum access rules and maximum power limits in the UHF band to facilitate expanded WSD use. Under these revised rules, all wireless microphone users will experience dramatic reductions in access to UHF spectrum and unlicensed wireless microphone users will have very limited opportunity, if any, to access interference-free UHF spectrum.

Shure appreciates the significant challenges and complexities of implementing such a massive overhaul of UHF spectrum and the difficult trade-offs that the Commission made in the Order to address the often competing needs of high power mobile operators, WSDs and the wireless microphone community.² Recognizing that the Commission’s Order is a part of a larger set of policy decisions the Commission has made with regard to spectrum use, Shure herein identifies several discrete measures that bear reconsideration as a means to assist the transition of wireless microphone operations to the new rules and to mitigate the costly, inefficient and otherwise harmful impact that the dramatic changes in UHF spectrum use will have on the wireless microphone community without undermining the Commission’s other goals with respect to facilitating other services in the UHF band.

² See, e.g., *Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket Nos. 14-166 and 12-268, Notice of Proposed Rulemaking, 29 FCC Rcd 12343, ¶¶ 2-4 (rel. Sep. 30, 2014) (“*Supplemental Spectrum Notice*”) wherein the Commission elaborates on the need to identify new spectrum for wireless microphones while balancing the interests of other spectrum users.

I. SHURE SEEKS CONFIRMATION THAT ANTENNA CONNECTOR LIMITATIONS IN PART 15 DO NOT APPLY TO UNLICENSED WIRELESS MICROPHONES

Shure requests Commission reconsideration as appropriate, or in the alternative, clarification that limitations on the use of standard antenna jacks and electrical connectors (“connectors”) applied to transmitters regulated under Part 15 rules have not been inadvertently extended to unlicensed wireless microphones operating in the TV bands.³ Specifically, the Order establishes permanent rules under Part 15 for wireless microphones that have been operated without a license pursuant to a blanket waiver since 2010.⁴ Although the Order is silent on the treatment of antenna connectors for future unlicensed wireless microphones, Shure seeks confirmation that limitations on antenna connectors pursuant to Sections 15.201, 15.203 and 15.204 of the Commission’s Rules do not apply to unlicensed wireless microphones.⁵ Such an approach is appropriate given that the longstanding concerns about human safety and spectral efficiency that justify limiting antenna connectors to proprietary designs for legacy Part 15 transmitters do not apply to wireless microphones and in light of the Commission’s clear intent to maintain consistency with Part 74 technical rules where possible. Further, imposing a limit on standard antenna connectors would present an onerous and unnecessary burden on wireless microphone manufacturers and end users.

³ See 47 CFR §§ 15.201, 203 and 204. Section 15.201 requires equipment authorization for intentional unlicensed radiators under Part 15 rules. Sections 15.203 and 15.204 specify rules for the unlicensed device use of external antennas.

⁴ See *Order* at ¶ 94.

⁵ Conventional wireless microphones used for sound reinforcement as well as devices used for cue and control communications, synchronization of TV camera signals, and in-ear monitors fall within the Commission’s definition of a “wireless microphone.” See *Supplemental Spectrum Notice*, n. 6.

A. Imposing Limits on Antenna Connectors for Unlicensed Wireless Microphones Regulated Under Part 15 Rules Provides No Human Safety Benefits or Meaningful Spectral Efficiency Gains

The Commission has previously elaborated that the limitation on antenna connectors in Section 15.203 serves to prevent an end user from substituting higher gain antennas that might (1) inadvertently expose the user or third parties to levels of energy exceeding the limits for human exposure determined to be safe by the FCC,⁶ and/or (2) create interference to other services and diminish frequency reuse.⁷ Neither aforementioned goal would be served by imposing a limitation on antenna connectors available to unlicensed wireless microphones in the TV bands.

First, unlicensed wireless microphones operating in the TV bands will operate with a maximum of 50 mW output.⁸ Given this modest amount of output power no antenna that satisfies the compact form factor requirements for a wireless microphone could be implemented - regardless of connector -- capable of creating a safety concern.⁹

Second, unique use model and form factor restraints ensure that unlicensed wireless microphones do not create harmful interference to other spectrum users. When wireless

⁶ See, e.g., *Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, ET Docket No. 03-201, Report and Order, 19 FCC Rcd 13539 at ¶ 23 (rel. Jul. 12, 2004).

⁷ See, e.g., *Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range*, ET Docket No. 96-102, Report and Order, 12 FCC Rcd 1576 at ¶ 50 (rel. Jan. 9, 1997).

⁸ See *Order* at ¶ 99. In many instances, unlicensed microphone uses will choose to operate at lower power levels (e.g., 5-10 mW) to conserve battery life.

⁹ For personal/portable devices FCC Bulletin 65 limits human exposure of a device operator to "0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube)." Office of Engineering and Technology, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* (1997) ("OET Bulletin 65")

microphones employ external antennas, such use generally occurs in highly controlled indoor environments, and does not involve an effort to extend the range of the device.¹⁰

In the case of in-ear monitor transmitters, external transmitter combiners and antennas are used to increase the spectrum efficiency over that of standalone systems. In venues where several co-located in-ear monitor transmitters are used, intermodulation distortion (IMD) can be created if multiple transmitters are operated together in the same rack with individual antennas. External transmitter combiners are used to combine the transmitter signals with far-reduced levels of IMD which makes more efficient use of the UHF spectrum. Typical transmitter signal combiners are constructed to accept coaxial cable inputs from the transmitter outputs.

These wireless microphone use models contrast with other Part 15 devices (*e.g.*, 802.11 Wi-Fi devices) that may operate outdoors with up to several Watts of EIRP, and employ tower or rooftop mounted antennas with significant gain in an effort to dramatically extend signal range.¹¹

B. Harmonized Use of Antenna Connectors is Consistent with the Commission's Efforts to Align Technical Rules for Part 74 and Part 15 TV Band Microphones

In creating a permanent framework under Part 15 for unlicensed wireless microphones the Commission recognized the distinct performance requirements and use models for these devices (the majority of which are operated in demanding professional audio environments) and

¹⁰ For example, external antennas may be used for the purpose of transmitting in-ear monitor communications from the audio-visual team to the performers in a theater or live music venue. Given that in-ear monitor transmitters are generally rack-mounted devices, an external antenna oriented towards the performer is desired instead of indiscriminately transmitting directly from an integrated antenna at the device, which may be heavily obstructed/shielded inside the rack.

¹¹ For example, wireless Internet service providers may use unlicensed Part 15 frequencies to reach customers at a range of several miles.

carried forward many technical rules applicable to licensed Part 74 wireless microphones in the TV bands. For example, the Commission adopted spectrally efficient ETSI (European Telecommunications Standards Institute) emission masks for both Part 74 and Part 15 microphones operating in the TV bands concurrently and required Part 15 unlicensed microphones “to comply with the same channelization, frequency stability, and bandwidth requirements as Part 74 wireless microphones.”¹² Common use of antennas and by extension antenna connectors is consistent with the Commission’s broader effort to align Part 74 and Part 15 microphone technical rules where possible, and to make the transition to a permanent unlicensed regulatory framework as smooth and expeditious a process as possible for end users already facing the loss of significant spectrum and equipment dislocation as a result of the 600 MHz Incentive Auction and recent migration out of 700 MHz frequencies.

C. Imposing Proprietary Antennas on Unlicensed TV Band Microphones Creates an Unnecessary and Onerous Burden, and Potentially Hurts Outreach Concerning the 600 MHz Migration

Requiring unlicensed wireless microphones that have operated successfully in TV band spectrum without interference for decades to adopt proprietary antenna connectors would create an unnecessary and onerous burden on an industry and user community heavily impacted by the loss of both 700 MHz and 600 MHz spectrum. Manufacturers would need to spend considerable time and effort to develop and implement new antennas with proprietary connectors into next generation wireless microphones, which would be very difficult, due to the fact that these devices are highly compact and operational performance is strongly affected by connector characteristics. Further, in-ear-monitor systems are often used with RF combiners to aggregate

¹² See Order at ¶¶ 97-100.

the output of several transmitters for use with a single antenna. These transmitters are normally rack mounted, requiring that the antennas be mounted outside the rack for these systems to operate properly and increase the spectrum efficiency of the wireless system.

In sum, wireless microphones (licensed and unlicensed) have successfully shared the TV bands for decades with television broadcasters and various other broadcast auxiliary services without creating interference. Given this established record of noninterference with higher priority services, clarifying that unlicensed wireless microphones can continue to use external antennas without proprietary connectors will not undermine the Commission's principal policy goals with respect to connector limitations for other Part 15 devices, and will not increase the likelihood of future interference. Such clarification, however, will support the Commission's goal of maintaining alignment between Part 74 and Part 15 wireless microphones in the TV bands, and promote a timely migration of unlicensed wireless microphone users from soon to be repurposed 600 MHz frequencies.

II. WIRELESS MICROPHONES OPERATING IN THE GUARD BANDS AND THE DUPLEX GAP SHOULD BE SUBJECT TO A 50 mW POWER LIMIT

In the Order, the Commission adopted a minimal 20 mW EIRP power limit for unlicensed and licensed wireless microphone operations permitted in the six (6) and four (4) megahertz sections of the duplex gap as well as in the guard bands between the wireless downlink and the TV bands.¹³ The 20 mW limit departs significantly from the 250 mW limit and 50 mW limits that were previously in place under Part 74 and Part 15 (pursuant to waiver).¹⁴

¹³ *Order* at ¶ 111.

¹⁴ *See Notice* at ¶ 146; *see also* 47 CFR § 74.861.

The Order provides that unlicensed wireless microphones will share the 6 MHz portion of the duplex gap and the lower guard band with WSDs that are permitted to operate at 40 mW maximum output power. With respect to WSDs, the Commission found that WSD operation at 40 mW will not risk interference to mobile services.¹⁵

Shure and other parties demonstrated in this proceeding that a 50 mW limit for wireless microphones will protect both wireless licensees and TV from interference.¹⁶ In fact, Shure demonstrated that wireless microphones could safely operate adjacent to such services with only a 100 kHz buffer, as opposed to the 1 MHz buffer adopted between wireless microphones and wireless licensees in the lower guard band and duplex gap.¹⁷ The Order states that the 20 mW limit for wireless microphones operating in the same band as WSDs operating at 40 mW “can help enable coexistence between unlicensed wireless microphones and white space devices by making both types of devices operate at more comparable levels.”¹⁸ The Order suggests that the disparity in operating powers between wireless microphones and WSDs is justified because more than one wireless microphones can operate, using narrower bandwidths, in the same spectrum.¹⁹

The 20 mW power limit for wireless microphones should be amended to permit both unlicensed and licensed wireless microphones to operate with up to 50 mW of power, consistent with the prior power limit for unlicensed wireless microphones. The 20 mW power limit is too

¹⁵ See *Order* at ¶ 42. The Commission finds the “likelihood of harmful interference from 40 milliwatt white space devices to wireless downlink services is extremely low.”

¹⁶ See Comments of Shure Incorporated at 22 (filed Feb. 4, 2015) (“*Shure Comments*”); see also Comments of Sennheiser Electronic Corporation at 15 (filed Feb. 4, 2015) (“*Sennheiser Comments*”); Comments of Audio-Technica U.S., Inc. at 10 (filed Feb. 4, 2015) (“*A-T Comments*”), Comments of CP Communications, Inc. at 4 (filed Feb. 4, 2015) (“*CP Comments*”).

¹⁷ See *Shure Comments* at 15; see also *Sennheiser Comments* at 14-15

¹⁸ *Order* at ¶ 139.

¹⁹ See *Order* at n. 340.

low for operation in “noisy” spectrum that is subject to interference from much higher power adjacent wireless operations and WSDs operating co-channel at higher powers. The 20 mW limit will compromise wireless microphone performance in fact inhibiting, not enabling, coexistence between microphones and WSDs permitted to operate at twice the power level in the same spectrum

The Order’s brief suggestion that the 20 mW proposed limit is warranted because more than one wireless microphone can operate in the shared spectrum was not based on result of actual measurement in any typical wireless microphone use case. This “aggregation” theory ignores the fact that microphone signals are significantly attenuated from the conducted output power due to body absorption. As cited in previous comments from Shure,²⁰ the amount of microphone transmitter attenuation due to the human body is 8 dB and 18 dB for handheld and body-worn transmitters, respectively. Using the handheld case, a 50 mW transmitter is attenuated by 8 dB which results in an effective radiated power of 8 mW. Using the body-worn case, a 50 mW transmitter is attenuated by 18 dB, which results in an effective radiated power of 0.8 mW. Each of these examples demonstrates that wireless microphones operating at 50 mW of transmitter power can successfully coexist with WSDs without interference.

Wireless microphones, whose essential functionality is defined by the ability to provide crystal clear quality, with low latency, will not be able to overcome the harmful effects of interference from adjacent high power wireless services and WSD operating at twice the power

²⁰ See Reply Comments of Shure Incorporated at 29-31 (filed Feb. 25, 2015) (“*Shure Reply Comments*”); see also Electronic Communications Committee, Adjacent Band Compatibility Between MFCN and PMSE Audio Applications in the 700 MHz Frequency Band, ECC Report 221 at 35-36 (approved Sept. 2014), available at <http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP221.PDF>. This extensive ECC study confirmed that average body loss for handheld microphones was 8 dB, and body worn microphones experienced on average 18 dB of body loss.

in the same spectrum. Including the handheld and body-worn attenuations levels, the new 20 mW power limit not only makes it extremely difficult to meet customer demand for high quality, interference-free wireless microphone operation in the guard bands, it imposes new burdensome costs on manufacturers and users due to the need to redesign equipment specifically for operating in the guard bands. Many wireless microphone users once again will be forced to retire a significant amount of operating equipment unnecessarily and will be faced with purchasing equipment solely designed for guard band operations.

This arbitrary reduced power limit mandates a “niche” requirement with limited utility in a small sliver of spectrum. Such requirements discourage the development of equipment for this use by making it uneconomical and impracticable for wireless microphone manufacturers to invest in producing equipment designed to operate only in the duplex gap and guard bands.

Further, equipment manufacturers will be hard pressed to provide redesigned equipment under the tight transition periods adopted elsewhere in the Commission’s Order. Guard band spectrum will not be known until after the close of the auction and rebanding decisions have been made.²¹ However, manufacturers will be forced to stop marketing and selling equipment in only 18 months from the channel reassignment notice. Redesign, certification, and manufacturing of new equipment will take significantly longer, potentially depriving users from having suitable equipment available and making it difficult or impossible for them to continue to provide essential services.

²¹ See Order at ¶ 287

III EITHER CONDUCTED OR RADIATED (EIRP) POWER MEASUREMENTS SHOULD BE PERMITTED FOR PART 15 WIRELESS MICROPHONES

Wireless microphones are used in a variety of ways that necessitate the use of various kinds of antennas according to the particular application. Some microphones have internal antennas while others use external antennas. In particular, in ear monitor systems must have external antennas since they are typically rack mounted. Equipment intended for unlicensed use under the Commission's Part 15 Rules is designed and manufactured for use in the same ways as equipment for licensed use under the Part 74 Rules. It is critical that the Commission not mandate separate testing procedures and requirements for equipment that is produced for these two categories of users. Accordingly, Shure requests that manufacturers be afforded the flexibility to use either conducted or radiated (EIRP) measurements for Part 15 wireless microphones as specified in Section 8 ("Rated Output Power") of ETSI EN 300 422 v1.4.2 (2011-08).²²

To the best of Shure's knowledge, no commenter supported a regulatory approach measuring microphone output solely on a radiated basis, and the Order states that the Commission declined to give manufacturers the flexibility of measuring output power on a conducted or radiated basis to "reduce the compliance burden" on the microphone industry.²³ Shure assures the Commission that such flexibility is welcome and will not burden manufacturers or end users.

²² See also Shure Petition for Reconsideration, GN Docket 14-166 (filed Dec. 17, 2015). Shure further elaborates on the complementary nature of radiated and conducted measurements in this earlier petition.

²³ Order at ¶ 99.

IV. THE MARKETING AND OPERATION CUT-OFF SHOULD NOT APPLY TO MICROPHONES THAT CAN TUNE TO PERMITTED FREQUENCIES

The Order imposes a “transition” period that, among other things, prohibits the operation and marketing of wireless microphone equipment that does not comply with the new rules for 600 MHz operations 18 months after release of the Channel Reassignment PN or no later than 33 months after the effective date of the new rules, whichever occurs first.²⁴ These dates apply to equipment even if it could be tuned to operate outside the 600 MHz service band.

As Shure and other parties have advised the Commission, this rule will impose significant burdens on users by compelling them to discard working equipment -- much of which was recently purchased as a result of the Commission’s decision to displace microphone operations from the 700 MHz band-- well before the end of its useful life. The Commission acknowledges that manufacturers “commonly certify wireless microphones to operate over a relatively wide frequency range, then market units that operate over only a portion of the authorized frequency range.”²⁵ The FCC Identification number required to be on equipment labels links to certification records that include the authorized frequency range but is not mandated to show whether the device is tuned to operate in specific 600 MHz frequencies. According to the Order, the transition rule is necessary to allow the use of the FCC identification number to identify which wireless microphones may be legally marketed and operated as compliant with the new 600 MHz rules, on the assumption that the precise frequency to which a specific wireless microphone is tuned may not be indicated on the device.

²⁴ See 47 CFR § 15.37

²⁵ Order at n. 694

While the FCC labelling requirements do not mandate that frequencies be indicated on the equipment, this information is often marked on the device, is always provided in the User Guide, and is also readily available from the manufacturer's web site. Shure therefore seeks reconsideration of this requirement to permit manufacturers to rely on existing labels that provide frequency information and to provide supplementary information to users that will help them identify operating frequencies that are compliant with the new rules. Such information can be effectively provided to end users in a number of ways, such as printed guides for distribution at retail outlets, on manufacturers' web sites, or by relabeling retuned equipment to show operating frequencies. This approach will ensure that the users have access to the operating frequency information they need and will help outreach efforts by wireless microphone manufacturers to ensure compliance with new Commission rules.

V. THE FCC RULES SHOULD MAKE PROVISION FOR CONTINUING UNLICENSED WIRELESS MICROPHONE RESERVATIONS TO ADDRESS PROFESSIONAL REQUIREMENTS FOR INTERFERENCE-FREE SPECTRUM

The Commission decided in the Order to eliminate the registration system for unlicensed wireless microphone reservation system on the basis that this system is no longer needed due to the recent rule changes that expand eligibility for Part 74 Low Power Auxiliary Service ("LPAS") licenses and access to the database registration system.²⁶ The Commission also pointed to the fact that unlicensed wireless microphones will continue to have access to some 600 MHz spectrum referring to the duplex gap and guard band spectrum shared with WSDs. The Order also suggests that 600 MHz unlicensed microphone users in need of interference-free

²⁶ See Order at ¶¶ 266-267

spectrum may possibly be able to take advantage of 2-3 MHz next to channel 37 if the auction produces certain results.²⁷

While Shure agrees that the recent expansion of license eligibility brings the wireless microphone licensing scheme closer to international standards for professional use, there are still important professional productions in the civic, cultural, religious, corporate, education and entertainment sectors where fewer than 50 microphone frequencies are routinely used that would not qualify for a Part 74 license based on the new eligibility definition. Further, although guard band spectrum that is compromised by a high noise floor and interference from adjacent services as well as WSD's operating co-channel at twice the power of wireless microphones can be useful for some wireless microphone services in some locations, it cannot be relied up for professional use due to the fact that it would not be protected against frequent and unpredictable interference. When the Commission first created the two reserve microphone channels, the Commission contemplated that unlicensed microphone users would always be able to rely on access to those channels and other UHF spectrum below channel 21 for interference-free operation and resort to registration in the event that all such spectrum for an event had been exhausted. That assumption no longer applies with the elimination of the reserve channels. Further, other non-UHF spectrum available under the Commission's Rules for microphone use is shared and similarly subject to unpredictable interference and thus unsuited for higher quality events. Finally, new spectrum that the Commission has identified to supplement the UHF for microphone use is similarly shared or subject to strict eligibility and usage limits and therefore does not make interference-free spectrum available for unlicensed wireless microphones.

²⁷ See Order at ¶¶ 148-149.

Given the Commission's decision to eliminate the two reserved channels, and rule changes that will allow fixed WSDs on channels near to assigned TV channels and portable WSD operations on channels below channel 21 (at higher powers), the complete elimination of the reservation system for unlicensed wireless microphones leaves virtually no possibility for interference-free wireless microphone operations for users that cannot meet the "50 microphone" requirement, a threshold that arbitrarily defines microphone use that warrants interference protection from other uses. Shure accordingly supports a reinstatement of the reservation system for unlicensed microphone users or, alternatively, a more limited reservation system that would make registration protection available in special circumstances requiring a high degree of reliability for a user that does not typically use 50 or more microphones and therefore is not eligible for licensing under the Commission's Rules.

Respectfully submitted,

Mark Brunner
Senior Director, Global Brand Management

Edgar Reihl
Director, Spectrum Policy

Ahren Hartman
Senior Director, Engineering

/s/
Catherine Wang
Timothy Bransford
Morgan, Lewis & Bockius LLP
2020 K Street, N.W.
Washington, DC 20006
Bus.: 202.373.6000
Fax.: 202.373.6001

Counsel to Shure Incorporated

Dated: December 23, 2015