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August 7, 2001

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Via Hand Delivery

Magalie Roman Salas, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Reply Comments of Shure Incorporated
ET Docket No. 01-75

Dear Ms. Salas:

On behalf of Shure Incorporated ("Shure"), enclosed please find an original and four (4) copies of Shure's reply comments in response to the Commission's Notice of Proposed Rulemaking Proceeding in the above-referenced docket.[1] An electronic copy of the instant reply comments are also included on the enclosed diskette.

Should you have any questions or require additional information regarding this matter, please contact the undersigned at (202) 424-7500.

Very truly yours,

Catherine Wang
Jeanne W. Stockman

Counsel to Shure Incorporated

Enclosures

No. of Copies rec'd 0+4
List A B C D E

[1] *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*, Notice of Proposed Rulemaking, ET Docket No. 01-75 (rel. March 20, 2001).

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554

In the matter of:	)	
	)	
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
Telecommunications Industry Association Petition for Rule Making Regarding Digital Modulation for the Television Broadcast Industry Auxiliary Service	)	RM-9418
	)	
Alliance of Motion Picture Television Producers, Petition for Rule Making Regarding Low-Power Video Assist Devices in Portions of the UHF and VHF Television Bands	)	RM-9856

COMMENTS OF

Shure Incorporated

Shure Incorporated ("Shure") hereby files these Reply Comments in the above-captioned matter. Shure herein urges the Commission to recognize the importance of wireless audio services to the American public and preserve the rules that permit secondary wireless microphone use in the Part 74 TV spectrum.

Shure is a respected manufacturer of professional wireless audio products that operate within the 470-806 MHz band under Section 74.861 of the Commission's Rules, 47 C.F.R. § 74.861, as Low Power Auxiliary Stations ("LPAS"). Shure holds Grants of Equipment Authorization (Certifications) from the Federal Communications Commission ("FCC") for these products. Shure has participated in previous Commission actions involving LPAS devices in which the Commission decided that LPAS could continue to

operate in the entire 470-806 MHz band on a secondary, non-interference basis.[1] As such, Shure is well-qualified to comment on the LPAS issues raised in this proceeding.

I. The Commission Should Not Amend the LPAS Rules in this Proceeding

Shure is filing these reply comments to address certain LPAS issues raised in the initial round of comments in this proceeding. In particular, the Society of Broadcast Engineers ("SBE") raised several LPAS issues in its comments and urged the Commission to adopt significant changes to the way LPAS is currently permitted to operate (including frequency allocations, eligibility, and licensing rules).[2] As an initial matter, while Shure strongly believes that the public has a clear interest in continued, unhampered wireless microphone use, Shure also believes that this is not the appropriate proceeding for considering changes to the rules for LPAS operation. The Commission's Notice neither highlighted public interest issues of concern regarding LPAS nor set forth proposed LPAS rule changes and their justification. Thus, there has not been sufficient public notice and opportunity to comment on significant changes to the Commission's rules as they apply to LPAS.

Two recent rulemaking proceedings[3] have touched on important issues with respect to Wireless Audio Systems, which include wireless microphones, In Ear Monitoring ("IEM"), Interruptible Fold Back ("IFB") monitoring, and Personal Wireless Intercom Systems ("PWIS"). However, neither proceeding squarely addressed what, if any, change to the existing rules would serve the public interest. Wireless Audio

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1 *See, e.g.*, Comments of Shure Brothers Incorporated filed September 11, 1997 in ET Docket No. 97-157; Comments of Shure Brothers Incorporated filed July 16, 1999 in WT Docket No. 99-168.

2 *See* Comments of Society of Broadcast Engineers, Incorporated filed July 9, 2001 in ET Docket No. 01-75 at p. 20 ("SBE Initial Comments").

Systems have a long history of successfully operating as low power auxiliary devices on a secondary, non-interference basis in the Part 74 TV bands – the only spectrum suitable for such operations. Wireless Audio Systems should be permitted to continue utilizing the 700 MHz band until potential interference issues can be studied, and in any event, until the conclusion of the DTV transition period. Furthermore, the Commission should consider the needs of Wireless Audio Systems in future rulemaking proceedings.

II. The Public Interest Requires Continued, Unhampered Use of Wireless Audio Systems

Based on Shure's real-world experience in this field, Shure can attest to the fact that the American public today demands and requires access to wireless audio technology. Wireless audio is essential to the production of virtually every major public event, be it in the field of education, entertainment, government, industry, or religious activity. In comments filed previously with the Commission in a related proceeding, the SBE has stated that "[o]n stage, the sports playing field, or on-scene during breaking news, wireless microphones can and do bring an event to life; or, gone wrong, can wring the life out of an event."[4] In comments filed in the current proceeding, SBE stated that "the location for a broadcast event can be a sports venue that can be a movie shoot that can be a live music event that can be an awards show, and so on. It is also not uncommon for convention centers and other venues to host a number of different events at once. The common denominator has been, is, and will continue to be use of wireless microphones and wireless IFB's".[5] Shure heartily agrees with these observations, and

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[3] The instant proceeding and *Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59)*, Notice of Proposed Rulemaking, GN Docket No. 01-74 (March 28, 2001) address these issues.

[4] Comments of the Society of Broadcast Engineers, Incorporated filed May 14, 2001 in GN Docket No. 01-74 at p. 1.

[5] SBE Initial Comments at p. 20.

notes that they are true of numerous activities conducted by businesses, religious and educational institutions, governmental bodies at all levels, law enforcement agencies, musical productions, and theatres (to name but a few). The American public relies heavily upon wireless audio equipment in the course of their daily work, worship, education and entertainment activities.

III. The Commission Should Preserve Rules that Permit Secondary, Wireless Microphone Operations in the Part 74 TV Bands

In order for wireless microphones and other types of wireless audio equipment to operate successfully, appropriate spectrum must be available. A Wireless Audio System that is subject to random and unpredictable interference is useless. For reliable operation, the background interference level must be known and relatively constant.

The fact of the matter is that at the present time, the Part 74 TV bands represent the only suitable allocation for Wireless Audio Systems. Wireless Audio Systems must be able to continue to utilize "open" Part 74 TV channels. Existing Part 15 bands are not usable due to interference caused by congestion from other wireless devices (*e.g.*, cordless phones and wireless local area networks). This congestion will only intensify as new wireless networks such as those using Bluetooth technology, begin to proliferate. Existing Part 90 wireless microphone frequencies are also problematic due to interference from other services, and are woefully inadequate in terms of bandwidth. Within the group of eight specifically designated frequencies in the 170 MHz band,[6] only three are simultaneously usable due to Intermodulation ("IMD") interference.

It is very important to note that Wireless Audio Systems operating on frequencies shared with paging or two-way wireless communications services are not reliable because of the intermittent and unpredictable nature of the interference from those

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[6] *See* 47 C.F.R. § 90.265(b).

services. For this reason in particular, the SBE's suggestion that the Commission consider establishing a new Part 95 wireless audio band in the new 700 MHz "guard band" channels[7] is problematic. SBE's proposal is also premature given that the characteristics and signal levels of the wireless services that will be the new primary users of this spectrum are not yet known making it impossible to study interference issues at this time.

From a technical standpoint, the "open" TV channels in the VHF and UHF range are by far the most desirable place for Wireless Audio System operation. Use of lower frequencies (*i.e,.* below the VHF range) are technically infeasible due to noise and wavelength considerations, and higher frequencies (*i.e.,* above 2 GHz) become increasingly difficult to use due to absorption and path loss. However, the main advantage of using the TV bands lies in the fact that while TV broadcast stations operate at far greater power levels, their schedules and interference profiles tend to remain relatively constant. This is vital to the successful operation of wireless audio equipment, particularly because of the low power levels used. The large installed base of Wireless Audio Systems using the Part 74 TV bands is also an important consideration.

Another advantage of secondary operation in the Part 74 TV bands is the amount of bandwidth available for Wireless Audio Systems. With current technology, one 6 MHz wide TV channel can accommodate between five (5) and eight (8) high quality analog Wireless Audio Systems (*e.g.,* wireless microphones or In Ear Monitors). User needs routinely reach 20, and sometimes 50, simultaneously operating Wireless Audio Systems. This number can grow to several hundred systems if needs include Interruptible Fold Back monitoring or Personal Wireless Intercom Systems. For all of the above reasons, Shure urges the Commission to retain the current secondary user status

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[7] *See* SBE Initial Comments at pp. 19-20.

of Part 74 LPAS equipment in the entire 470-806 MHz band at least through the end of the DTV transition period, as was previously decided in several other proceedings.[8]

IV. Wireless Audio Systems Have Low Interference Potential to Other Services

Documented cases of interference to television broadcasting (the primary use of Part 74 spectrum) have been few and far between, which is especially notable considering the large number of Wireless Audio Systems in use. This good report is probably the result of the low power (typically 10 to 50 mW) of wireless audio transmitters. They are normally hand held or worn on the body, which further reduces the radiated signal due to body absorption. Wireless Audio Systems are also primarily used indoors, which typically adds another 15 dB of attenuation at VHF and 20 dB at UHF, due to building attenuation.

According to FCC Rules, Wireless Audio Systems using Part 74 frequencies must be operated within TV channels that are not in use at their operating location.[9] They are not normally used in residential areas where the highest potential for television interference would exist. In addition, an ever-increasing number of viewers receive their TV programming from cable or satellite systems, which by design are virtually immune to interference from a Part 74 wireless audio transmitter. All wireless audio transmitters must be certified to comply with FCC rules that place strict limits on spurious emissions and occupied bandwidth. This contributes to efficient spectrum use and interference reduction. Thus, it can be seen that safeguards are already in place to protect television broadcasting and other wireless services.

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[8] *See, e.g., Reallocation of Television Channels 60-69, the 746-806 MHz Band*, 12 FCC Rcd 22953, 22966-67 (1998).

[9] Current FCC rules require a minimum separation of 97 to 129 km from an on-channel TV transmitter depending on frequency and location (*see* 47 C.F.R. § 74.802(b)). Shure believes this requirement can be relaxed considerably when the DTV transition period has ended, due to the more robust nature of DTV transmission.

V. Wireless Audio System Frequency Coordination Must Be Flexible

The system architecture of wireless audio transmitters and receivers varies in accordance with cost considerations and design goals. These variations result in differing technical considerations for frequency coordination at venues with multiple systems.[10] Small facilities that employ a modest number of wireless systems are easy to configure; especially when all or most of the transmitters come from a single manufacturer.[11] Large facilities that make extensive use of wireless audio equipment typically have a technical support staff that installs and monitors these systems to ensure smooth operation. The biggest challenge to successful wireless audio operation undoubtedly occurs at locations where multiple operators are simultaneously attempting to operate multiple wireless systems from different manufacturers; for example, at large public events. These situations call for a dedicated frequency coordination effort, such as provided by the SBE's network of volunteer frequency coordinators. Shure supports this concept and agrees that volunteer coordination efforts may need to be expanded, as the SBE has suggested.[12] This should normally enable large events to be managed on-site by those in control of the facility without expenditure of FCC time and resources.[13]

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[10] For example, receivers may use single or double conversion with high or low side LO injection, resulting in different image frequency susceptibilities.

[11] Most manufacturers, including Shure, provide technical recommendations for operating multiple systems. Shure also has an Applications group that assists users with these installations.

[12] SBE Initial Comments at p. 24.

[13] In most stadiums, theatres, and concert halls, the authority in charge of the facility regulates the use of tape recorders and flash photography. Operation of radio equipment could be similarly regulated. Current examples of situations where radio transmissions are restricted by local authorities include operation of two-way radios in blasting zones and use of cellular telephones in motor vehicles or on board aircraft.

The SBE has also called for the FCC to establish flexible spectrum policy that meets the needs of diverse users.[14] Shure believes this is consistent with the Commission's mission to serve the public interest through policies that encourage flexible use of frequency allocations to foster the most efficient use of radio spectrum.

CONCLUSION

The importance of wireless audio to broadcasting operations, as pointed out by the SBE,[15] is unquestioned by anyone familiar with the industry. Wireless Audio Systems, now play a vital role in virtually every kind of audio production, large or small. In today's increasingly crowded RF spectrum landscape, the only satisfactory spectrum for reliable operation of these devices has been and continues to be secondary use of the Part 74 TV bands. Despite the fact that large numbers of Wireless Audio Systems are in use, very few problems of interference to other services have occurred. Large events with multiple Wireless Audio Systems do require frequency coordination in order to operate smoothly, and the role of frequency coordinators for these should probably be expanded.

The Commission cannot rely on the incomplete record in this proceeding to adopt changes that could adversely affect Wireless Audio System use. In particular, the establishment of a new Part 95 Service in the 700 MHz "guard band" channels would be inadequate to meet the needs of Wireless Audio System users, and would be premature since new primary wireless services have not begun operation and interference issues cannot yet be studied.

The American public has come to demand and rely upon wireless audio in all walks of life. Wireless Audio Systems must be able to continue to utilize the Part 74 TV

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[14] SBE Initial Comments at p. 20.

bands on a secondary, non-interference basis. This spectrum represents the only currently viable home for these devices. Additionally, the FCC should continue to allow secondary operation of LPAS equipment in the entire 470-806 MHz band through the end of the DTV transition period, and should carefully consider the important service provided by Wireless Audio Systems in any future rulemaking actions.

Respectfully submitted,

SHURE INCORPORATED

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August 7, 2001

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[15] Comments filed by Society of Broadcast Engineers, Incorporated on May 14, 2001 in GN Docket No. 01-74 at pp. 1-2.