

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Sennheiser Electronic Corporation, Request) RM-11821
For Amendment of Part 74 of the)
Commission’s Rules to Advance the Use of)
Spectrum Efficient Wireless Microphone)
Equipment)

COMMENTS OF ALTEROS, INC.

Alteros, Inc. (“Alteros”) submits these Comments in response to a Petition for Rulemaking¹ filed by Sennheiser Electronic Corporation requesting that the Federal Communications Commission (“FCC” or “Commission”) amend its rule section 74.861(e)(5) to allow for an emerging technology that uses a full 6 MHz channel and that can carry more wireless microphone devices in the channel than is possible under the existing rule. Sennheiser similarly requested that the Commission clarify that advanced wireless microphone equipment in the 941.5-952 MHz and 1435-1525 MHz bands can use 6 MHz channels.² Alteros respectfully responds to Sennheiser’s *Petition* with limited and qualified agreement and further recommendations.

I. BACKGROUND.

Alteros, an Audio-Technica company, was formed in 2016 and is dedicated to the research, development, and sales of innovative technology products with a special focus on the evolving RF landscape and to creating high-end wireless solutions for live audio production, broadcast studios, sports events, and theater applications in the ever shrinking frequency

¹ *Sennheiser Electronic Corporation, Request for Amendment of Part 74 of the Commission’s Rules to Advance the Use of Spectrum Efficient Wireless Microphone Equipment*, [Petition for Rulemaking](#), RM-11821 (Aug. 17, 2018) (“*Petition*”).

² *Id.* at p. 1.

spectrum. Alteros products capitalize on Audio-Technica's extensive research in ultra-wideband ("UWB") and RF technology and innovative digital solutions to solve the most demanding technical problems. As spectrum for high profile events has become more and more compromised, Alteros was formed in response to the FCC's desire to develop technology solutions that will allow wireless microphones and other broadcast auxiliary services, both licensed and unlicensed, to successfully operate outside of the television bands without disrupting existing licensed services. To this end, Audio-Technica invested millions of dollars in the research, development, production and launch of the world's first ultra-wideband digital wireless microphone system and then followed this innovation with the formation of the new company, Alteros, which in less than a year was already winning awards and recognition for designing and providing technically-advanced digital wireless products used in the highest level venues and most critical performance applications.

II. DISCUSSION.

In these Comments, Alteros respectfully responds to Sennheiser's *Petition* with limited and qualified agreement and further recommendations. Sennheiser first states that, "[a]n emerging technology that uses a full 6 MHz channel can carry more wireless microphone devices in the channel than is possible under the existing rule." Sennheiser further states that, "[t]he technology will improve spectrum efficiency and help to counter a severe spectrum shortage." Alteros agrees with the first statement, but disagrees with the second because as proposed, it would be possible for a single wireless microphone transmitter to occupy and operate in a full 6 MHz channel. This would be exceedingly inefficient use of spectrum.

In the past, it has been suggested that efficient use of microphone spectrum is a minimum of 18 channels in a 6 MHz band. In actual use, many professional wireless

coordinators are managing to operate 18-20 channels of high quality wireless microphones in a single 6 MHz TV channel. Alteros believes that the effort of making a rule change should carry a valuable return. With 18 channels being the quantity that was expected as efficient with the currently-existing technology, we request that any new rule change require a *minimum* of 24 channels of high-quality simultaneous operation of wireless microphones in a given channel.

Sennheiser requests that the Commission amend its rules, and also seeks to clarify that, in addition, advanced wireless microphones in the 941.5-952 MHz and 1435-1525 MHz bands be allowed to use 6 MHz channels. Alteros agrees that if a universally available method allowing a minimum of 24 high-quality simultaneous channel operation rule change be put into effect, this should apply to all allowable Part 74 frequency bands, including the expanded 900 MHz frequencies and the 1435-1525 MHz bands. In addition, we suggest that an additional and proportional adjustment should be applied to the 4 MHz of Part 74 allowable spectrum within the duplex gap.

Sennheiser describes performance microphones and in-ear monitors as unable to tolerate digital compression.³ Alteros disagrees. The highest possible sound quality, latency and dynamic range performance is indeed possible utilizing digital compression, and the use of the Alteros GTX system by Grammy award-winning producers for their most critical sound performance requirements is proof that the technology is indeed possible to develop.

Sennheiser's *Petition* describes a Wireless Multi-Channel Audio System ("WMAS") that can greatly improve spectrum efficiency. Alteros agrees, and notes that it has employed the methods described and marketed them successfully for over 11 years, utilizing several wireless methods which allow fully-digital operation on a single frequency channel which allows the

³ *Petition* at p. 3 (noting "[p]erformance microphones and in-ear monitors cannot tolerate even moderate digital compression...").

combining of signals for high quality audio. We do not disagree with this description or the resulting assumption of improved performance.

However, Alteros would like to note that Sennheiser specifically asks the Commission to amend the rule language to: “(1) define WMAS; and (2) allow WMAS systems to use 6 MHz bandwidth...”⁴ Sennheiser filed a patent application for wireless microphone or wireless in-ear monitoring system on October 28, 2016 describing the methods that would be required to execute the proposed WMAS definition as detailed in their petition for rulemaking.⁵ We do not believe it is appropriate, responsible or in the public interest to suggest amending rules such that a single company or entity would potentially be the only candidate able to operate under the rules.⁶ Alteros agrees with Sennheiser’s position that public interest would be served by rule changes which would permit improved spectrum efficiency. We note that public interest

⁴ *Petition* at p. 7.

⁵ U.S. Patent Application No. 15/771,600, Publication No. 20180302702 (published Oct. 18, 2018) (Sennheiser electronic GmbH & Co. KG, applicant).

⁶ Standards that incorporate patented technologies raise a particular competitive risk known as patent hold-up. The standards that support markets in the wireless sector provide a good illustration of the problem. *See Standard-Essential Patents and Licensing: An Antitrust Enforcement Perspective*, Address by FTC Chairwoman Edith Ramirez, 8th Annual Global Antitrust Enforcement Symposium, Georgetown University Law Center, Washington, DC (Sept. 10, 2014). Further, incorporating patented technologies into standards also has the potential to distort competition by enabling standard essential patent holders to use the leverage that they may acquire as a result of the standard setting process to negotiate higher royalty rates or other favorable terms after the standard is adopted than they could have credibly demanded beforehand. This is one form of “patent hold-up.” *See Certain Wireless Communication Devices, Portable Music and Data Processing Devices, Computers and Components Thereof*, Inv. No. 337-TA-745, Federal Trade Commission Statement on the Public Interest (June 6, 2012). When it incorporates a wireless standard into its rules, the Commission implicitly prohibits use of other standards. The Commission, in other words, acts as a standard-setting organization. As courts have repeatedly explained, when such an organization adopts a standard, it generally must impose a requirement to license such patents at “reasonable and nondiscriminatory” (or “RAND”) royalties to prevent the owners of essential patents from “extract[ing] supracompetitive royalties from the industry participants.” *See Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 310 (3d Cir. 2007). *See also Advanced Television Sys. and Their Impact Upon the Existing Television Broad. Serv.*, 11 FCC Rcd. 17771, ¶ 54 (1996).

is also best served when all wireless microphone manufacturers may choose to produce and offer for sale such advanced technology wireless devices to all their licensed part 74 customers.

Sennheiser points out that the sole downside to their request is the possibility of an operator connecting too few devices to realize the potential for improved spectrum efficiency.⁷ Alteros certainly agrees that this is one of the downsides to the Sennheiser request. As stated above, we believe that a minimum of 24 channels of high-quality simultaneous operation is a requirement both to the system approved under this rule and to the operation of such a system. As such, any rule change must also include a method by which the full 24 channel operation will be made mandatory, and which will prevent use of the licensed equipment with fewer than 24 operational channels.

Additionally, Alteros points out that, for current wireless equipment operating via current rules, it is possible to coordinate wireless devices from several manufacturers' devices to co-exist in a 6 MHz band. Any rule changes must not allow the exclusive use of a 6 MHz band for a single manufacturer. As such, any proposed rule change must also require a method that allows synchronization and coordination of the 6 MHz operating bandwidth equipment across multiple manufacturers' system within the single frequency band.

Alteros suggests comments and changes to the Sennheiser proposed Definitions as follows: The description "Wireless Multi-Channel Audio System" is too broad, and the language should be changed back to the language in the Commission's rules defining a wireless microphone as "[a]n intentional radiator that converts sound into electrical audio signals that are transmitted using radio signals to a receiver which converts the radio signals back into audio

⁷ *Petition* at p. 7.

signals that are sent through a sound recording or amplifying system.”⁸

To differentiate from traditional wireless microphone operation, Alteros suggests using the term: *High Efficiency Multi-Channel Wireless Microphone System*. For low power auxiliary stations operating in the bands allocated for Part 74 licensed wireless microphone, Alteros suggests using the following language:

(5) The operating bandwidth shall not exceed 200 kHz, except that a *high efficiency multi-channel wireless microphone system* may have an operating bandwidth not exceeding 6 MHz when transmitting the signals of no fewer than 24 high-quality simultaneous operating channels. The system must be capable of concurrently operating a minimum of 24 simultaneous high-quality channels in the same 6 MHz, and the channels may not be exclusive to a single manufacturer’s system.

(f) The operating bandwidth of a *high efficiency multi-channel wireless microphone system* operating in the 4 MHz of part 74 spectrum in the duplex gap, shall not exceed 4 MHz when transmitting the signals of no fewer than 16 high-quality simultaneous operating channels. The system must be capable of concurrently operating a minimum of 16 simultaneous high-quality channels in the same 4 MHz, and the channels may not be exclusive to a single manufacturer’s system.

III. CONCLUSION

Based on the foregoing, Alteros respectfully requests that the Commission consider the language changes recommended in this filing. Alteros looks forward to working with Commissioners and staff in this proceeding.

Respectfully submitted,
ALTEROS, INC.

By: /s/ Erin P. Fitzgerald
Erin P. Fitzgerald
Womble Bond Dickinson (US) LLP
1200 19th Street, N.W.
Washington, D.C. 20036
(202) 857-4428
Attorney for Alteros, Inc.

By: /s/ Jacquelynn A. Green
Jacquelynn A. Green
President, CTO
Alteros, Inc.
1100 Campus Dr., Suite 200
Stow, OH 44224
(330) 686-8120

December 28, 2018

⁸ 47 C.F.R. 15.236(a)(1).

CERTIFICATE OF SERVICE

I, Erin P. Fitzgerald, hereby certify that on this 28th day of December, 2018, I caused true and correct copies of the foregoing Comments of Alteros, Inc. to be served by electronic mail upon the following:

Mr. Joe Ciaudelli
Director, Spectrum Affairs
SENNHEISER Research & Innovation
1 Enterprise Drive
Old Lyme, CT 06371
860-848-7422
Joe.Ciaudelli@Sennheiser.com

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington VA 22209
Counsel for Sennheiser Electronic Corporation
703-812-0440
lazarus@fhhlaw.com

/s/ Erin P. Fitzgerald
Womble Bond Dickinson (US) LLP

December 28, 2018