Sennheiser Electronic Corporation
1 Enterprise Drive
Old Lyme, CT 06371
Phone: +1 (860) 434-9190
Fax: +1 (860) 434-1759

www.sennheiserusa.com

August 12, 2016

Via Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: GN Docket Nos. 12-268 and 14-166; ET Docket No. 14-165; MB Docket No. 15-146
***Ex Parte* filing of Sennheiser Electronic Corporation**

Dear Ms. Dortch:

Sennheiser Electronic Corporation ("Sennheiser") hereby files in support of the Ex Parte filing submitted to the Commission by Shure Incorporated on June 29, 2016, regarding application of Section 15.203[1] which prohibits removable antennas with standard connectors and jacks for Part 15 certified devices. Sennheiser also raised this issue in our Petition for Reconsideration[2] and in a subsequent Ex Parte filing[3].

Adding to the points Shure Incorporated stated in their recent filing:

---

1 47 C.F.R. § 15.203.

2 See *CONSOLIDATED PETITION FOR RECONSIDERATION OF SENNHEISER ELECTRONIC CORPORATION*, GN Docket Nos. 14-166 and 12-268; ET Docket No. 14-165 (filed December 17, 2015). Sennheiser also sought reconsideration to not limit LPAS access to 1.4 GHz to no more than 30 MHz of spectrum per location; not apply the -90 dBc spurious emissions limit for all frequencies above and below the ETSI mask specification; designate coordinated frequencies for wireless microphones in 169-172 MHz.

3 See *Ex Parte filing of Sennheiser Electronic Corporation*, GN Docket Nos. 12-268 and 14-166; ET Docket No. 14-165; and MB Docket No. 15-146 (filed April 15, 2016)

Sennheiser Electronic Corporation
1 Enterprise Drive
Old Lyme, CT 06371
Phone: +1 (860) 434-9190
Fax: +1 (860) 434-1759

www.sennheiserusa.com

- The switching bandwidth (wide tuning range) of equipment is steadily increasing. This is consistent with the Commission's guidance to microphone manufacturers to offer equipment with high flexibility and even develop systems to work across multiple frequency bands[4]. Antennas matched to the microphone transmitter's operating frequency are necessary to maximize power and spectral efficiency. This would be prohibitively difficult without standard connectors. Microphone manufacturers already provide several antennas with some models with extended switching bandwidth to optimally match to the various operating frequencies. Proper matching is particularly crictical for body worn transmitters because of the effects due to body absorption. Depending on the frequency and the manner a transmitter is attached to the body, the loss of radiated power can be between 8 and 25 dB[5]. This body loss in conjunction with the mismatching of the antenna will limit the range of operation, which impairs or interrupts performance on large stages or sporting fields. Detachable antennas have proven to be the solution avoiding mismatch, thus securing interference free operation.

- Body pack microphone transmitters, which represent the majority of units sold, endure particularly rough handling. The antennas are prone to damage since the transmitter is worn close to the body and concealed on a performing artist, athlete, or other talent often in rapid

[4] Report& Order FCC 15-100, ¶ 121.
[5] ETSI SE7 and measurements of DKE – German Commission of Electrotechnique, electronic and Information technology.

Sennheiser Electronic Corporation
1 Enterprise Drive
Old Lyme, CT 06371
Phone: +1 (860) 434-9190
Fax: +1 (860) 434-1759

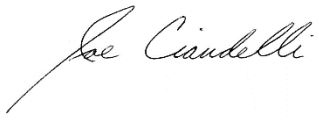
www.sennheiserusa.com

movement. It is important that spare antennas can be attached immediately to bring the units back to reliable operation.

"Unlicensed" does not equate to "unprofessional" in the wireless microphone community. For example, operation in the future 600 MHz guard bands and the upper portion of the duplex gap will be deemed unlicensed even when used by a licensed microphone operator. Consumer hobbyists are a minority of microphone operators who, through the market dynamics of price point, are served with lower end products that lack detachable antennas. Higher cost systems with detachable antennas are used by trained audio engineers, so there is negligible risk of consumers misusing standard connectors to install antennas that would take the device out of compliance. We are not aware of any past violations of this kind with existing equipment.

Please contact me with any questions.

Respectfully submitted,



Director, Spectrum Affairs
SENNHEISER ELECTRONIC CORPORATION
Joe.Ciaudelli@Sennheiser.com
860-848-3132 Office
212-688-6666 Mobile