

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of	)	
	)	
Expanding the Economic and Innovation	)	Docket No. 12-268
Opportunities of Spectrum Through	)	
Incentive Auctions	)	

**REPLY OF SENNHEISER ELECTRONIC CORPORATION**

Sennheiser Electronic Corporation (“Sennheiser”) hereby replies to comments filed in response to Sennheiser’s Petition for Reconsideration (“Petition”),<sup>1</sup> as well as to other Petitions filed in this proceeding.<sup>2</sup>

Sennheiser seeks reconsideration by the Federal Communications Commission (“FCC” or “Commission”) of two aspects of its order: 1) The Commission’s denial to wireless microphone users of two blocks of clean spectrum in the UHF frequencies; and 2) The Commission’s refusal to consider a mechanism for reimbursement to wireless microphone owners for equipment displaced from the 600 MHz band.

As is well-established in the record, wireless microphones are vitally important to our society, playing an irreplaceable role in the provision of news to our citizens as well as in entertainment, religious worship, and community gatherings. Wireless microphones also are key to fostering successful entertainment and information industries in the U.S.

It is clear that professional-grade wireless microphones – those used in broadcasting, film production, and live events – require reserved spectrum in the UHF frequencies. Additionally,

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<sup>1</sup> *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Petition for Reconsideration of Sennheiser Electronic Corporation, Docket No. 12-268 (filed Sept. 15, 2014) (“Sennheiser Petition”).

<sup>2</sup> *In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567 (2014) (“R&O”).

there is no dispute that the Commission’s prior reallocation of TV channels 52-69 (698-806 MHz) required owners to replace still-useful microphones, and the present proceeding now will require owners to replace some of this newly purchased equipment. For these reasons, nearly sixty letters have been filed in support of Sennheiser’s Petition, letters by individuals and small businesses seeking to obtain a second UHF channel to ensure continued audio quality for professional productions and seeking fair reimbursement for the replacement of wireless microphones.

Sennheiser respectfully requests that the Commission grant its Petition.

**A. THE FCC MUST PROVIDE TWO UHF BLOCKS SET ASIDE FOR WIRELESS MICROPHONES.**

Sennheiser seeks reconsideration of the Commission’s determination that wireless microphones do not require two reliable blocks of interference-free UHF spectrum (*i.e.*, clean of out-of-band emissions that the duplex gap is likely to experience), and suggests as options either combining the remaining reserved channel with Channel 37 or finding additional spectrum from what is to be auctioned.<sup>3</sup> While manufacturers have begun moving “backstage” operations, such as intercom, cueing, and interruptible fold-back, as well as non-professional equipment off the UHF frequencies, live performance and spontaneous newsgathering require the use of two distinct blocks in UHF because in-ear monitors and microphones must be on separated frequencies and require good propagation characteristics and reduced antenna size. Wireless microphones for professional use must satisfy three technically demanding criteria: very high audio fidelity, near-absolute reliability, and extremely low latency. The importance of fidelity and reliability are self-evident. The latency requirement arises because a performer on stage or in the studio is exposed to his own voice, via monitor speakers or in-ear monitors, through the

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<sup>3</sup> Sennheiser Petition at 2.

same microphone system that delivers his voice to the audience. Any significant delay becomes intolerable to the performer. The practical upper limit is less than ten thousandths of a second through the entire system, from the microphone transducer all the way back to the monitor.

Lectrosonics, Inc., another manufacturer of wireless microphones, concurs with Sennheiser's assessment,<sup>4</sup> as does Future Sonics, Inc., a manufacturer of wireless personal monitors.<sup>5</sup> As Future Sonics details:

It is imperative to have reliable prime frequencies. In addition, the wireless Future Sonics Ear Monitors® brands also help reduce hearing and vocal fatigue. This offers young performers to prevent early on hearing damage and aging performers, i.e. Fleetwood Mac, Barbara Streisand, U2, Reba, Frankie Valli, Gloria Estefan to name a very few, the only way to properly perform as long as they are able to get to the stage.<sup>6</sup>

Additionally, CP Communications, one of the largest vendors of rental wireless production equipment, makes clear that “the FCC must recognize that nothing else is available now, given factors such as body signal absorption and battery life limitations.”<sup>7</sup> CP Communications further states:

Given today's technology, there is no practical alternative for critical uses; so sweeping wireless microphones out of most of the 600 MHz band (as well as the 500 MHz band due to subsequent post auction television broadcaster re-packing) will unavoidably result in a degradation of audio delivery that public audiences expect to experience.<sup>8</sup>

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<sup>4</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Bob Cunnings, VP of Engineering, and Karl Winkler, Director of Business Development, Lectrosonics, Inc., Docket No. 12-268 (filed Nov. 1, 2014) (“Lectrosonics Letter”).

<sup>5</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Marty Garcia, CEO & Founder, Future Sonics, Inc., Docket No. 12-268 (filed Nov. 9, 2014) (“Future Sonics Letter”).

<sup>6</sup> *Id.* at 1.

<sup>7</sup> Comments of CP Communications, LLC in Support of Petition for Reconsideration, Docket No. 12-268, at 3 (filed Nov. 12, 2014) (“Comments of CP Communications”).

<sup>8</sup> *Id.*

And a letter by an award-winning producer summarizes the needs of the entertainment industry:

[E]very American not only enjoys entertainment but also benefits from it as a leading contributor to the U.S. economy. Content creators and live entertainers require reliable wireless communication to practice their art. Although there may be competing pressures for this valuable spectrum, jeopardizing the America’s entertainment industry could have dire effects. Millions of people are employed in the entertainment industry and they value their ability to do their jobs. They need these critical electromagnetic bands. At least two blocks of UHF should be dedicated to mics to ensure reliability for productions where you don’t get a second chance.<sup>9</sup>

Mobile Future objects to Sennheiser’s request on the basis that it is contrary to Congressional intent and the FCC’s broadband goals, and that additional spectrum can be found through a separate pending FCC proceeding on wireless microphones.<sup>10</sup> The Wireless Internet Service Providers Association (“WISPA”) similarly opposes Sennheiser, claiming that the loss of UHF spectrum “will be largely offset by other actions the Commission has taken and may take.”<sup>11</sup> As Sennheiser has demonstrated, there is no substitute for the loss of UHF spectrum; while manufacturers have worked diligently to move as many users off of the UHF spectrum,<sup>12</sup> some cannot be moved.<sup>13</sup> Moreover, while Sennheiser appreciates the Commission’s work to

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<sup>9</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Karl Richardson, Docket No. 12-268 (filed Nov. 19, 2014).

<sup>10</sup> Opposition of Mobile Future to Petitions for Reconsideration, Docket No 12-268, at 5 (filed Nov. 12, 2014) (“Mobile Future Opposition”).

<sup>11</sup> WISPA Consolidated Opposition to Petitions for Reconsideration, Docket No. 12-268, at 5-7 (filed Nov. 12, 2014) (“WISPA Opposition”).

<sup>12</sup> Sennheiser estimates that up to 80% of wireless microphone use will transition from UHF spectrum.

<sup>13</sup> For this reason, CTIA’s criticism of manufacturers for failing to develop frequency agile equipment is erroneous, as such equipment is available but does not solve the dearth of available spectrum. Opposition and Reply of CTIA – The Wireless Association to Petitions for Reconsideration at 21, Docket No. 12-268 (filed Nov. 12, 2014) (“CTIA Reply”). For example, a typical professional live-performance theater operating 60 microphones cannot retune all of these microphones to the limited number of remaining UHF channels.

find additional spectrum for wireless microphones, it will take time to enact rules and develop product. Wireless microphone users and event productions require spectrum throughout this process. Finally, WISPA asserts that the FCC's change to the protected contour of co-channel television stations will provide for more spectrum to wireless microphone users,<sup>14</sup> but this is only helpful in some instances. For example, in major cities, it will still remain difficult for wireless microphones to operate outdoors without safe-haven channels for hyper-critical links needed for newsgathering and major special events.<sup>15</sup>

Finally, Sennheiser agrees with RTDNA that wireless microphones need reliable, clean spectrum for spontaneous newsgathering and, while Sennheiser has concerns about operating in the duplex gap, RTDNA's proposal that wireless microphones have a 6 MHz channel with guard bands on either side would be more palatable than the current scheme.<sup>16</sup> A single block is not enough.

For these reasons, notwithstanding the availability of other spectrum options and increasing regulatory flexibility, wireless microphones require two separated UHF channels.

**B. EQUITY COMPELS REQUIRING REIMBURSEMENT FOR REPLACEMENT WIRELESS MICROPHONES.**

Given that the 600 MHz auction will benefit one group (the wireless carriers that will sell services on the spectrum) at the expense of another group (wireless microphone owners, a group which just recently incurred large displacement costs), as a matter of fairness the government has an obligation to require reimbursement. The Petition and prior filings establish that long-

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<sup>14</sup> WISPA Opposition at 6.

<sup>15</sup> See Sennheiser Petition at 7 (noting the lack of desirability of closer co-channel locations).

<sup>16</sup> Petition for Reconsideration of Radio Television Digital News Association, Docket No. 12-268 (filed Sept. 15, 2014).

standing Commission precedent offers a mechanism to do so, one outside the scope of the Spectrum Act. The Commission must place the public interest above commercial interests and provide for a reimbursement scheme.

The record details the high-cost of replacing microphones. CP Communications explains that it spent more than \$300,000 purchasing new equipment just a few years ago during the transition from the 700 MHz spectrum, equipment designed to have a long life-span.<sup>17</sup> For this reason, CP Communication supports Sennheiser’s reimbursement request, pointing out that wireless microphone owners are “being forced to bear a double hit and again vacate a band through no fault of their own,” especially in light of possible further reduction in the allocated TV channels.<sup>18</sup> Full Compass Systems, one of the largest resellers of wireless audio equipment, explains their reasons for supporting the reimbursement proposal:

I agree with Sennheiser’s proposal for auction winners to compensate wireless mic owners for any equipment that they will not be able to use after spectrum repacking. Replacing the previous lot of 700 MHz wireless systems resulted in many public schools having to go without wireless for some time (in many cases, years) due to insufficient funding for such a large unplanned expense. It also resulted in higher prices to many performance venues throughout the Nation that passed those added costs onto ticket holders in order to keep their own doors open.<sup>19</sup>

As noted above, more than fifty others, mostly small business owners and individual producers, have filed in support of Sennheiser’s request, essentially because of the financial hardship the Commission’s decision will cause. For example, one audio engineer, who works on both film productions and live performances, explains his concern: “I’ve mixed sound for productions that used as many as 30 wireless channels . . . . These productions will face an

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<sup>17</sup> Comments of CP Communications at 4.

<sup>18</sup> *Id.*

<sup>19</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Shawn Tallard, Full Compass Systems, Docket No. 12-268 (filed Nov. 12, 2014).

amazing financial hardship if they have to replace \$20,000 to \$30,000 worth of gear which, incidentally, they just replaced a few years ago due to the loss of the 700 MHz spectrum.”<sup>20</sup>

Another production/tour manager and audio engineer notes that “[t]he repacking of the spectrum will cost my company and clients \$25,000USD to \$40,000USD to replace and/or update our current wireless equipment.”<sup>21</sup>

CTIA opposes reimbursement of wireless microphones on the bases that the Spectrum Act does not require reimbursement; that reimbursement is inconsistent with past practice; and that wireless microphone users were given plenty of warning about the loss of spectrum.<sup>22</sup>

CTIA is incorrect in each instance. First, it is overly limiting to view the Spectrum Act as the sole basis for FCC authority in this proceeding – is not a bar to FCC acting under other available authority, namely the same Title I and III provisions that authorized reimbursement in other auctions.<sup>23</sup> Second, while it is true that there was no request for reimbursement in the 700 MHz proceeding, this does not bar Sennheiser’s request herein, as FCC made no finding on the matter in the 700 MHz proceeding and therefore there is no Commission precedent. And finally, as Sennheiser demonstrated, it was not until after the 700 MHz transition that wireless microphone

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<sup>20</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Rich Roszel, Docket No. 12-268, at 1-2 (filed Nov. 6, 2014).

<sup>21</sup> Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Tony Bulluck, President and Owner, A.B. Spectrum Systems, Docket No. 12-268 (filed Nov. 12, 2014).

<sup>22</sup> CTIA Reply at 20-23.

<sup>23</sup> See Sennheiser Petition at 10-12.

owners received notice of the forthcoming spectrum repacking;<sup>24</sup> thus, the idea that wireless microphone owners had “advance notice” is mythical at best.

CTIA’s filing also perpetuates the myth that this situation arises out of the failure by wireless microphone manufacturers to design better microphones, such as those that can be frequency agile.<sup>25</sup> Sennheiser has offered such equipment for years.

For these reasons, Mobile Future’s opposition to Sennheiser’s reimbursement request is equally unsupported. Furthermore, Sennheiser questions Mobile Future’s assertion that a reimbursement scheme would provide a financial disincentive to wireless bidders and reduce auction proceeds;<sup>26</sup> to the extent required reimbursement would cause a financial disincentive, it would be exceedingly minor compared to the value of the spectrum. Sennheiser also notes that its Petition only seeks reimbursement at the pro-rated rate rather than the replacement value of the microphones, a reasonable request.

Fairness requires that the Commission put in place a mechanism to reimburse wireless microphone owners for their loss, as proposed in Sennheiser’s Petition.

**C. Wireless Microphones Can Successfully Co-exist with Wireless Users and the FCC is Properly Considering Technical Standards in the Part 15 Proceeding.**

Several parties have sought reconsideration or raised concerns with regard to the operation of unlicensed devices in the duplex gap or guard band portions of the 600 MHz band. Qualcomm seeks reconsideration of the allocation of 600 MHz spectrum to unlicensed operations, claiming that the decision is not “technically sound” because the record does not

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<sup>24</sup> See Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Mitchell Lazarus, Counsel for Sennheiser Electronic Corporation, Docket No. 12-268, at 4-5 (filed Dec. 13, 2013).

<sup>25</sup> CTIA Reply at 21-22.

<sup>26</sup> Mobile Future Opposition at 4.

show that unlicensed devices can coexist with licensed wireless devices.<sup>27</sup> In particular, Qualcomm takes umbrage with the placement of wireless microphones in the duplex gap absent a technical showing that the combined use of the duplex gap and guard bands will not cause interference.<sup>28</sup> CTIA supports Qualcomm, stating that the Commission should only uphold its new unlicensed framework if such operations will not cause harmful interference to licensed wireless services.<sup>29</sup>

As WISPA notes, it is well-established that unlicensed devices must not cause interference to other users.<sup>30</sup> Sennheiser fully expects to continue to comply with this requirement, and additionally has specifically committed to protect both WMTS and RAS on Channel 37. Wireless microphones have a long history of successful co-existence with other users, including public safety land mobile services operating on TV Channels 14-20. TechFreedom suggests that the FCC develop robust standards for unlicensed operations on 600 MHz,<sup>31</sup> and Sennheiser fully supports the FCC's promulgation of robust technical standards. The pending development of such standards should not serve as a reason for the FCC to reconsider its decisions in this proceeding, however. Sennheiser agrees with WISPA that the concerns of Qualcomm and others are premature and should be dismissed.<sup>32</sup>

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<sup>27</sup> Petition for Reconsideration of Qualcomm Incorporated, Docket No. 12-268, at 3 (filed Sept. 15, 2014) ("Qualcomm Petition").

<sup>28</sup> *Id.* at 11.

<sup>29</sup> CTIA Reply at 3.

<sup>30</sup> Opposition of WISPA at 4-5.

<sup>31</sup> Comments of TechFreedom, Docket No. 12-268 (filed Nov. 12, 2014).

<sup>32</sup> WISPA Opposition at 4-5.

For these same reasons, it is premature to suggest, as the WMTS Coalition and GE Healthcare do,<sup>33</sup> that unlicensed devices cannot co-exist with WMTS devices under any set of technical rules. The pending Part 15 proceeding is the appropriate forum in which to develop these rules.<sup>34</sup>

### CONCLUSION

The Commission must reconsider the availability of two full UHF blocks for wireless microphone use; beyond this, the current spectrum allocation plan should stand. The Commission also should exercise its authority to require compensation for wireless microphone owners, as detailed in Sennheiser's earlier pleadings.

Respectfully submitted,



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November 24, 2014

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<sup>33</sup> See Petition for Reconsideration of WMTS Coalition, Docket No. 12-268 (filed Sept. 15, 2014); Petition for Reconsideration of GE Healthcare, Docket No. 12-268 (filed Sept. 15, 2014); Opposition of the WMTS Coalition to Petitions for Reconsideration, Docket No. 12-268 (filed Nov. 12, 2014).

<sup>34</sup> *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Band and Duplex Gap, and Channel 37*, Notice of Proposed Rulemaking, ET Docket No. 14-165 and GN Docket No. 12-268 (rel. Sept. 30, 2014).

**CERTIFICATE OF SERVICE**

I, Deborah N. Lunt, a secretary with the law firm of Fletcher, Heald & Hildreth, PLC, hereby state that true copies of the foregoing REPLY OF SENNHEISER ELECTRONIC CORPORATION were mailed this 24<sup>th</sup> day of November, 2014, to the following (copies to FCC recipients were hand delivered):

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