

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

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

ET Docket No. 14-165

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

GN Docket No. 12-268

Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions

**REPLY IN SUPPORT OF PETITION FOR  
RECONSIDERATION OF MICROSOFT CORPORATION**

**I. Introduction**

The Commission has made great strides towards enabling consumer access to unlicensed white-space technologies through its development of new Part 15 technical rules. By correcting two important oversights—the imposition of an unworkable database “push” requirement, and a needless mandate for low-power, fixed, indoor white-space devices (“WSDs”) to use high gain antennas—the Commission can unlock still greater benefits and reduce costs for consumers. White-space opponents have failed to provide any reason not to correct these errors by requiring “fast polling”—using database “pull” instead of “push”—on only two channels, and permitting fixed, indoor WSDs to use unity-gain antennas at a conducted power of 40 mW. The Commission should also clarify its plans for WSD deployments in channel 37 along the lines that

Microsoft has suggested in its Petition for Reconsideration.<sup>1</sup> Taken together, these steps will reduce uncertainty and promote investment, significantly increasing the likelihood that white-spaces technologies will provide substantial benefits for American consumers.

## **II. The Commission Should Permit Fixed WSDs to Operate Indoors at 40 mW Without a Directional Antenna**

The record supports Microsoft's request that the Commission correct its rules for 40 mW fixed devices so that they may operate indoors without directional antennas. Indeed, Microsoft's petition on this point was met with little serious opposition.

For example, while the National Association of Broadcasters ("NAB") objects to permitting 40 mW fixed devices to use omnidirectional antennas, NAB's arguments fail to address the fact that Microsoft's proposal is limited to *indoor* devices.<sup>2</sup> Therefore, in addition to being unrealistic and inaccurate for the reasons laid out in Microsoft's opposition to NAB's petition for reconsideration,<sup>3</sup> NAB's analysis is also entirely inapposite. It does not undermine Microsoft's common-sense observation that "an *indoor-only* fixed device presents even less interference risk than a personal/portable white-space device operating at the same power level."<sup>4</sup> In addition to home routers, the requirement that indoor 40 mW fixed devices must use directional antennas could limit the usefulness of TVWS spectrum for the Internet of Things

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<sup>1</sup> See Petition for Reconsideration and Clarification of Microsoft Corporation at 2-15, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Dec. 23, 2015) ("Microsoft Petition").

<sup>2</sup> See Microsoft Petition at 16; Opposition to Petitions for Reconsideration of the National Association of Broadcasters at 5-8, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 29, 2016) ("NAB Opposition").

<sup>3</sup> Response and Opposition to Petitions for Reconsideration of Microsoft Corporation at 23-25, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 29, 2016) ("Microsoft Opposition").

<sup>4</sup> Microsoft Petition at 16.

(“IoT”). These devices, such as smart appliances in consumers’ homes, plainly pose less interference risk than personal/portable devices operating at the same power level *outdoors*, and could not properly operate with highly directional antennas. Yet NAB would nonetheless require these indoor fixed devices to adhere to significantly more restrictive antenna-gain rules, even though they are unnecessary and will significantly reduce value for consumers. Although some IoT devices could operate as Mode II personal/portable devices, this would bar them from a significant amount of lower-frequency VHF spectrum,<sup>5</sup> even though the propagation characteristics of this VHF spectrum would be especially valuable for IoT applications.

NAB’s claim that home routers are not fixed devices also misses the mark. NAB appears to contend that a device should be categorized as a personal/portable device, and not a fixed device, if it is so much as *possible* to move it from its “specified fixed location.”<sup>6</sup> But the rules include no such requirement. Rather, they require only that a fixed device “transmits and/or receives radiocommunication signals at a specified fixed location.”<sup>7</sup> A home router, which is only rarely moved, and typically must be reconfigured when it is, is no different from any other fixed device in this regard.

It is, of course, not impossible to move other fixed devices once they are installed. Indeed, the white-space rules specifically include requirements that are triggered “[i]f a fixed white space device is moved to another location... .”<sup>8</sup> These rules account for the fact that moving a fixed device is a significant step that will typically be accompanied by reinstallation

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<sup>5</sup> See 47 C.F.R. § 15.707(b).

<sup>6</sup> NAB Opposition at 7.

<sup>7</sup> 47 C.F.R. § 15.703(f).

<sup>8</sup> 47 C.F.R. § 15.711(c).

and reconfiguration at a new site, making it reasonable to require a qualified technician to resubmit the device's location to a white-space database.<sup>9</sup>

Microsoft's further request—that the Commission clarify that moving a fixed device within a home would not require resubmission of the device's location—would merely acknowledge that moving a low-power device from one part of a home to another will have virtually no effect on its interference potential to operations outside the home. No party has presented any argument—much less evidence—to contradict this position. Indeed, the Commission has already provided similar allowances for personal/portable devices, requiring them to re-check the database when they are moved 100 meters. And in any event, both fixed and personal/portable WSDs would still be required to contact a white-space database to ensure that they observe the required separation distances.

Finally, Shure Incorporated (“Shure”) maintains that removing the power limits on low-power indoor fixed devices with unity gain antennas increases the risk of harmful interference to wireless microphones. Shure makes clear, however, that it does not oppose Microsoft's petition as it relates to residential buildings.<sup>10</sup> This is important, as home routers are the most significant use case that would be affected by the Commission's unnecessary restrictions on indoor low-power fixed devices. But the Commission also should not exclude indoor commercial, industrial, and public spaces from the potential benefits of white-space routers. Many small businesses, for example, rely on Wi-Fi routers bundled with their Internet service in a manner similar to most residential users.

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<sup>9</sup> *See id.*

<sup>10</sup> Comments of Shure Incorporated at 8, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 29, 2016) (“Shure Opposition”).

Significantly, Shure has provided no analysis to support its implausible assumption that these low-power fixed devices are *more* likely to cause harmful interference than personal/portable devices operating at the same radiated power level within the building. Shure’s argument also disregards the fact that the Commission’s rules provide licensed wireless microphone users with access to reserved spectrum in the duplex gap, as well as the ability to reserve channels, thereby avoiding co-channel operation with WSDs entirely. With respect to unlicensed microphones, operators of these devices also will easily be able to avoid the channel where their own indoor white-space router operates. And in the unusual case where an indoor location could include both unlicensed wireless microphones and a white-space router controlled by unaffiliated entities, the unlicensed microphone operator will still be well positioned to determine whether its operations on a particular channel are compatible with the unlicensed white-space router, just as an unlicensed microphone operator must determine whether it can co-exist with other unlicensed WSDs.

### **III. The Commission Should Roll Back its Database “Push” Mandate and Instead Require WSDs to Frequently Re-Check the Database on Two Designated Channels**

Several parties agree with Microsoft’s conclusion that the Commission’s database “push” rule is technologically and legally infirm<sup>11</sup>—and none appear to disagree. Sennheiser Electronic Corporation (“Sennheiser”) and NAB, however, contend that the Commission should replace database “push” with the very proposal it previously rejected: mandating frequent database

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<sup>11</sup> NAB Opposition at 8-9; Shure Opposition at 6; Opposition and Response of Sennheiser Electronic Corporation at 8, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Jan. 27, 2016) (“Sennheiser Opposition”); Google Inc. Petition for Reconsideration at 1-11, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Dec. 23, 2015) (“Google Petition”).

checks for devices operating on *every* channel, 24-hours per day.<sup>12</sup> Sennheiser and NAB do so notwithstanding the Commission’s conclusion that such a rule would unnecessarily impose significant costs on white-space database administrators and users.<sup>13</sup>

As Google and Microsoft have explained,<sup>14</sup> the Commission should instead adopt a simple rule that will identify two channels in any location, at any given time, for frequent database re-checks. Importantly, there is no need for the Commission itself to specifically identify these channels; rather, it can simply adopt a rule requiring WSDs to contact the database every 20 minutes when they operate on one of two vacant channels meeting specified criteria, e.g., the two lowest UHF channels available in that location.<sup>15</sup>

Under this proposal, wireless microphone operators covering breaking news events will be able to make their spectrum reservations on these two channels in the usual way, and be assured that the channel will be cleared within 30 minutes. This solution would therefore achieve the Commission’s goal of ensuring rapid access to spectrum for electronic newsgathering without incurring the significant resource costs of requiring every WSD in the United States to

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<sup>12</sup> Sennheiser and NAB have done so in part to obtain additional spectrum reservations for wireless microphone uses beyond the breaking news coverage scenarios that the Commission intended to facilitate. *Compare* Sennheiser Opposition at 8-9, *and* NAB Opposition at 9-10, *with 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*, Report and Order, 30 FCC Rcd. 9551, 9662 ¶ 273 (2015) (“Part 15 Order”) (“The issue that needs to be addressed is making channels available for licensed wireless microphone use for events that cannot be anticipated, such as late-breaking news events, within minutes or hours of when they occur [without the two channels currently reserved for wireless microphones]”).

<sup>13</sup> Part 15 Order ¶ 277.

<sup>14</sup> Google Petition at 1-11; Microsoft Opposition at 13-19.

<sup>15</sup> *See id.*

contact the database every 20 minutes on the off chance that a breaking news event occurs nearby.

While NAB and Sennheiser oppose this fast-polling-channel approach, neither party offers any compelling reason not to adopt it. NAB, for example, simply repeats the rationale the Commission gave for requiring database “push.”<sup>16</sup> But as Microsoft has observed, this explanation misunderstands the fast-polling proposal.<sup>17</sup> Although the Commission noted that it would not be able to identify the fast-polling channels in a given market until after the auction and transition period,<sup>18</sup> the fast-polling proposal would not require any such step.<sup>19</sup> Similarly, the Commission expressed concern that travelling news crews might not be able to tune to the fast-polling channels identified in a particular location.<sup>20</sup> But this overlooks the fact that such wireless microphones must already be able to tune to different channels across the UHF band, because the white spaces available for wireless microphone use will vary by market, due to market-by-market variability in the channels occupied by broadcasters and other licensees.

NAB’s argument that the Commission should increase database polling frequency because doing so will not increase database costs is even less persuasive. First, the Commission has already considered and rejected this argument.<sup>21</sup> It need not evaluate it again on reconsideration.<sup>22</sup> And as the Commission rightly pointed out, NAB’s argument does not take

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<sup>16</sup> NAB Opposition at 8.

<sup>17</sup> Microsoft Opposition at 18-19. *See also* Google Petition at 9-11.

<sup>18</sup> Part 15 Order ¶ 277.

<sup>19</sup> *See* Microsoft Opposition at 18-19; Google Petition at 9-11.

<sup>20</sup> Part 15 Order ¶ 277.

<sup>21</sup> *Id.*

<sup>22</sup> 47 C.F.R. § 1.429(1)(3).

into account the likely growth of the unlicensed white-space ecosystem after the Incentive Auction.<sup>23</sup>

Finally, Sennheiser contends that the two channels made available on short notice under the fast-polling proposal would not provide enough spectrum for wireless microphones. But there were only two channels available on short notice for wireless microphones under the Commission's prior approach. Thus, between the two fast-polling channels under Google's and Microsoft's proposal, the 4 MHz dedicated to wireless microphone use in the duplex gap,<sup>24</sup> and licensed wireless microphones' continued ability to reserve additional channels on 24-hours' notice,<sup>25</sup> users of licensed wireless microphones will be at least as well off under this proposal as they were before.

#### **IV. The Commission Should Disregard Unsupported Claims that Uncertainty About Channel 37 Will Have “Minimal Impact” on Unlicensed Operations**

NAB and WMTS Coalition contend that the Commission should delay deployment of WSDs in channel 37 and resist sensible calls to identify a fixed target date for nationwide WSD deployments because this uncertainty and delay will have a “minimal” impact on the development and deployments of WSDs. This is simply incorrect.

As Microsoft has explained, the development of a healthy unlicensed ecosystem depends on the availability of three usable channels in every major market.<sup>26</sup> This means that not only must these channels ultimately become available, investors and innovators must also be able to

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<sup>23</sup> See Part 15 Order ¶ 277.

<sup>24</sup> *Id.* ¶ 153.

<sup>25</sup> See *id.* ¶ 273.

<sup>26</sup> See Reply Comments of Microsoft Corporation at 3, ET Docket No. 14-165 and GN Docket No. 12-268 (filed Feb. 25, 2015).

predict and rely on their ultimately becoming available. If unlicensed WSDs are to reach their full potential, these businesses must begin making the needed investments now in chip design and fabrication in order for these products to be market-ready in the near future. If the Commission's rules do not make clear that there will eventually be sufficient spectrum available to support a vibrant unlicensed ecosystem, these businesses will invest those resources elsewhere. And this decision, once made, will not be easily reversed as the spectrum picture gradually comes into focus over the coming months or years.

Channel 37 is a crucial part of this picture. As the Commission knows, access to additional broadband spectrum will be most important in dense urban areas where spectrum is intensively used. In addition, making spectrum available in many of the nation's largest markets, including Los Angeles and New York, is especially important because of those areas' large resident populations and because they are frequent travel destinations.<sup>27</sup> But these are also the locations where, due to the Commission's nationwide impairment goals and other dynamics, the fewest white spaces are likely to be available.

In fact, in Los Angeles, not only might there be no vacant channels available after the Incentive Auction and post-auction repack, a broadcaster may also be placed in the duplex gap.<sup>28</sup> This means that channel 37 could actually be the *only* channel guaranteed to be available in Los Angeles after the repack—far short of the three channels needed for a successful WSD ecosystem.

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<sup>27</sup> See Comments of Microsoft Corporation at 5, MB Docket No. 15-146 and GN Docket No. 12-268 (filed Sept. 30, 2015) (“Microsoft Vacant Channel Comments”).

<sup>28</sup> See *id.*

As Microsoft and others have explained in the vacant-channel proceeding, it is critical that the Commission act to preserve vacant channels after the repack.<sup>29</sup> Even if the Commission does so, however, channel 37 itself will often be the necessary third channel, and must therefore be widely, and predictably available in order for unlicensed devices to succeed in Los Angeles and other large markets. This is why it is so important for the Commission to clarify its plans for channel 37 test deployments, and the purpose of its waiver process. The Commission should take steps to assure industry that it will not permit the trial deployment period and waiver processes to become a tool for WMTS interests to sow uncertainty and infinite delay.

## **V. Conclusion**

Microsoft appreciates the Commission's efforts to craft effective Part 15 rules for the television bands and the 600 MHz band. As they stand today, however, these rules impose unnecessary restrictions that threaten to undo the Commission's hard work to promote efficient use of the white spaces. The Commission can avoid this outcome by (1) adopting the modest, but important, adjustments to the Commission's new Part 15 rules described above and in Microsoft's Petition for Reconsideration, and (2) clarifying its commitment to WSD operations in channel 37, and more fully explaining its plans for this channel as described in Microsoft's Petition.

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<sup>29</sup> *See, e.g.*, Microsoft Vacant Channel Comments at 2-6; Comments of Google Inc. at 2-7, MB Docket No. 15-146 and GN Docket No. 12-268 (filed Sept. 30, 2015); Comments of Open Technology Institute at New America and Public Knowledge at 3-6, MB Docket No. 15-146 and GN Docket No. 12-268 (filed Sept. 30, 2015).

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I, Jessica Parent, do hereby certify that on this 10th day of March, 2016, I caused a copy of the foregoing Reply in Support of Petition for Reconsideration to be served by postage pre-paid mail on the following:

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