

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Amendment of Part 15 of the Commission's	)	ET Docket No. 14-165
Rules for Unlicensed Operations in the	)	
Television Bands, Repurposed 600 MHz Band,	)	
600 MHz Guard Bands and Duplex Gap, and	)	GN Docket No. 12-268
Channel 37, and	)	
	)	
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	)	
	)	
Expanding the Economic and Innovation	)	
Opportunities of Spectrum Through Incentive	)	
Auctions	)	

To: The Commission

**OPPOSITION OF GE HEALTHCARE**

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February 29, 2016

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To: The Commission

**OPPOSITION OF GE HEALTHCARE**

Pursuant to Section 1.429 of the Federal Communications Commission’s (“FCC” or “Commission”) rules, GE Healthcare (“GEHC”)<sup>1</sup> respectfully submits this Opposition to the petitions for reconsideration filed by Microsoft Corporation (“Microsoft”) and Google Inc. (“Google”) on December 23, 2015 in the above-captioned proceeding.<sup>2</sup>

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<sup>1</sup> GEHC is a unit of General Electric Company and provides a broad range of products and services that enable healthcare providers to better diagnose and treat diseases and medical conditions, including products and services that incorporate wireless technology.

<sup>2</sup> Microsoft Corp., Petition for Reconsideration and Clarification, ET Docket No. 14-165, GN Docket No. 12-268 (filed Dec. 23, 2015) (“Microsoft Petition”); Google Inc., Petition for Reconsideration, ET Docket No. 14-165, GN Docket No. 12-268 (filed Dec. 23, 2015) (“Google Petition”).

## I. Introduction and Summary.

Over the objections of GEHC and others, and despite overwhelming evidence in this proceeding record that its interference analysis was flawed, the Commission adopted separation distances and procedures in the *Part 15 R&O* that will not protect safety-of-life wireless medical telemetry service (“WMTS”) operations from harmful interference in many cases.<sup>3</sup>

Yet Microsoft and Google ask the Commission to afford *even less* protection to WMTS systems. As explained below, the Commission should deny Microsoft’s requests to reduce the significance of the initial test deployments of white space devices in Channel 37 by altering them in ways that are contrary to their stated purpose and could lead to absurd results. The Commission should also deny Microsoft’s request to modify the waiver process in order to make it more difficult for hospitals to seek the FCC’s assistance when they experience harmful interference. In addition, the Commission should deny Google’s request to set a nationwide deployment date for white space devices on Channel 37 without waiting to assess the results of the initial test deployments.

The Commission should, however, grant the National Association of Broadcasters’ (“NAB”) request to overhaul the geolocation/database scheme, which would help address some concerns about its dependability. The Commission should also grant the GEHC and WMTS Coalition’s requests to reconsider the WMTS separation distances and correct the methodology

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<sup>3</sup> See *Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, et al.*, Report and Order, 30 FCC Rcd 9551 (2015) (“*Part 15 R&O*”); see also, e.g., GEHC Comments at 25-26.

used to develop them,<sup>4</sup> which would also help achieve its goal of protecting this safety-of-life service from harmful interference.<sup>5</sup>

## **II. The Commission Should Deny Microsoft’s Requests to Reduce the Significance of the Initial Test Deployments of White Space Devices on Channel 37.**

The Commission limited the initial deployment of white space devices on Channel 37 to one or two geographic areas as “an additional measure to ensure that the separation distances and procedures [adopted in the *Part 15 R&O*] will provide the intended protection to WMTS systems.”<sup>6</sup> The Commission also explained that it would issue a public notice announcing that white space devices may be deployed nationwide on Channel 37 “[a]t the successful conclusion of *testing* of these initial deployments.”<sup>7</sup>

Microsoft asks the Commission to reconsider these initial test deployments.<sup>8</sup> In particular, Microsoft seeks assurances that their results will not cause the Commission to modify either the separation distances or procedures adopted in the *Part 15 R&O*.<sup>9</sup> Microsoft also seeks to narrow the scope of the initial test deployments to evaluating the interference risk between white space devices and WMTS operations “in dense urban environments, with a view to liberalizing the [C]hannel 37 rules.”<sup>10</sup>

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<sup>4</sup> GE Healthcare, Petition for Reconsideration, ET Docket No. 14-165, GN Docket No. 12-268 (filed Dec. 23, 2015) (“GEHC Petition”); WMTS Coalition, Petition for Reconsideration, ET Docket No. 14-165, GN Docket No. 12-268 (filed Dec. 23, 2015) (“WMTS Coalition Petition”).

<sup>5</sup> See, e.g., *Part 15 R&O* ¶ 202 (2014) (vowing to “be conservative in [the] determination of protection distances to protect WMTS”).

<sup>6</sup> See *id.* ¶ 221.

<sup>7</sup> *Id.* (emphasis added).

<sup>8</sup> Microsoft Petition at 4-6.

<sup>9</sup> *Id.* at 5.

<sup>10</sup> *Id.* at 6.

Microsoft's requests would defeat the purpose of the initial test deployments.<sup>11</sup> As the Commission explained when it adopted this approach, the initial test deployments will allow it, the Food and Drug Administration ("FDA"), and stakeholders to "validate and, if needed, adjust our approach **so that critical WMTS systems do not experience harmful interference.**"<sup>12</sup> Such caution is more than warranted because WMTS is a safety-of-life service and cannot tolerate even small or episodic incidents of interference.<sup>13</sup> Moreover, as GEHC and the WMTS Coalition have explained throughout this proceeding, the Commission's separation distances and procedures will *not* be sufficient to protect WMTS systems.<sup>14</sup> The methodology used to develop the separation distances contained a number of material errors,<sup>15</sup> and GEHC and the WMTS Coalition's field tests confirm that white space devices that operate beyond such distances can easily cause harmful interference to WMTS systems.<sup>16</sup>

Microsoft's requests could also lead to absurd results. Suppose, for example, that the initial test deployments confirm that the Commission's separation distances and procedures do not adequately protect WMTS systems from harmful interference. In this scenario, the problem could be wide-spread, but Microsoft would have the Commission modify its WMTS protection criteria only "in particular circumstances."<sup>17</sup> Such an approach would be inefficient and far more burdensome to the Commission and stakeholders than adjusting the separation distances and/or procedures generally.

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<sup>11</sup> *See id.*

<sup>12</sup> *Part 15 R&O* ¶ 221 (emphasis added).

<sup>13</sup> *See, e.g.,* GEHC Petition at 4.

<sup>14</sup> *See, e.g.,* GEHC Petition; WMTS Coalition Petition.

<sup>15</sup> *See, e.g.,* GEHC Petition at 6-21.

<sup>16</sup> *See id.* at 26-27.

<sup>17</sup> *See* Microsoft Petition at 6.

Additionally, Microsoft’s suggestion to limit the FDA’s role in the test deployments to determining whether WMTS devices have been made vulnerable to interference because they “do not follow modern RF engineering practices” is misguided.<sup>18</sup> WMTS equipment should not be subject to limitations on use by the FDA merely because the FCC's rules were not sufficient to protect this otherwise properly functioning equipment from new sources of interference. More generally, and consistent with the 2010 FCC/FDA Memorandum of Understanding,<sup>19</sup> the FDA should take an active role in designing, conducting, and evaluating the initial test deployments given its strong interest in ensuring that the FCC’s new rules do not negatively impact patient safety.<sup>20</sup>

### **III. The Commission Should Deny Microsoft’s Request to Alter the Waiver Process in Ways that Will Make It Difficult to Resolve Instances of Harmful Interference to WMTS Systems.**

The *Part 15 R&O* established a waiver process through which parties may request to modify separation distances that do not appropriately protect WMTS systems.<sup>21</sup> Microsoft asks the Commission to alter this process by creating two additional requirements for requests for greater separation distances: (1) include “concrete evidence” that a WMTS site is experiencing

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<sup>18</sup> *See id.* at 5-6.

<sup>19</sup> *See* Memorandum of Understanding Between the Federal Communications Commission and the Food and Drug Administration Center for Devices and Radiological Health (2010), *available at* [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-300200A2.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-300200A2.pdf).

<sup>20</sup> FDA involvement alone is not a substitute for establishing an Institutional Review Board (“IRB”) to oversee the design and execution of validation trails. Indeed, FDA’s own regulations require IRBs – duly constituted with independent subject matter experts – to oversee such trials rather than the agency providing sole oversight. *See* 21 C.F.R. pts. 50, 56. This is to satisfy key principles of patient protection under the World Medical Association’s (“WMA”) original Declaration of Helsinki and the United States’ corresponding “Common Rule.” *See* WMA, Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, *available at* <http://www.wma.net/en/30publications/10policies/b3/>; U.S. Dept. of Health and Human Services, Federal Policy for the Protection of Human Subjects (‘Common Rule’), <http://www.hhs.gov/ohrp/humansubjects/commonrule/> (last visited Feb. 28, 2016).

<sup>21</sup> *See Part 15 R&O* ¶ 217.

harmful interference from a white space device; and (2) describe the good faith efforts the WMTS operator has made to resolve the interference with the white space community.<sup>22</sup>

The Commission should deny both requests. First, concrete evidence of the source of harmful interference may not be immediately available in some cases. Its absence should not prevent hospitals from asking the Commission to investigate and resolve the problem or from obtaining temporary relief while the Commission completes its analysis. With critical patient care and hospital operations on the line, the stakes are too high to require perfect information about the harmful interference's source before taking steps to resolve it.

Moreover, white space device operators should bear the burden of proving that they are not interfering with WMTS systems. Hospitals should be able to easily detect when interference is occurring. However, determining whether a white space device is causing the interference – let alone *which* specific device is its source – could prove extremely challenging. Consequently, when a WMTS system experiences interference, the white space device operators should have the obligation to modify their operations and coordinate with the hospital to ensure that no further interference occurs. After all, white space device operators have an independent obligation under Section 15.5 of the Commission's rules not to cause interference to WMTS operations.<sup>23</sup>

In addition, a hospital should not have to substantiate a showing that harmful interference from white-space devices is *already occurring* to obtain a waiver, as Microsoft suggests.<sup>24</sup>

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<sup>22</sup> See Microsoft Petition at 8-13.

<sup>23</sup> See 47 C.F.R. § 15.5.

<sup>24</sup> Notably, the Commission currently allows waiver requests to be filed before harmful interference has actually occurred. See *Part 15 R&O* ¶ 217 (“If parties believe a distance other than that provided in the rules . . . under protects WMTS systems, they may file waiver requests with the Commission to modify the distance for a particular facility or a group of similarly situated facilities.”).

Rather, a hospital should only be required to substantiate that the specific propagation conditions within its vicinity (*i.e.*, within the default separation distances) would result in less path loss than is necessary to prevent harmful interference to one or more of its WMTS receive antennas.

**Granting such waivers *proactively* is critical to preventing harmful interference in cases where actual propagation conditions are known to be different from those assumed by the TM 91-1 model, which the FCC used to develop the default separation distances. In such cases, harmful interference is an eventual certainty.** Examples of such substantiated showing include but are not limited to: (1) photographs demonstrating unobstructed line-of-sight from one or more WMTS antennas to one or more potential white space device locations; and (2) path loss measurements demonstrating less-than-sufficient path loss between one or more WMTS antennas to one or more such locations.

Second, although WMTS operators should and will coordinate in good faith with the unlicensed community to resolve interference issues, they should not be required to describe these efforts in detail in their waiver petitions. Such a requirement would discourage waiver petitions by increasing the burden and delay associated with filing them. Of course, white space device operators will have an opportunity to raise any concerns regarding the lack of coordination during the Commission's review of the waiver petition.

#### **IV. The Commission Should Deny Google's Request to Immediately Specify A Nationwide Roll-Out Date for Unlicensed Operations on Channel 37.**

As described above, the Commission intends to allow nationwide deployment of white space devices on Channel 37 only after the test deployments show that this can be achieved without endangering safety-of-life WMTS systems. Google requests that, instead, the Commission establish a nationwide deployment date before waiting to see whether white space

devices can co-exist with WMTS systems with the separation distances and procedures adopted in the *Part 15 R&O*.<sup>25</sup>

The Commission should deny this request. Google claims that uncertainty about a nationwide roll-out date may affect unlicensed device deployments and investment in unlicensed equipment.<sup>26</sup> However, such effects are likely to be minimal. They are also outweighed by the potential harms to hospitals and their patients. The Commission should proceed cautiously and deliberately with regard to allowing use of Channel 37 by unlicensed white space devices.<sup>27</sup> Moreover, such use *should be delayed* if, as GEHC expects, the Commission’s validation trials reveal flaws in the separation distances and procedures adopted in the *Part 15 R&O*.

**V. The Commission Should Grant NAB’s Request to Overhaul the White Space Geolocation/Database Scheme.**

Regardless of what separation distances the Commission adopts, WMTS systems may be exposed to unauthorized white space device operations near hospitals unless the Commission includes safeguards that ensure white space devices and the geolocation/database scheme itself operate as intended.<sup>28</sup> NAB indicates that this scheme currently suffers from a number of “fundamental flaws” and asks the Commission to overhaul it before allowing additional white space device operation.<sup>29</sup> NAB requests, among other things, that the Commission require

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<sup>25</sup> See Google Petition at 12-14.

<sup>26</sup> See *id.* at 12.

<sup>27</sup> In principle, at least, deployment of Channel 37 capable *devices* need not be delayed since the primary purpose of the geolocation/database scheme is to allow channel availability to be controlled and modified over time without changing devices themselves. So Channel 37 capable devices could potentially be deployed prior to Channel 37 being made available via the database pending completion of validation trials. However, as GEHC has previously discussed, this assumes that sufficient additional measures are taken to assure the dependability of the geolocation/database technology including, in particular, the reliability of the software that resides in the devices themselves. See, *e.g.*, GEHC Petition at 36-39.

<sup>28</sup> See, *e.g.*, GEHC Petition at 36-39.

<sup>29</sup> See National Association of Broadcasters, Petition for Reconsideration, ET Docket No. 14-165, GN Docket No. 12-268, at ii, 2-4 (filed Dec. 23, 2015) (“NAB Petition”).

location uncertainty testing and procedures for white space devices and take additional measures to ensure that white space devices operate only on authorized channels and at authorized power levels.<sup>30</sup>

The Commission should grant NAB's request. As GEHC and others have warned throughout this proceeding, serious concerns remain about the dependability of white space devices and the geolocation/database scheme as a whole.<sup>31</sup> For example, the Whitespace Spectrum Access System ("WSAS") functionality residing in each white space device will be software-based and almost certainly include open-source and commercial off-the-shelf components.<sup>32</sup> Likewise, most white space devices are likely to be low-cost consumer grade-devices, subject to malfunction or manipulation by device owners or third-parties. Such bugs and vulnerabilities are likely to escape detection during the FCC's hardware-oriented device certification testing due to its inadequacy to detect software defects.<sup>33</sup> GEHC's petition for reconsideration discusses in detail these and other potential threats and weaknesses, along with measures that can help mitigate them.<sup>34</sup>

At the very least, the Commission should wait until after resolution of the rulemaking NAB has requested to "vastly improve the accuracy of the TVWS database" before allowing nationwide use of Channel 37 by white space devices.<sup>35</sup> The Commission sought comment in a notice of proposed rulemaking released on February 26, 2016 on a number of proposals related

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<sup>30</sup> *See id.* at 4-7, 14-15.

<sup>31</sup> *See, e.g.,* GEHC Petition at 36-42.

<sup>32</sup> *See, e.g., id.* at 37-38.

<sup>33</sup> *See, e.g., id.*

<sup>34</sup> *See id.* at 36-42.

<sup>35</sup> *See* National Association of Broadcasters, Petition for Rulemaking, RM-11745 (filed Mar. 19, 2015).

to NAB's request.<sup>36</sup> According to the Commission, these proposals "will improve the accuracy and reliability of the fixed white space device data" and help minimize "the potential to cause interference to protected services."<sup>37</sup>

**VI. The Commission Should Grant the Requests of GEHC and the WMTS Coalition to Reconsider the Channel 37 Separation Distances and the Methodology Used to Develop Them.**

Finally, we urge the Commission to expeditiously grant both our and the WMTS Coalition's petitions for reconsideration.<sup>38</sup> Among other things, both petitions ask the Commission to reconsider the separation distances adopted in the *Part 15 R&O* and point out that the methodology used to develop them contained a number of material errors that caused the Commission to underestimate the distances.<sup>39</sup> For example, the Commission misapplied an inappropriate propagation model to calculate path loss, did not include a factor for the Signal to Noise Ratio required by WMTS receivers, erroneously assumed that WMTS receive antennas are at a height of no greater than 10 meters, and failed to account for the likely existence of multiple interferers.<sup>40</sup> The Commission also misinterpreted key components of real-world interference and path loss tests performed by GEHC and the WMTS Coalition.<sup>41</sup> The Commission should eliminate these material errors and adopt new protection distances and other rules that will, in fact, adequately protect WMTS systems.

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<sup>36</sup> See *Amendment of Part 15 of the Commission's Rules for Unlicensed White Space Devices*, Notice of Proposed Rulemaking and Order, FCC 16-23 (rel. Feb. 26, 2016).

<sup>37</sup> *Id.* ¶ 2.

<sup>38</sup> See GEHC Petition; WMTS Coalition Petition.

<sup>39</sup> See GEHC Petition at 6-27; WMTS Coalition Petition at 8-17.

<sup>40</sup> See GEHC Petition at 7-8, 21-26; WMTS Coalition Petition at 11, 16-17.

<sup>41</sup> See, e.g., GEHC Petition at 27-36.

## VII. Conclusion.

Given the “safety-of-life” nature of WMTS and the potential catastrophic consequences of even a single case of harmful interference, the Commission should deny Microsoft’s requests to undermine the significance of the initial test deployments and make it more difficult for hospitals to seek temporary relief when they experience harmful interference. The Commission should also deny Google’s request to establish a nationwide deployment date for white space devices on Channel 37 prior to the conclusion of the initial test deployments.

The Commission should, however, take additional measures to ensure that this safety-of-life service remains protected from harmful interference. In particular, the Commission should grant NAB’s request to overhaul the white space geolocation/database scheme, along with the requests of GEHC and the WMTS Coalition to reconsider the WMTS separation distances and correct the methodology used to develop them.

Respectfully submitted,

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February 29, 2016

## CERTIFICATE OF SERVICE

I hereby certify that on February 29, 2016, a true and correct copy of the foregoing Opposition of GE Healthcare was provided first class mail to each of the following:

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