

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

In the Matter of

Petitions for Rulemaking Regarding the  
Citizens Broadband Radio Service

GN Docket No. 12-354  
RM-11788  
RM-11789

**COMMENTS OF GOOGLE INC. AND ALPHABET ACCESS  
IN RESPONSE TO PETITIONS FOR RULEMAKING**

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July 24, 2017

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## INTRODUCTION AND SUMMARY

The Commission once considered the Citizens Broadband Radio Service (“CBRS”) band to be an experiment testing whether modern sharing technologies can support commercial interest in spectrum that also hosts substantial incumbent operations, including federal use. The experiment has succeeded. Widespread business and technical coordination, and significant investments made by a diverse group of companies, demonstrate that the rules the FCC adopted are achieving their goals. The Commission’s rules have converted underutilized spectrum that could not support a traditional clear-and-auction approach into a band with more varied and intense interest than any other pending deployment. Indeed, the CBRS band is today the only band where local enterprises have commercially viable access to licensed spectrum.

A large set of companies including hospitality providers, energy producers, rural broadband operators, and other local employers are investing many thousands of employee hours and millions of dollars based on the structure the FCC adopted. Based on this extensive industry experience, it is clear that the FCC can best maintain and promote investment in the CBRS band by (1) preserving stable rules on which investors can rely, and (2) allowing all categories of commercial users to pursue the technologies and business plans they believe will succeed in the marketplace.

The Commission thus should reject the wholesale changes to the CBRS framework proposed by CTIA<sup>1</sup> and T-Mobile,<sup>2</sup> which would violate both of these principles. First,

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<sup>1</sup> See *Petition for Rulemaking to Amend the Commission’s Rules Regarding the Citizens Broadband Radio Service in the 3550-3700 MHz Band*, Petition for Rulemaking, GN Docket No. 12-354 (filed June 16, 2017) (“CTIA Petition”).

<sup>2</sup> See *Petition for Rulemaking to Maximize Deployment of 5G Technologies in the Citizens Broadband Radio Service and Amendment of the Commission’s Rules with Regard to*

significant changes to the rules at this late date would undermine investments and confidence, sidelining capital that otherwise would be used to expand broadband Internet access. Second, accepting the changes sought by CTIA and T-Mobile would favor the Commission’s economic choices over those of the market—locking in place a single business plan, executable only by the handful of companies that buy spectrum rights that cover large geographic areas for terms measured in decades.

Relying on the FCC’s flexible and market-oriented rules, Google Inc. (“Google”) and Alphabet’s Access group (“Access”)<sup>3</sup> have been major participants in making this band useful to as wide a range of users and business plans as possible, including Wireless Internet Service Providers (“WISPs”), Mobile Network Operators (“MNOs”), Multiple-System Operators (“MSOs”), enterprises, venues, and many others. Google has conditional certification as a Spectrum Access System (“SAS”) Administrator, and Google and Access have conducted extensive radio testing under experimental authorizations from the Commission.<sup>4</sup> We joined a diverse set of companies in establishing the Wireless Innovation Forum (“WinnForum”) as a multi-stakeholder group to develop interoperable standards, and Access was a founding member of the 62-member CBRS Alliance to assure the commercial success of the band for many categories of operators. Google and Access are investing in the success of the 3.5 GHz band as an engine for adaptable broadband development, rather than just particular types of service.

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*Commercial Operations in the 3550-3650 MHz Band*, Petition for Rulemaking, GN Docket No. 12-354 (filed June 19, 2017) (“T-Mobile Petition”).

<sup>3</sup> Alphabet Access is a group within Alphabet Inc. that includes Google Fiber and related projects.

<sup>4</sup> Under experimental license WH2XNF and WI2XNS.

Representatives from all segments of the wireless industry have been able to work collaboratively to promote the 3.5 GHz band because the FCC’s CBRS rules do not limit success to any one specific business model. So that diverse broadband use cases will remain viable and widespread investment will continue, the Commission should not expand the rights of the Priority Access tier at the expense of General Authorized Access (“GAA”). In addition, the Commission should maintain rules that enable flexible market forces to determine the most efficient use of Priority Access Licenses (“PALs”) in the 3.5 GHz band, including license terms, periodic contestability, census-tract licensing, and dynamic frequency assignment. The Commission should also preserve the current rules regarding public disclosure of anonymized information in the SAS, which (as CTIA elsewhere has acknowledged) adequately protect proprietary and competitively sensitive information. Finally, the Commission should reject T-Mobile’s calls to alter fundamental technical operating parameters for CBRS devices.

**I. THE PART 96 RULES ARE SUPPORTING INTENSIVE DEVELOPMENT OF CBRS SERVICES**

Industry has made extraordinary progress in the short time since the Commission provided regulatory certainty for commercial operations in the CBRS band, and is already finalizing relevant industry standards and preparing to deploy services.<sup>5</sup> This progress is occurring on several fronts.

***Wireless Innovation Forum.*** The WinnForum’s Spectrum Sharing Committee (“SSC” or “Committee”)—whose membership includes both CTIA and T-Mobile—“serves as a common industry and government standards body to support the development and advancement of

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<sup>5</sup> Letter from All Points Broadband, et al., to Ajit Pai, Chairman, Federal Communications Commission, et al., GN Docket No. 12-354 (filed June 1, 2017).

spectrum sharing technologies for the 3.5 GHz band.”<sup>6</sup> Since its inception in 2015, WinnForum SSC has worked aggressively to develop standards for CBRS implementation.

As WinnForum SSC’s most recent report to the Wireless Telecommunications Bureau and Office of Engineering and Technology makes clear, the Committee has already completed work, or is nearing completion, on numerous CBRS requirements and protocols relevant to operations, interoperability, security, and device testing and certification.<sup>7</sup> These include:

- CBRS Operational Security Technical Specification (published June 2016)
- Spectrum Access System (“SAS”) SAS-SAS Protocol Technical Specification (published November 2016)
- SAS to Citizens Broadband Radio Service Device (“CBSD”) Technical Specification (published December 2016)
- CBRS Communications Security Technical Specification (published April 2017)
- PAL Database Technical Specification (published April 2017)
- CBRS PKI Certificate Policy (published April 2017)
- Signaling Protocols and Procedures for CBRS: SAS-CBSD Interface Technical Specification (published June 2017)
- Requirements for Commercial Operation in the U.S. 3550-3700 MHz Citizens Broadband Radio Service Band (latest release published July 2017)

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<sup>6</sup> Letter from Lee Pucker, CEO, Software Defined Radio Forum Inc., and Kurt Schaubach, Chair, WinnForum SSC, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 2, GN Docket No. 12-354 (filed Feb. 16, 2016).

<sup>7</sup> Letter from Lee Pucker, CEO, Software Defined Radio Forum Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, and attached Spectrum Sharing Committee Release Schedule, GN Docket No. 15-319 (filed 26 May 2017) (“Spectrum Sharing Committee Release Schedule”).

As a result of these efforts, WINNForum SSC anticipates that the Commission will be able to move forward with certification of SAS and Environmental Sensing Capability (“ESC”) systems this fall, paving the way for GAA deployments and PAL auctions next year.<sup>8</sup>

**CBRS Alliance.** The CBRS Alliance is composed of diverse industry stakeholders working together to (1) promote LTE-based CBRS technology, use cases and business opportunities; (2) support capabilities to achieve this goal, including multi-operator deployments; and (3) establish an effective product certification program for LTE equipment in the CBRS band that ensures multi-vendor interoperability.<sup>9</sup> The CBRS Alliance’s members include mobile device and chip manufacturers such as Qualcomm, Intel, Ericsson, Samsung, and Nokia, carriers including AT&T, and other Internet service providers including Comcast and Charter.<sup>10</sup> CBRS Alliance members anticipate approval of the first 3.5 GHz LTE handset later this year.<sup>11</sup>

**Market advances.** Concrete commercial uses of the 3.5 GHz band are emerging. For example, earlier this year, Nokia, Access, and Qualcomm—each a founding member of the CBRS Alliance—partnered with race operators to use 3.5 GHz band technologies to create “a 360-degree virtual reality zone inside a stock car to provide a streaming, real-time virtual user experience at speeds over 180 mph.”<sup>12</sup> As the Dynamic Spectrum Alliance (“DSA”) has explained, this deployment “demonstrates that low barriers to entry, abundant spectrum, and

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<sup>8</sup> Spectrum Sharing Committee Release Schedule at 5.

<sup>9</sup> CBRS ALLIANCE, *CBRS Alliance* (2017), <https://www.cbrsalliance.org>.

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

<sup>11</sup> Monica Allevan, *Industry Pumped for 3.5 GHz but Mostly Mum about Handsets*, FIERCEWIRELESS (June 8, 2017), <http://www.fiercewireless.com/wireless/editor-s-corner-industry-pumped-for-3-5-ghz-but-mostly-mum-about-handsets>.

<sup>12</sup> Letter from Kalpak Gude, President, Dynamic Spectrum Alliance, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 2, GN Docket No. 12-354 and GN Docket No. 15-319 (filed Apr. 20, 2017) (“DSA Letter”).

innovative technologies and deployment methods can offer private enterprise new ways to reach audiences and offer consumers new experiences.”<sup>13</sup>

Rural broadband providers also are investing under the CBRS framework.<sup>14</sup> Rise Broadband is the largest fixed wireless broadband provider in the U.S., and is implementing a nearly \$17 million deployment in conjunction with the FCC’s Rural Broadband Experiments program<sup>15</sup> using base stations that will be capable of operating across the entire CBRS band.<sup>16</sup> As Rise co-founder Jeff Kohler has explained, a significant reason for building a CBRS system is that, “instead of licensing the whole country or huge [geographic] swaths, [PALs] will be auctioned by census tract – it appears it may be affordable for small carriers.”<sup>17</sup>

Other companies have made significant investments to enable indoor deployments.<sup>18</sup> Ruckus Wireless and Qualcomm have developed and demonstrated technologies for the 3.5 GHz band that “combine ‘coordinated shared spectrum ... with neutral host-capable small cells to enable cost-effective, ubiquitous in-building cellular coverage.’”<sup>19</sup> As Ruckus has observed, these technologies enable “entities such as businesses, hoteliers, hospitals, municipalities, and niche service providers to deploy and operate their own LTE networks without having to acquire

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<sup>13</sup> *Id.*

<sup>14</sup> *Id.* at 3.

<sup>15</sup> See FEDERAL COMMUNICATIONS COMMISSION, *Rural Broadband Experiments* (Dec. 14, 2016), <https://www.fcc.gov/general/rural-broadband-experiments>.

<sup>16</sup> See Letter from Stephen E. Coran to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 12-354 (filed Apr. 7, 2017).

<sup>17</sup> Joan Engebretson, *Rise Broadband Exec: Broadband Wireless Economics Are Better Than Ever*, TELECOMPETITOR (Apr. 14, 2016), <http://www.telecompetitor.com/rise-broadband-exec-broadband-wireless-economics-are-better-than-ever/>.

<sup>18</sup> DSA Letter.

<sup>19</sup> *Id.* at 3 (quoting RUCKUS WIRELESS, *Ruckus Wireless Shares Vision for the Future on In-Building Cellular* (Feb. 18, 2016), <https://goo.gl/2KgMqF>).

rights to exclusive, licensed spectrum,” and “may also be made available to the established cellular operators via a neutral-host relationship.”<sup>20</sup>

Other examples of companies working to bring the 3.5 GHz band into widespread commercial use include:

- Federated Wireless<sup>21</sup> and Alphabet Access have successfully interoperated their SAS systems.<sup>22</sup> The interoperability demonstrated by Federated Wireless and Access is a key milestone for the deployment of technologies in the CBRS band.
- Alphabet Access has created a Trusted Tester CBSD Program to help hardware manufacturers test products,<sup>23</sup> and has performed a successful end-to-end demonstration using 3.5 GHz mobile devices.<sup>24</sup>
- Ericsson has developed technology that successfully passed Access’s testing, and plans to deploy several devices.<sup>25</sup>

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<sup>20</sup> Testimony of David A. Wright, Director, Regulatory Affairs and Network Standards, RUCKUS WIRELESS, before the HR Committee on Energy and Commerce, at 13 (Apr. 5, 2017), <http://docs.house.gov/meetings/IF/IF16/20170405/105841/HHRG-115-IF16-Wstate-WrightD-20170405.pdf>.

<sup>21</sup> Monica Allevan, *Ericsson Seeks Permission to Conduct 3.5 GHz Experiments in Plano, Texas*, FIERCE WIRELESS (Apr. 3, 2017), <http://www.fiercewireless.com/wireless/ericsson-files-sta-to-conduct-experiments-at-3-5-ghz-plano>.

<sup>22</sup> Dan Meyer, *Alphabet, Federated Claim SAS Interoperability for 3.5 GHz Band Destined for 5G*, RCR WIRELESS NEWS (Dec. 21, 2016), <http://www.rcrwireless.com/20161221/policy/alphabet-federated-claim-sas-interoperability-for-3-5-ghz-band-destined-for-5g-tag2>.

<sup>23</sup> Monica Allevan, *Google-Led SAS Ready to Test with 3.5 GHz Hardware Vendors for CBRS Band*, FIERCE WIRELESS (Feb. 24, 2017), <http://www.fiercewireless.com/tech/google-led-sas-ready-to-test-3-5-ghz-hardware-vendors-for-cbrs-band>.

<sup>24</sup> *Id.*

<sup>25</sup> ERICSSON, INC., *Ericsson Passes Extensive Testing for 3.5 GHz CBRS Shared Spectrum Usage with Access SAS*, NASDAQ GLOBENEWSWIRE (Feb. 27, 2017), <https://globenewswire.com/news-release/2017/02/27/928131/0/en/Ericsson-passes-extensive-testing-for-3-5-GHz-CBRS-shared-spectrum-usage-with-Access-SAS.html>.

- SpiderCloud Wireless developed the industry’s first small cells that will support LTE in traditional licensed spectrum as well as in the CBRS band.<sup>26</sup>
- Nokia has developed and designed a CBRS LTE Small Cell product, Flexizone, specifically for enterprises, venues, and the hospitality industry.<sup>27</sup>
- Intel is working on technology to coordinate and integrate wireless communications—from LTE to Wi-Fi—in the CBRS band.<sup>28</sup>
- Ruckus Wireless demonstrated upcoming LTE Small Cell products at the 2017 Mobile World Congress.<sup>29</sup>
- Accelleran has developed hardware that is specifically designed for the current CBRS rules, and will support software solutions using 3.5 GHz spectrum.<sup>30</sup>
- Sercomm has worked with Federated Wireless to develop products that will deliver robust, in-home LTE network services using the 3.5 GHz band.<sup>31</sup>
- GE is working with Nokia and Qualcomm to develop a private, LTE network for the Industrial Internet of Things (“IoT”) using the CBRS band.<sup>32</sup>

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<sup>26</sup> Caroline Gabriel, *SpiderCloud Adds 3.5 GHz Support to its Enterprise Small Cells*, WIRELESS WATCH (Oct. 19, 2016), <http://rethinkresearch.biz/articles/spidercloud-adds-3-5-ghz-support-enterprise-small-cells/>.

<sup>27</sup> NOKIA, *Nokia Expands Flexi Zone Small Cell Portfolio, Boosting Performance and Simplifying Deployment for Operators and Enterprises* (Sept. 8, 2016), [http://www.nokia.com/en\\_int/news/releases/2016/09/08/nokia-expands-flexi-zone-small-cell-portfolio-boosting-performance-and-simplifying-deployment-for-operators-and-enterprises](http://www.nokia.com/en_int/news/releases/2016/09/08/nokia-expands-flexi-zone-small-cell-portfolio-boosting-performance-and-simplifying-deployment-for-operators-and-enterprises).

<sup>28</sup> Necati Canpolat, *Industry Focuses Efforts on Wi-Fi, Coordinated Shared Spectrum, and Convergence of Wireless and Computing*, INTEL (Apr. 19, 2017), <https://blogs.intel.com/technology/2017/04/industry-focuses-efforts-wi-fi-coordinated-shared-spectrum-convergence-wireless-computing/>.

<sup>29</sup> Dave Wright, *Mobile World Congress 2017*, RUCKUS WIRELESS (Mar. 10, 2017), <https://theruckusroom.ruckuswireless.com/wi-fi/2017/03/10/mobile-world-congress-2017/>.

<sup>30</sup> ACCELLERAN, *Accelleran Brings Live 3.5 GHz Small Cell Solution to MWC2017 and Announces New Small Cell Products* (Feb. 27, 2017), <http://www.acceleran.com/acceleran-brings-live-3-5ghz-small-cell-solution-to-mwc2017-and-announces-new-small-cell-products/>.

<sup>31</sup> Arif Ahsan, *Sercomm Corporation*, CABLELABS (2015), <https://www.tekstadium.com/vendor/sercomm-corporation/>.

<sup>32</sup> Pete Lancia, *GE, Nokia and Qualcomm Unveil First Private LTE-Based Trial Network Customized for Industrial IoT*, QUALCOMM (Feb. 22, 2017),

Indeed, ABI Research recently predicted a new \$1.7 billion dollar hardware market within the next five years from unlicensed and shared technologies such as CBRS and unlicensed LTE.<sup>33</sup> As ABI has explained, “technologies taking advantage of this spectrum type are not only attracting [MNO] interest for low cost network densification, but also brand-new entrants. This is due to the opportunities that the network technologies promote for densification, neutral hosts, as well as enterprise and private network operators.”<sup>34</sup>

In sum, the assertion that the existing rules are inconsistent with investment is incorrect. A wide-ranging group of companies, including all parts of the wireless industry as well as investors often left out of licensed spectrum access in other bands, have proven that the rules support such investment. It is critical that the Commission not disrupt these activities and dampen future investment by undermining regulatory certainty and adopting the major rule changes sought by CTIA and T-Mobile.

## II. THE FCC SHOULD RETAIN DEDICATED GAA SPECTRUM

The CTIA and T-Mobile petitions reflect carriers’ current interest in the 3.5 GHz band for mobile broadband services.<sup>35</sup> But it was not always so. Just six years ago, carriers took the

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<https://www.qualcomm.com/news/releases/2017/02/22/ge-nokia-and-qualcomm-unveil-first-private-lte-based-trial-network>.

<sup>33</sup> ABI Research, *New LTE Unlicensed and Shared Spectrum Technologies Help Create a US \$1.7B Hardware Market Over the Next Five Years*, PR NEWSWIRE (June 27, 2017), <http://www.prnewswire.com/news-releases/new-lte-unlicensed-and-shared-spectrum-technologies-help-create-a-us17b-hardware-market-over-the-next-five-years-300480210.html>.

<sup>34</sup> *Id.*

<sup>35</sup> *See* CTIA Petition at 1; T-Mobile Petition at 5-8.

position that the band would not soon be useful for mobile deployments, and that the Commission should focus its efforts on promoting fixed services.

For example, when the Commission sought comment on NTIA's Fast Track Report identifying the 3.5 GHz band as a candidate for reallocation for commercial use, AT&T opined that this spectrum is "likely to be of limited utility for mobile broadband," but "might prove quite useful for fixed broadband or for unlicensed use."<sup>36</sup> CTIA similarly stated that spectrum above 3 GHz, including the 3.5 GHz band, is "unlikely to be useful for mobile services due to propagation issues in the near-term," but "remain[s] valuable for fixed broadband services and should be investigated for reallocation."<sup>37</sup> T-Mobile agreed that "the spectral location of the 3550-3650 MHz ... band[] make[s] [it] less suitable for mobile broadband applications" than spectrum below 3 GHz.<sup>38</sup>

The carriers' recent change of position casts doubt on their current insistence that mobile operations are sure to be the optimal use case, which the Commission should favor over all others. And it reveals something even more fundamental. The big carriers' changing positions on appropriate commercial uses for the 3.5 GHz band underscore that no one can predict future spectrum uses with certainty. This is true of the private sector as well as regulators. For this reason, the FCC should not attempt to predict the technology, business model, or group of companies that will best make use of the 3.5 GHz band. Instead, it should maintain rules that enable any potential operator to explore different uses, take risks, and follow market forces. This

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<sup>36</sup> Comments of AT&T Inc. at 7, ET Docket No. 10-123 (filed Apr. 22, 2011).

<sup>37</sup> Comments of CTIA—The Wireless Association at 13, ET Docket No. 10-123 (filed Apr. 22, 2011).

<sup>38</sup> Comments of T-Mobile USA, Inc. at 7, ET Docket No. 10-123 (filed Apr. 22, 2011).

approach has been the hallmark of the Commission’s best policy decisions, including the CBRS framework.

T-Mobile seeks the most radical and restrictive change, alone petitioning the FCC to undo the CBRS band’s balanced structure of protected incumbent operations, PAL licensees, and GAA users.<sup>39</sup> T-Mobile argues that allotting the entire 3.5 GHz band for PAL operations will “maximiz[e] the utility of the band for 5G operations.”<sup>40</sup> This is incorrect. Eliminating dedicated GAA spectrum would reduce the utility of the CBRS band for an array of entities—ranging from WISPs to local businesses to venues that want to provide on-premises services—that have indicated their interest in using GAA rather than PAL spectrum.<sup>41</sup>

As CTIA’s lack of support suggests, T-Mobile’s view is far outside the mainstream. Even CTIA, like Google, Access, and many others, evidently sees no incompatibility between the designation of GAA spectrum and the deployment of 5G technologies in the 3.5 GHz band. Indeed, GAA can support a more intense pace of innovation for development and deployment of

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<sup>39</sup> T-Mobile Petition at 9-11.

<sup>40</sup> *Id.* at 1.

<sup>41</sup> *See, e.g.*, Comments of the Wireless Internet Service Providers Association at 7, GN Docket No. 12-354 (July 14, 2014); Reply Comments of the Wireless Internet Service Providers Association at iii, GN Docket No. 12-354 (Aug. 15, 2014) (“WISPA reiterates its strong support for the Commission’s proposed three-tier Spectrum Access System (‘SAS’) and the Commission’s goal of maximizing spectral efficiency in this new ‘innovation band.’ WISPA opposes the efforts of those commenters from the mobile wireless industry that seek to phase in the SAS through a two-tier system that excludes [GAA] use or worse, that propose to install a two-tier ‘command and control’ regulatory approach that would foreclose GAA use and includes only long-term licenses.”); Comments of Microsoft Corporation, GN Docket No. 12-254 (Dec. 5, 2013); Michael Calabrese, *Solving the “Spectrum Crunch:” Unlicensed Spectrum On A High-Fiber Diet*, Time Warner Cable Research Program on Digital Communications (2013) at 16-17 (“It is critical that a substantial portion of the [3.5 GHz] band should always be available for unlicensed use (‘General Authorized Access’) in every market nationwide.”).

5G applications. Qualcomm, for instance, already offers its MulteFire LTE technology to support 5G services in GAA spectrum.<sup>42</sup>

It is especially odd for T-Mobile to maintain that government rules customized for traditional carrier licensing regimes are necessary for carrier investment in the 3.5 GHz band. T-Mobile boasts of its early adoption of new technologies and access models for the benefit of consumers,<sup>43</sup> has advocated that the Commission permit carriers to provide services using LTE technologies such as LTE-U and LAA in unlicensed spectrum,<sup>44</sup> and has specifically urged the Commission to adopt CBRS rules that permit use of LTE-U and LAA technologies in the 3.5 GHz band.<sup>45</sup> As the Commission has determined,<sup>46</sup> and T-Mobile itself has emphasized,<sup>47</sup> a diversity of licensing models across different frequencies will best support innovative wireless broadband.

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<sup>42</sup> See Patrik Lundqvist, *A New Kind of Spectrum for New Opportunities*, QUALCOMM (Aug. 29, 2016), <https://www.qualcomm.com/news/onq/2016/08/29/new-kind-spectrum-new-opportunities>.

<sup>43</sup> See T-MOBILE, *Un-Carrier Network List of Firsts* (Sept. 6, 2016), <https://newsroom.t-mobile.com/news-and-blogs/uncarrier-network-list-of-firsts.htm>.

<sup>44</sup> See, e.g., Comments of T-Mobile USA, Inc., ET Docket No. 15-105 (filed June 11, 2015) (“T-Mobile Comments on LTE-U and LAA Technologies”).

<sup>45</sup> Letter from Steve B. Sharkey, Chief Engineering and Technology Policy, Federal Regulatory Affairs, T-Mobile, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 12-354 (filed Apr. 9, 2015).

<sup>46</sup> *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-36650 MHz Band*, Report and Order, 30 FCC Rcd. 3959, ¶ 63 (2015) (“CBRS Report and Order”).

<sup>47</sup> See T-Mobile Comments on LTE-U and LAA Technologies at 5 (“Consistent with the FCC’s own philosophy, carriers should be allowed to use an ‘all of the above’ approach for ... network capacity expansion and management.”).

T-Mobile’s suggestion that eliminating designated GAA spectrum is necessary to help U.S. carriers win a “global race” to roll out LTE services using 3 GHz spectrum<sup>48</sup> is similarly mistaken. The 3.5 GHz band is different in the U.S. than in the rest of the world. As the Commission has explained, “unlike many other countries that have fully reallocated the 3.5 GHz Band for commercial broadband uses, we must accommodate a spectral environment that includes, and will continue to include, extensive use of the band by military radar systems.”<sup>49</sup> The presence of military incumbents and other operators makes the SAS and ESC necessary, and will limit harmonization of this band with existing LTE Bands 42 and 43 internationally.<sup>50</sup> Therefore, none of the proposals in T-Mobile’s petition—and certainly not abolishing dedicated GAA spectrum—would result in international harmonization of the 3.5 GHz band.

Finally, T-Mobile maintains that “facilitating commercial 5G use of 3.5 GHz band would potentially enable 1100 megahertz of spectrum for 5G commercial wireless use” given spectrum identified for study in the latest draft of the MOBILE NOW bill.<sup>51</sup> As the Commission has recognized, “[e]nsuring that a stable and significant quantity of spectrum is available for both Priority Access Licensees and GAA will foster innovation, encourage efficient use of the band, and create an environment conducive to a wide array of potential users and uses.”<sup>52</sup> Accordingly, it is doubtful that assigning 1100 continuous megahertz of 3 GHz spectrum all to

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<sup>48</sup> See T-Mobile Petition at 6; see also CTIA Petition at 4-5.

<sup>49</sup> CBRS Report and Order ¶ 86.

<sup>50</sup> See *id.* (“Many of the policies we adopt in this *Report and Order* are intended to address this unique situation and ensure that the band is made available for commercial use while protecting important incumbent operations. As such, industry standards may need to evolve to accommodate some of the policies we adopt herein.”).

<sup>51</sup> T-Mobile Petition at 7-8.

<sup>52</sup> CBRS Report and Order ¶ 63.

the same few carriers would advance innovation and investment. Contrary to T-Mobile's suggestion, moreover, the draft MOBILE NOW legislation does not envision this outcome. Indeed, as the draft Senate Report makes clear, NTIA and the FCC are to assess the feasibility of "licensed or unlicensed" commercial operations in various frequencies.<sup>53</sup> Maintaining the GAA tier within the 3550-3700 MHz range will aid NTIA and the Commission in meeting their duty to assess the potential of the light licensing model for extension to additional mid-range bands.

### **III. THE FCC SHOULD PRESERVE RULES THAT ALLOW MARKET FORCES TO DETERMINE THE BEST USE OF PALS**

CTIA recognizes that, under the current three-tier authorization framework, CBRS spectrum can serve as an "innovation band."<sup>54</sup> Paradoxically, however, the effect of CTIA's proposed changes to the PAL licensing framework would be to lock in place a single business plan that would be available only to a small set of companies. The Commission should reject this step backwards, which would reduce overall investment and innovation in the band and lead to less broadband coverage, especially in rural America.

During the CBRS rulemaking proceeding, some carriers urged the Commission to adopt licensing rules that would favor companies with long-range, high-cost macrocell networks over all other companies.<sup>55</sup> Other commenters observed that very large geographic areas and/or very long license terms are a poor fit for 3.5 GHz operations, particularly given the limited range and

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<sup>53</sup> S. Rep. No. 115-4, at 16 (2017).

<sup>54</sup> See CTIA Petition at 1.

<sup>55</sup> See, e.g., Comments of CTIA – The Wireless Association at 9, GN Docket No. 12-354 (filed July 14, 2014) (urging the Commission to allow higher power levels for outdoor PAL use). See also Comments of Ericsson in Response to the FNPRM at 10, GN Docket No. 12-354 (filed July 14, 2014) (arguing that the proposed power limits should support macrocells).

comparatively low cost and service life of 3.5 GHz equipment.<sup>56</sup> Conversely, small cell areas such as census blocks and short license terms (*e.g.*, on the order of one year as initially proposed by the Commission) could make spectrum both available and useful for venues, institutions, local operators, and other non-traditional players,<sup>57</sup> while also accommodating the local densification plans of established wireless carriers.

The Commission did not accept either of these positions. Rather, it adopted a middle ground of census tract licenses with initial terms of either three or six years (at the licensee's option), with subsequent terms of three years. As the Commission explained in both its initial order and on reconsideration, this license term compromise enabled the rules to “strike a balance between some commenters’ desire for flexibility with other commenters’ need for certainty.”<sup>58</sup> It is this approach that has attracted development and investment by the wide range of potential operators described above. The Commission should maintain this balance.

**A. The Commission Should Maintain the Existing License Term of Up to Six Years with No Automatic Renewal Expectation.**

According to CTIA, a three-year license term does not fully account for the complexities of building out small cell networks in a way that would provide sufficient certainty for

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<sup>56</sup> *See, e.g.*, Comments of Google Inc. on the FNPRM at 8-10, GN Docket No. 12-354 (filed July 14, 2014); Comments of The Wireless Internet Services Providers Association (WISPA) at 14-15, GN Docket No. 12-354 (filed Dec. 5, 2013); Comments of Microsoft Corporation at 7, GN Docket No. 12-354 (filed Dec. 5, 2013) (“Issuing Priority Access licenses by Census block group would help limit the amount of control that a single party could exert over the market.”). *See also* Comments of Open Technology Institute at New America and Public Knowledge at 17, GN Docket No. 12-354 (filed Dec. 5, 2013).

<sup>57</sup> *See, e.g.*, Comments of Open Technology Institute at the New America Foundation and Public Knowledge at 16-19, GN Docket No. 12-354 (filed Dec. 5, 2013).

<sup>58</sup> *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Second Report and Order, FCC 16-55, 31 FCC Rcd. 5011, ¶ 43 (2016); CBRS Report and Order ¶ 107.

investment.<sup>59</sup> But the Commission did not adopt a three-year term for initial PALs. Rather, as CTIA acknowledges only in a footnote, the CBRS rules specify sequential licenses with a total term of six years at the PAL licensee's option during the first application window.<sup>60</sup>

CTIA makes no effort to show that this initial six-year term is too short. Indeed, the six-year initial term is already generous; the build-out requirements for several of the traditional carrier spectrum blocks cited by CTIA require coverage within four years after the Commission grants the license.<sup>61</sup> Thus, there is no substantial argument for changing the renewal rule for initial licenses. At most, the Commission might want to assess CTIA's claim near the end of the initial six-year PAL deployment period. The Commission might then consider whether to extend the six-year term to subsequent PALs if it determines such periods would better match license terms to the investment horizon for small-cell equipment available in the market at that time.

A commitment by the Commission to review the appropriate license terms for subsequent windows would resolve CTIA's investment-related concerns without harmful changes to the current CBRS renewal policy. In particular, CTIA asks for an automatic expectation of renewal for PAL licenses, making the licenses essentially permanent.<sup>62</sup> But if the Commission were to implement CTIA's renewal expectancy proposal, then the full value of PAL licenses for the entire life of the program would need to be paid up front, instead of over time in successive auctions. The initial cost of PAL licenses would be vastly greater. This large initial cost would exclude smaller auction participants, and assignments based on the initial PAL application window would almost certainly lock up the entire band for just a few players forever. This result

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<sup>59</sup> *See id.*

<sup>60</sup> *See* 47 C.F.R. § 96.27(b); CTIA Petition at 6 n.15.

<sup>61</sup> *See* 47 C.F.R. § 27.14.

<sup>62</sup> CTIA Petition at 6.

would erect a barrier to entry against local businesses, corporate campuses, hospitality enterprises, and others wanting to make appropriate investments to build their own wireless networks, as well as rural-oriented companies focusing their investments on the areas that the largest carriers do not cover adequately.<sup>63</sup> Effectively excluding these potential CBRS investors from PAL auctions would drive down use of 3.5 GHz frequencies overall, and likely reduce total auction proceeds due to decreased participation.

CTIA maintains that the lack of an “ongoing right of renewal creates a risk that a PAL licensee will invest in a license at auction, purchase and deploy equipment, incorporate 3.5 GHz into its end-user devices, and then face stranded investment in just three or six years.”<sup>64</sup> This concern is unwarranted. At the end of the term, a PAL licensee is eligible to rebid for the license at auction. With a network in place, the licensee should be able to provide service during the new license term at lower cost than any new bidder. This gives the licensee the ability to make one of two determinations: either the spectrum is sufficiently valuable to them to offer a winning bid at re-auction, or it is not, in which case the licensee can exit the band without the sunk cost of having acquired a long-term perpetual license.

Given the early stage and fast pace of development of the 3.5 GHz band, this approach is most consistent with economic efficiency and the Coasean concept of using auctions to put spectrum to best use.<sup>65</sup> If PAL spectrum were auctioned once for perpetual rights, then the bids would reflect the expected net present value of being able to use the spectrum in perpetuity. The net present value of spectrum is often subject to considerable uncertainty—for instance, Bulow,

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<sup>63</sup> See, e.g., *supra* note 16 and accompanying text.

<sup>64</sup> CTIA Petition at 6.

<sup>65</sup> See R. H. Coase, *The Federal Communications Commission*, 2 JOURNAL OF LAW AND ECONOMICS, 1-40 (Oct. 1959).

Levin, and Milgrom have written of “a successful bidder that prior to a major FCC auction estimated the value of a Chicago area license at \$30 per covered person, plus or minus \$60”<sup>66</sup>— and this baseline uncertainty would be compounded by inability to predict the new technologies and use cases for 3.5 GHz spectrum that may arise over time.

Under these conditions, there is a substantial chance that the bidder who wins the spectrum will not be the bidder who is able to make the best use of the spectrum in the long run. By contrast, estimates of the net present value of spectrum for the next three to six years are likely to be subject to less uncertainty, and there will be less risk that the firm that is best able to use the spectrum in that time period would not be allocated the spectrum. Thus, re-auctioning the spectrum periodically will enhance economic efficiency if the firm that is able to make the best economic use of the spectrum changes over time, as would be the case if new entrants discover innovative ways to use the spectrum over time. Indeed, six years ago the consensus view was that the only valuable use of 3.5 GHz band licenses would be fixed broadband.<sup>67</sup> If the PAL auctions had been held in 2011, the bids would have reflected that now-obsolete view. Opportunities to repurpose the spectrum for mobile would be limited today, and the Treasury likely would have received far less than what currently is thought to be the net present value of the spectrum.<sup>68</sup>

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<sup>66</sup> Jeremy Bulow, et al., *Winning Play in Spectrum Auctions*, STANFORD UNIVERSITY (2009).

<sup>67</sup> See *supra* p. 12.

<sup>68</sup> If, on the other hand, the firm that is able to make the best economic use of the spectrum does not change over time, having a single auction for perpetual rights is not substantially more efficient than re-auctioning the same spectrum periodically. In that case, the same firm would make the highest bid in each of these auctions, and the firm would continue to be able to use the spectrum.

Even though the winners of perpetual licenses theoretically could make spectrum available for superior uses through secondary transactions, this is not a real-world justification for indefinite renewals. Such transactions impose significant costs, either reducing the likelihood that such transactions will occur<sup>69</sup> or, when they do, partially dissipating the economic gains. Reliance on the secondary market also assumes that licensees' economic interests are necessarily aligned with the public interest in intensive use of spectrum, and overlooks potential incentives to warehouse it. Experience in other spectrum bands, where large carriers have engaged in fewer secondary market transaction than one might have predicted in the face of substantial demand,<sup>70</sup> has demonstrated that some combination of these factors can significantly limit the secondary market's ability to maintain an efficient distribution of resources. And if the Commission seeks to foster market participation in the 3.5 GHz band by venue owners and other less traditional wireless licensees who have little experience with such transactions, transaction costs on the secondary market for 3.5 GHz PALs are likely to be especially high. In such a situation, Coase teaches that assignment of rights by a regulator—in this case, by auction—has an important role to play in minimizing these costs and maximizing overall social value.<sup>71</sup> Limiting license terms makes it possible for the Commission to perform this important function as technologies and business models change.

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<sup>69</sup> R. H. Coase, *The Problem of Social Cost*, 3 JOURNAL OF LAW AND ECONOMICS, 17 (Oct. 1960) (“*The Problem of Social Cost*”).

<sup>70</sup> *See infra* pp. 26-27.

<sup>71</sup> *The Problem of Social Cost* at 17-18, 27-28 (explaining that, when the costs of private market transactions are high, government action, and in particular its delimitation of rights, may be the most effective means of fostering economic efficiency).

## **B. Census Tract Licensing Should Be Maintained.**

T-Mobile and CTIA argue that the Commission should remove flexibility from its CBRs auctions by requiring all winning bidders to acquire rights to a Partial Economic Area (“PEA”) rather than a census tract.<sup>72</sup> This proposal would exclude all but a small handful of companies from realistic access to PALs. The PEAs established by the Commission divide the country’s almost four million square miles into a little over 400 service areas.<sup>73</sup> Consequently, many PEAs are enormous—some spanning hundreds of miles on a single side and/or encompassing millions of residents. On average, PEAs are approximately 178 times larger than census tracts. Choosing these license areas as the boundaries for small-cell systems—which might not be able to penetrate the walls of even a single building in the case of indoor systems and which would have difficulty covering the main street of many small towns without multiple installations—is an almost comical mismatch.

Moreover, while urging these very large license areas, CTIA and T-Mobile conspicuously do not recommend a build-out requirement. This omission underscores the risk that PAL holders would warehouse their rights to the protected spectrum, rather than deploying service or subleasing to potential competitors who might win away the licensees’ customers with better or less expensive services.

T-Mobile maintains that the Commission’s decision in the Spectrum Frontiers proceeding to assign licenses on a PEA basis for the 39 GHz band, and its proposal to use PEAs for some other future millimeter wave bands, demonstrates that PEAs are the “best [license area] for 5G

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<sup>72</sup> CTIA Petition at 9-11; T-Mobile Petition at 16-19.

<sup>73</sup> See *Wireless Telecommunications Bureau Provides Details About Partial Economic Areas*, Public Notice, DA-14-677, 29 FCC Rcd. 5687 (rel. June 2, 2014).

operations.”<sup>74</sup> But that very same order also recognized the benefits of smaller license areas.<sup>75</sup> Indeed, when the Commission adopted rules for mobile operations in the 28 GHz band, it rejected calls from the majority of commenters to use Basic Trading Areas (“BTAs”), opting instead to issue licenses on a county basis.<sup>76</sup>

In doing so, the Commission explained that the smaller license areas would (1) “afford[] a licensee the flexibility to develop localized services”; (2) “allow[] for targeted deployments based on market forces and customer demand”; and (3) “facilitate[] access by both smaller and larger carriers.”<sup>77</sup> The Commission also rejected arguments that the presence of additional borders for smaller license areas would result in an undue burden for licensees, observing that mobile deployments would likely occur in “denser population centers or around highway corridors,” and citing long-standing procedures for border coordination.<sup>78</sup> Finally, the Commission explained that, if a BTA licensee were to determine that it is not “economically viable to build within certain counties of a BTA, ... it would be appropriate to give other interested parties an opportunity to license and to make use of the spectrum.”<sup>79</sup> The Commission cited these very same considerations—increased flexibility, efficiency, and access—when it decided to use census tracts as the basis for PAL licenses.<sup>80</sup> Rather than demonstrating the superiority of PEA-based licensing, the Commission’s decisions in the Spectrum Frontiers

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<sup>74</sup> T-Mobile Petition at 18.

<sup>75</sup> *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order, 31 FCC Rcd. 8014, ¶¶ 35-36 (2016).

<sup>76</sup> *Id.*

<sup>77</sup> *Id.* ¶ 35.

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *See* CBRS Report and Order ¶¶ 96-101.

proceeding and in the 3.5 GHz band vividly illustrate that there is no single best solution across all bands and services. Instead of a one-size-fits-all approach, the Commission properly concluded that a diversity of licensing models was most appropriate in light of the varied characteristics of different bands, but also to facilitate the development of a diversity of services and business models.

CTIA maintains that census tracts will result in a “complicated” licensing scheme compared with larger license areas due to the greater number of licenses involved.<sup>81</sup> But the fact that there are more census tracts than PEAs does not impose undue burdens on CBRS operators. The Commission expressly designed the CBRS licensing rules “to encourage participation from a wide variety of users and a broad range of operations.”<sup>82</sup> Many of these new operators—from small businesses, to schools, to tribal lands—are unlikely to have any need to manage large numbers of licenses. FCC rules that would require these investors to purchase PALs covering enormous areas would force them to pay for areas that they do not need, and thus probably prevent the desired diversity of PAL operations.

The number of PAL licenses also should not be problematic for carriers that seek to aggregate multiple census tracts to offer service. Carriers that are large enough to offer service over large numbers of census tracts will already necessarily have internal systems in place to manage their expansive spectrum holdings. For example, Sprint and its Clearwire subsidiary already hold over 30,000 active FCC licenses.<sup>83</sup>

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<sup>81</sup> CTIA Petition at 9.

<sup>82</sup> CBRS Report and Order ¶ 151.

<sup>83</sup> FEDERAL COMMUNICATIONS COMMISSION, *FCC License View*, <http://reboot.fcc.gov/license-view/> (last visited July 24, 2017).

With respect to the auctions themselves, CTIA’s complexity argument ignores the capabilities of modern systems, which the Commission can procure using auction revenues.<sup>84</sup> Google, for instance, conducts millions of auctions every minute just for its own business.<sup>85</sup> Having completed the first-of-its-kind and far more complex 600 MHz incentive auction, the FCC’s auction team is well-positioned to implement successful procedures for CBRS auctions that draw on such industry experience.

CTIA also asserts that assigning CBRS licenses by census tract would be “unnecessarily challenging for SAS administration.”<sup>86</sup> This is mistaken. SAS administration focuses on managing interference among users at particular locations. PAL areas receive protection from harmful interference based upon actual deployments of one or more PAL CBSDs.<sup>87</sup> In other words, the claimed actual service area, which is based on calculations of CBSD coverage area, is the area the SAS protects. The formal boundaries of the license area do not define the area to be protected, except to the extent that service outside of license areas is not protected. Therefore, the size of the PAL license area has essentially no effect on the complexity of PAL protections.

Even if this were not the case, SAS administrators currently must demonstrate their ability to manage census tract-sized PAL rights in order to receive operating authority.<sup>88</sup> No candidate SAS administrator has suggested that the existing census tract regulation is beyond its technical capability to implement. In applying for certification as a SAS administrator under

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<sup>84</sup> 47 U.S.C. § 309(j)(8)(B).

<sup>85</sup> See Jack Nicas, *How Google’s Ad Auctions Work*, WSJ (Jan. 19, 2017), <https://www.wsj.com/articles/how-google-ad-auctions-work-1484827203>.

<sup>86</sup> CTIA Petition at 9.

<sup>87</sup> See 47 C.F.R. § 96.25(c).

<sup>88</sup> See 47 C.F.R. § 96.63.

Part 96, CTIA itself necessarily concluded that the census tract licenses in the existing rules are workable. The contrary rhetoric in CTIA’s petition is inconsistent with CTIA’s commitment in its application that it will implement its SAS consistent with the existing PAL provisions.

Finally, CTIA and T-Mobile suggest that secondary market transactions involving PAL partitioning and disaggregation would be an effective substitute for the current CBRS auction and licensing rules.<sup>89</sup> Yet the mere legal right for a PAL holder to partition or disaggregate its spectrum would provide no practical assurance of spectrum availability. As the Commission has recognized, “[d]ivesting large, unwanted swaths through secondary markets transactions could impose significant transactions costs.”<sup>90</sup> Furthermore, incumbent carriers’ buy-and-hold behavior in other bands suggests that they likewise will not engage in partitioning or disaggregation here.<sup>91</sup> While rural consumers complain about inadequate coverage from existing providers, the market has seen little or no disaggregation or partitioning to meet their needs. The truth is that the carriers, once they have spectrum, do not relinquish it, even if it goes unused or underused.

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<sup>89</sup> See CTIA Petition at 10-11; T-Mobile Petition at 18-19.

<sup>90</sup> CBRS Report and Order ¶ 100.

<sup>91</sup> See, e.g., Mike Dano, *Verizon’s Shammo: The ‘Philosophy that Verizon is Spectrum Short is Just False,’* FIERCE WIRELESS (Dec. 7, 2015), <http://www.fiercewireless.com/wireless/verizon-s-shammo-philosophy-verizon-spectrum-short-just-false> (paraphrasing Verizon CFO Fran Shammo’s remarks to investors “that only 40 percent of [Verizon’s] total spectrum assets are currently being used by its LTE network technology”); see also Mike Dano, *AT&T CFO: Our 40 MHz of Unused Spectrum Will ‘Dramatically Improve Our Capacity,’* Fierce Wireless (Aug. 9, 2016), <http://www.fiercewireless.com/wireless/at-t-cfo-our-40-mhz-unused-spectrum-will-dramatically-improve-our-capacity> (quoting AT&T CFO John Stephens saying that “[AT&T] owns roughly 140 MHz of spectrum nationwide but is only using around 100 MHz of those holdings.”).

### C. PAL Frequencies Should Not Be Rigidly Assigned.

T-Mobile asks the Commission to take away SASs' ability to dynamically assign PAL spectrum and instead have parties manually bid on specific frequency blocks.<sup>92</sup> While T-Mobile argues that dynamic frequency assignment impedes network planning,<sup>93</sup> the opposite is true. Dynamic frequency assignment helps operators provide the consistent service LTE customers seek.<sup>94</sup> As the Commission has explained, with dynamic frequency assignment the loss of a specific channel in a specific location due to incumbent operations does not necessarily result in the loss of PAL rights.<sup>95</sup> Dynamic assignment ensures that operators have access to the best available spectrum channel at that time and place and, by relocating operations when higher-tier users claim their spectrum, minimizes disruptions to service.<sup>96</sup>

SAS management also does not prevent PAL holders with large aggregations of spatially or spectrally adjoining licenses from operating on common frequencies throughout their contiguous license holdings, and in contiguous spectrum, to the extent possible. Rather, the CBRS rules contemplate that SASs will “assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area” and “assign multiple channels held by the same Priority Access Licensee to contiguous frequencies within

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<sup>92</sup> T-Mobile Petition 15-16.

<sup>93</sup> *Id.*

<sup>94</sup> *See, e.g.* Reply Comments of Google Inc., at 13-14, GN Docket No. 12-354 (filed Aug. 15, 2014) (“Google 2014 Reply Comments”).

<sup>95</sup> CBRS Report and Order ¶ 81 (“[S]tatic channel assignments for Priority Access Licensees would lead to unpredictable spectrum availability, undermining the very stability that commenters claim is needed to encourage investment in the band. However, with automated frequency assignment, Priority Access Licensees could be relocated to unencumbered channels and allowed to continue providing service.”) (internal citation omitted).

<sup>96</sup> *See id.*

the same License Area” when it is feasible to do so.<sup>97</sup> In addition, SASs can accommodate such operations by statically assigning PAL reservations to contiguous logical channels.<sup>98</sup> In contrast, if the Commission permitted parties to manually select frequencies, an operator could position itself in the middle of the PAL spectrum, thereby preventing other PAL holders from aggregating contiguous blocks.

In short, the current SAS dynamic assignment framework allows protection of federal incumbent and Priority Access operations while enabling a seamless experience for end users of CBRS services. It should not be disturbed.

#### **IV. THE PART 96 RULES FOR PUBLIC RELEASE OF NON-PROPRIETARY INFORMATION STRIKE A REASONABLE BALANCE**

CTIA and T-Mobile argue in their petitions that CBSD registration information should not be available to the public because such information presents unspecified competitive and/or security related concerns.<sup>99</sup> But wireless carriers’ transceiver locations are visible to passersby, logged by crowd-sourced applications, and publicly documented.<sup>100</sup> For example, any person with access to the Internet is free to pull up information on T-Mobile’s base station located near the corner of 12<sup>th</sup> Street SW and Maine Ave SW that serves the Commission’s headquarters building, and view information on that deployment (eNB ID 51119) including cell IDs, physical cell identity allocations, air interfaces, uplink and downlink frequencies used, and received signal

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<sup>97</sup> 47 C.F.R. § 96.59(b).

<sup>98</sup> Google 2014 Reply Comments, Appendix B, Declaration of Preston Marshall, Ph.D., ¶ 10.

<sup>99</sup> See CTIA Petition at 11-12; T-Mobile Petition at 19-20.

<sup>100</sup> See, e.g., CELLMAPPER, *Index*, <https://www.cellmapper.net/Index> (last visited July 24, 2017).

strength.<sup>101</sup> The operators of many of the largest and most extensive Wi-Fi networks in the U.S. publish the locations of their own access points, often on searchable maps.<sup>102</sup>

There is no reason why anonymized information about CBRS deployments should present greater security or competitive concerns. In contrast, there are legitimate reasons to make this information publicly available, such as enabling potential operators to investigate the feasibility of providing GAA services in an area prior to incurring the cost of attempting to reserve specific spectrum.

With respect to sharing information between SAS databases, several aspiring SAS administrators—including CTIA—have already negotiated a model sharing agreement. As CTIA has explained to the Commission, this agreement “provides the necessary protections for SAS customers’ proprietary and competitively sensitive information, as well as end users’ private information.”<sup>103</sup> There is no need for the Commission to reopen an issue that, as CTIA itself has acknowledged, has already been resolved through successful industry negotiation.

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<sup>101</sup> CELLMAPPER, *T-Mobile USA 4G – LTE Network*, <https://www.cellmapper.net/map?MCC=310&MNC=260&type=LTE&latitude=38.88286208803332&longitude=-77.02798337002793&zoom=18&showTowers=true> (last visited July 24, 2017).

<sup>102</sup> *See, e.g.*, COMCAST, *XFINITY WiFi Hotspot Finder*, <http://hotspots.wifi.comcast.com> (last visited July 24, 2017); AT&T, *AT&T Wi-Fi Hot Spot Locations*, <https://www.att.com/maps/wifi/basic.html> (last visited July 24, 2017) (“AT&T Wi-Fi Hot Spot Locations”); OPTIMUM, *Find Optimum WiFi Hotspots*, <https://www.optimum.net/internet/hotspots/> (last visited July 24, 2017); COX, *Find a WiFi Hotspot*, <https://www.cox.com/aboutus/wifi-hotspot-map.html> (last visited July 24, 2017); SPECTRUM WIFI, *Find WiFi Locations*, <https://www.spectrum.com/wifi-hotspots.html> (last visited July 24, 2017).

<sup>103</sup> Letter from Brian M. Josef, Assistant Vice President, Regulatory Affairs, CTIA, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 1, GN Docket No. 15-319 (filed Sept. 29, 2016).

## V. THE CBRS TECHNICAL RULES SHOULD BE MAINTAINED

T-Mobile—but not CTIA—also petitions the Commission to alter fundamental technical operating parameters for CBRS devices.<sup>104</sup> Doing so would introduce substantial delays the design, development, certification, and approval of these devices. Whatever merit T-Mobile’s arguments might (or might not) have had years ago, making fundamental alterations to the Commission’s finalized technical rules for the 3.5 GHz band at this late date would undo substantial standards-setting efforts by the WinnForum and disrupt deployments. Further, changes in the technical rules may require a re-examination of detailed, established sharing arrangements with incumbent users (especially the federal government), causing substantial delay in CBRS deployments. Lastly, such changes are not necessary, as evidenced by the strong interest and investment in CBRS under the current rules.<sup>105</sup> The Commission should reject T-Mobile’s request.

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<sup>104</sup> T-Mobile Petition at 21-23.

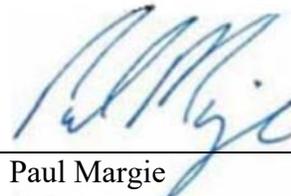
<sup>105</sup> *See generally* Section I *supra*.

## CONCLUSION

The CBRS rules have successfully promoted widespread investment, and substantial deployments from a wide cross-section of industry are imminent. But this parade of innovation will continue only with regulatory stability and rules that allow market forces, and not government regulations, to determine the best use of PALs. Petitioners' proposals would strand existing investments, reduce competition, and result in less efficient use of spectrum.

The Commission should reject the CTIA and T-Mobile petitions.

Respectfully submitted,



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July 24, 2017

## CERTIFICATE OF SERVICE

I hereby certify that, on this 24<sup>th</sup> day of July, 2017, a copy of the foregoing pleading was served via first class mail upon:

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