

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Petitions for Rulemaking to Amend the	)	GN Docket No. 12-354
Commission’s Rules Regarding the Citizens	)	RM-11788
Broadband Radio Service in the 3550-3700	)	RM-11789
MHz Band	)	

**COMMENTS OF VIVINT WIRELESS, INC.**

Vivint Wireless, Inc. (“Vivint”) submits these comments to the Petitions for Rulemaking submitted by CTIA and T-Mobile USA, Inc. on June 16, 2017 and June 19, 2017, respectively.<sup>1</sup>

**I. INTRODUCTION**

Vivint is a leading smart home technology provider, offering home security, energy management, home automation, local cloud storage, and high-speed Internet solutions to more than 1.1 million customers throughout the United States and Canada. Vivint has operational networks in El Paso and San Antonio, TX and in Utah where it provides 50+ Mbps residential broadband internet services solutions. Vivint’s unique approach to fixed-wireless broadband uses spectrum for backhaul, which is more cost-effective than fiber to stimulate competition in suburban areas.

Vivint is a competitor (and a potential new entrant) in several markets to traditional broadband providers like cable. Vivint stands ready and willing to invest in General Authorized Access (“GAA”) in the Citizens Broadband Radio Service (“CBRS”) established in the 3550-3700 MHz (“3.5 GHz”) band to provide fixed-wireless broadband use as early as 2018. It will also enthusiastically invest in Priority Access Licenses (“PALs”) based on current FCC rules.<sup>2</sup>

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<sup>1</sup> See *Public Notice*, DA 17-609 (rel. June 22, 2017).

<sup>2</sup> See 47 C.F.R. Section 96.1 *et seq.* See also, *Amendment of the Commission’s Rules with Regard to Commercial Operations of the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959 (2015) (“3.5 GHz Order”); *Amendment of the Commission’s Rules with*

CTIA seeks to amend the rules for PALs to change: (a) the PAL term from three years to ten years, combined with an expectation of renewals, (b) the PAL service area from census tracts to Partial Economic Areas (“PEAs”), and (c) the Spectrum Access System (“SAS”) Administrators’ treatment of CBRS device registration information to reduce security risks to user identity information and to protect disclosure to competitors.<sup>3</sup> T-Mobile seeks the same amendments to the CBRS rules as CTIA, but additionally wants the FCC to change the rules to: (a) auction all 150 megahertz of spectrum in the 3.5 GHz band as PALs, with “opportunistic use” for GAA, rather than auction only 70 megahertz per market, (b) permit bidding on specific PAL spectrum blocks, and (c) amend technical rules for out-of-band emission limits and output power for outdoor operations.<sup>4</sup>

Vivint opposes several changes proposed by CTIA and T-Mobile because, as described herein, the requested changes will harm opportunities for fixed-wireless broadband entrants like Vivint and will lock out new competitors. Along with the diverse group of entities that filed an ex parte letter with the FCC on June 1, 2017, Vivint urges the FCC to remain committed to the CBRS rules adopted in 2015 and affirmed in 2016.<sup>5</sup> Specifically, Vivint concurs that “[c]hanges that substantially alter the technical rules” or the core principals of the rules such as balancing auctioned and non-auctioned spectrum would “reduce the utility of the band and penalize the businesses that have invested in reliance on the FCC’s prior decision.”<sup>6</sup>

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*Regard to Commercial Operations of the 3550-3650 MHz Band*, GN Docket No. 12-354, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011 (2016) (“*3.5 GHz Order on Reconsideration*”).

<sup>3</sup> CTIA, Petition for Rulemaking, GN Docket No. 12-354, at pg. 2 (filed June 15, 2017).

<sup>4</sup> T-Mobile, Petition for Rulemaking, GN Docket No. 12-354, at pg. 4 (filed June 19, 2017) (“*T-Mobile Petition*”).

<sup>5</sup> Letter from All Points Broadband, American Tower Corp., Amplex Internet, Baicells Tech, Boingo, Engine, Google, Inc., High Speed Link, Microsoft Corp., NCTA – The Internet & Television Association, Republic Wireless, Rise Broadband, Skywerx Internet Services, Smart City, Telrad Networks, and the Wireless Internet Service Providers Association to Chairman Ajit Pai, Commissioner Mignon Clyburn, and Commissioner Michael O’Rielly, GN Docket No. 12-354 (filed June 1, 2017).

<sup>6</sup> *Id.* at pg. 2.

Further, Vivint respectfully asks the FCC to move forward with certifying SAS providers, to finalize any technical rules needed to allow GAA deployment to begin, and to move ahead with the auction of PALs. These actions are necessary to fulfill the FCC's goals to make the 3.5 GHz band "hospitable to a wide variety of users, deployment models and business cases."<sup>7</sup>

## II. DISCUSSION

### A. 3.5 GHz Band Offers Significant Opportunity for Fixed-Wireless Broadband

There is a lack of competition in the U.S. for fixed broadband service with most consumers having no more than one or two choices,<sup>8</sup> which is woefully inadequate. Such choice is generally limited to a cable provider or a local exchange provider.<sup>9</sup> It is therefore imperative that companies be permitted to use spectrum to innovate and introduce competitive fixed wireless broadband services. Without access to new spectrum, it will not be possible to enable a credible overbuilder in the fixed broadband space.

In contrast, mobile broadband competition in the U.S. is more robust than fixed broadband with four nationwide mobile broadband provider choices.<sup>10</sup> Indeed, consumers in most parts of the U.S. have numerous choices for a mobile provider among the four national mobile network operators as well as regional providers (like United States Cellular Corporation d/b/a U.S. Cellular and Cellular South Inc. d/b/a C Spire) and multiple mobile virtual network operators ("MVNOs").

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<sup>7</sup> 3.5 GHz Order at ¶6.

<sup>8</sup> See *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, 2016 Broadband Progress Report, GN Docket No. 15-191, 31 FCC Rcd 699, ¶86 (rel. Jan. 29, 2016) (finding 51% of the U.S. population has 1 option for fixed broadband at 25 Mbps/3 Mbps and 38% has more than 1 option).

<sup>9</sup> *Id.* at ¶26 (reporting that the most common fixed broadband service in the U.S. is cable modem service followed by wired services, including cable, DSL and fiber, which collectively represent 97% of the fixed broadband market whereas satellite and fixed wireless services make up less than 3%).

<sup>10</sup> See *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Nineteenth Report, WT Docket No. 16-137, 31 FCC Rcd 10534, ¶¶ 37, 39 (rel. Sept. 23, 2016) (finding more than 90% of the U.S. population is covered by at least four mobile wireless service providers and approximately 89% of the U.S. population lived in census blocks with LTE mobile broadband coverage by at least four service providers at the end of 2015).

The FCC should not permit mobile providers to turn the 3.5 GHz band into another cellular band, even with the current focus on developing and implementing 5G services. Rather, the FCC should proceed as planned with the CBRS framework to provide an opportunity to “address the growing demand for fixed and mobile broadband capacity.”<sup>11</sup>

Current CBRS rules permit the 3.5 GHz band to act as viable transmission medium for fixed broadband competitors while still supporting cellular providers. Vivint believes the 3.5 GHz band will likely be an “extension band” for 5G services, meaning users will be pushed off low-band or other mid-band spectrum and onto 3.5 GHz band spectrum as auxiliary spectrum to accommodate traffic spillover during peak traffic. Thus, allowing GAA use of the 3.5 GHz band when traffic demands more spectrum will likely be more efficient than permitting any one operator exclusive use of a channel (i.e., PAL-only use) or use only to accommodate mobile broadband traffic spillover during peak traffic on low-band or other mid-band spectrum.

## ***B. FCC Should Reject Certain CTIA and T-Mobile Proposals***

### **1. Retain Census Tracts for PALs**

The FCC should retain census tract service areas for PALs and reject the request by CTIA and T-Mobile to change to PEAs. Such an outcome supports the mandate of Section 309(j)(4)(c) of the Communications Act of 1934, as amended, for the FCC to prescribe area designations that promote “economic opportunity for a wide variety of applicants.”<sup>12</sup> As the FCC acknowledged, “[t]hat mandate is particularly compelling in light of the opportunities for participation with much lower capital investment requirements associated with smaller service areas” for PALs whereas “larger, traditional license areas...are inconsistent with [the FCC’s] desire to promote innovative, low power uses” in the 3.5 GHz Band.<sup>13</sup>

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<sup>11</sup> 3.5 GHz Order at ¶23 (*emphasis added*).

<sup>12</sup> 47 U.S.C. §309(j)(4)(c).

<sup>13</sup> 3.5 GHz Order at ¶100.

Auctioning PALs on a PEA basis will create an artificial barrier to entry. Interested parties will need more capital to obtain PALs on a PEA basis than the capital needed to obtain PALs on a census tract basis. Such a change will adversely affect local broadband providers as compared to the nationwide mobile broadband providers. New competitors will need to raise large amounts of capital investment to be able to participate on a PEA basis.

On the other hand, retaining census tract service areas for PALs does not prevent larger broadband providers from aggregating multiple contiguous census tracts to provide service within traditional geographic license areas.<sup>14</sup> Census tracts generally align with boundaries like city lines and with natural features like rivers and are included in census geospatial databases, which eases the ability to incorporate data into an SAS.<sup>15</sup> Accordingly, “census tracts are sufficiently granular to promote intensive use of the band and are large enough, either on their own or in aggregate, to support a variety of use cases.”<sup>16</sup>

Further, the major obstacle with PAL service areas being auctioned on a PEA basis is the combination of dense urban, urban, suburban and rural areas into a single license. For example, the entire bay area in Northern California is one PEA (PEA004), and Southern California has only two PEAs covering the entire Los Angeles and San Diego areas (PEA002 and PEA0018).<sup>17</sup> Any PAL auction on PEA basis will likely reduce spectrum utilization because only one operator will win per PEA market, which will likely be a cellular carrier with deeper pockets to spend on spectrum acquisition particularly in dense urban markets, but such winner may not deploy to the entire PEA. By retaining census tract service areas for PALs, multiple types of providers will have an opportunity to obtain spectrum and are more likely increase spectrum utilization by acquiring spectrum in those specific geographic areas they intend to serve.

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

<sup>15</sup> *Id.* at ¶97.

<sup>16</sup> *Id.* at ¶101.

<sup>17</sup> See FCC PEA Boundaries at [https://apps.fcc.gov/edocs\\_public/attachmatch/DA-14-759A4.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DA-14-759A4.pdf).

The FCC needs to level the playing field between the nationwide and regional or local broadband competitors. Vivint is looking for an opportunity – this opportunity to license PALs by census tract areas – to obtain spectrum rights as it builds out its network and compete with existing providers. Accordingly, the FCC must reject a change to PEAs because it will effectively exclude multiple types of operators from obtaining PALs in the 3.5 GHz band.

## **2. Retain 3-year term for PALs**

The FCC should retain the three-year term for PALs with the ability to initially apply for two consecutive services for a total of six years, and reject the request by CTIA and T-Mobile to change to a 10-year term, combined with an expectation of renewals, like traditional cellular licenses. The FCC purposefully established a shorter term to encourage innovation and market entry. Any change in direction to follow a traditional cellular licensing model may stymie innovation and may effectively lock out new entrants from the 3.5 GHz band, particularly in urban and suburban markets.

In 2015 and again in 2016, the FCC determined that the three-year, non-renewal license terms for PALs “strike[s] an appropriate balance between the public interest need for targeted, flexible licensing and the need to provide sufficient certainty for licenses to invest in the 3.5 GHz Band.”<sup>18</sup> In doing so, the FCC rejected CTIA and T-Mobile arguments that more time and assurance were needed to realize a return on investment.<sup>19</sup> The FCC stated:

the rules governing the 3.5 GHz Band work in concert to promote shared access to the band, foster innovation, and ensure that Citizens Broadband Radio Service users are able to efficiently target their use of the 3.5 GHz Band to their specific needs. Non-renewable, short-term licenses are an essential component of this overall framework. They allow operators to obtain PALs when and where Priority Access to the band is needed while permitting periodic, market-based reassignment of these rights in response to changes in local conditions and operator needs. The technical rules and band-wide operability requirement ensure that operators can easily utilize both Priority Access and GAA spectrum in their networks and seamlessly switch between tiers without purchasing

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<sup>18</sup> 3.5 GHz Order on Reconsideration at ¶ 39.

<sup>19</sup> *Id.* at ¶ 43.

additional equipment. In addition, our decision not to impose specific construction requirements for PALs further increases the flexibility and fungibility of these licenses and reduces the barriers to fluid movement between service tiers. These unique features of the Citizens Broadband Radio Service effectively negate the risk of stranded investment for operators and incentivize efficient network deployments.<sup>20</sup>

Vivint agrees with the FCC that the three-year PAL term will “promote competition, spur innovation, and encourage rapid network deployment in the 3.5 GHz Band.”<sup>21</sup>

### **3. Proceed with Auction of 70 megahertz per market**

The FCC decided to allow both auctioned and non-auctioned spectrum use in the 3.5 GHz band to encourage deployment, innovation, and investment. The FCC allocated a maximum of 70 megahertz for PALs and the remaining 80 megahertz is for GAA use, although all 150 megahertz could potentially be use in a market where there are no PALs issued or in use.<sup>22</sup> The FCC should affirm its allocation and reject T-Mobile’s request to auction all 150 megahertz in a market for PALs.

It is disingenuous for T-Mobile to suggest that GAA users will still be able to access and use 3.5 GHz spectrum if all 150 megahertz per market is auctioned. As T-Mobile noted, such spectrum would be available only “when not in use by PAL licensees” which might never occur in urban markets and have little opportunity in suburban markets. But T-Mobile and other cellular companies would have little incentive to de-register with a SAS and cease transmitting 3.5 GHz signals to permit GAA usage. Such a situation would lead to inefficient use of 3.5 GHz spectrum and less opportunities for GAA operators to use the spectrum during light or even no traffic usage by PALs.

Moreover, organizations have been investing and making plans to deploy through GAA based on assumptions that standards are being developed to protect PAL users with 70 megahertz

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<sup>20</sup> *Id.* at ¶44.

<sup>21</sup> *Id.* at ¶45.

<sup>22</sup> *3.5 GHz Order* at ¶¶63-64.

of spectrum. If the FCC upends the ongoing standards process to auction 150 megahertz, it will result in major delays to implementation and deployment to the detriment of consumers and will chill new investments in the future in this and other spectrum bands.

#### **4. Unnecessary to Bid on specific spectrum**

T-Mobile's request to bid on specific blocks of spectrum for PALs is unnecessary and a bit confusing. The FCC rules protect on a primary basis those operations by incumbent federal government users (e.g., U.S. Navy).<sup>23</sup> Under the existing parameters, a PAL licensee is prohibited from interfering with an incumbent's operations and would move to a different channel to avoid interference. More specifically, the SAS will assign all channels and may change the frequencies if necessary, although SAS administrators are required to "maintain consistent and contiguous frequency assignments for licensees with multiple PALs in the same or adjacent license areas whenever feasible."<sup>24</sup> T-Mobile's request to bid on specific blocks of spectrum for PALs would seem to limit the available channels should a PAL licensee need to move to avoid interfering with a protected incumbent.

#### **5. Retain Technical Rules**

T-Mobile argues that the current out-of-band emission ("OOBE") limits for all CBRS devices ("CBSDs") should be relaxed to facilitate wider channels optimized for 5G use.<sup>25</sup> T-Mobile also argues that effective isotropic radiated power ("EIRP") levels for outdoor operated CBSDs under the current rules will "limit the coverage that cell sites can achieve, thereby driving up network costs and risking decreased investment in the band."<sup>26</sup> Vivint respectfully disagrees with T-Mobile's arguments regarding OOBE and outdoor EIRP levels, and urges the FCC to retain the existing technical rules that were painstakingly designed to "promote effective

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<sup>23</sup> 47 C.F.R. §96.15.

<sup>24</sup> *3.5 GHz Order* at ¶93.

<sup>25</sup> *T-Mobile Petition* at pgs. 21-22.

<sup>26</sup> *Id.* at pg. 23.



coexistence of different users in the band” during a multi-year rulemaking with extensive input from a wide array of interests.<sup>27</sup>

Current OOB limits ensure the utility of the 3.5 GHz band to support densely deployed next generation networks with transmitters reusing spectrum in close physical proximity.<sup>28</sup> Relaxing these OOB limits would benefit cellular carriers that operate sparsely deployed traditional base stations at the expense of new technology entrants. Relaxing CBSD OOB limits would permit channel bonding for LTE-based networks optimized for 20 megahertz emissions but would also yield less stringent filtering and more relaxed out-of-channel emission roll-off, permitting greater in-channel EIRP and improved transmission range for uplink communications from power constrained end user devices to far removed cellular base stations.

For a traditional cellular network operator attempting to use the 3.5 GHz band as auxiliary spectrum to accommodate traffic spillover during peak traffic, a relaxation in OOB limits would be helpful for minimizing the capital expenditure needed to provide customers with contiguous coverage. However, for new entrants seeking to intensely reuse 3.5 GHz spectrum in an effort to provide next generation wireless broadband and other innovative new services, a relaxation in OOB presents an interference threat. These new entrants will generally not be uplink power constrained due to network densification and the close proximity of access points and/or small cellular sites, but will be susceptible to interference and elevated ambient noise resulting from the relaxed OOB levels proposed by T-Mobile, which in a best case scenario will degrade the utility of the 3.5 GHz band, and may render the band unusable altogether in certain circumstances.

T-Mobile’s proposal to increase outdoor EIRP for Category A and B CBSDs similarly serves the interests of traditional cellular operators at the expense of innovative new entrants. The

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<sup>27</sup> 3.5 GHz Order on Reconsideration at ¶ 85.

<sup>28</sup> The current OOB limits set a -13 dBm/MHz emission limit for frequencies from 0 to 10 megahertz outside the channel edge, a -25 dBm/MHz emission limit for frequencies more than 10 megahertz outside the channel edge, down to 3530 MHz and up to 3720 MHz, and a -40 dBm/MHz emission limit below 3530 and above 3720 MHz.

current EIRP levels (30 dBm/10 MHz for Category A and 47 dBm/10 MHz for Category B CBSDs) provide more than adequate power for 5G transmission technologies, and as evidenced by the intense interest in CBRs-related issues in recent months,<sup>29</sup> will not discourage investment in the 3.5 GHz band. Any increase in EIRP levels would facilitate the use of large, traditional macro base stations for 3.5 GHz band operations but would result in increased ambient energy that would hinder the ability of innovative new entrants to reuse the spectrum in dense next generation network deployments.

### III. CONCLUSION

For the foregoing reasons, Vivint urges the FCC to reject the rule changes proposed by CTIA and T-Mobile. Vivint respectfully asks the FCC to move forward with certifying SAS providers, to finalize any technical rules needed to allow GAA deployment to begin, and to move ahead with the auction of PALs.

Respectfully submitted,

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<sup>29</sup> See, e.g., Ex Parte Letter from Paul Margie, Counsel to Alphabet's Access Group and Google Fiber, GN Docket No. 12-354 (filed May 11, 2017) (discussing how "[p]otential service providers are working aggressively to initiate commercial operations, based on the rules that the FCC adopted," and "describing the work of the Wireless Innovation Forum, with participation by more than 47 companies, and the CBRs Alliance, with 52 corporate members," as well as "Alphabet's investment in research and development in the 3.5 GHz band.").