Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band	)	GN Docket No. 12-354
	)	
	)	

COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

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July 14, 2014

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I. INTRODUCTION AND SUMMARY

CTIA – The Wireless Association® ("CTIA") submits these comments in the above-captioned proceeding proposing new rules for wireless services in the 3.5 GHz Band (3550-3650 MHz).[1] CTIA commends the Commission's proposal to endorse open eligibility for Priority Access Licenses ("PALs"),[2] to promote competition in the mobile broadband market and help foster the innovation and investment needed to make the 3.5 GHz band a success.[3] The Further Notice advances a number of other proposals that, if adopted, risk undermining these goals. To promote use of the 3.5 GHz band, the FCC should balance policies that will foster up-front investment with the introduction of a novel sharing regime. To that end, the Commission should:

- ***Use a transitional approach to implement its regulatory framework***. To minimize the interference risk to incumbent licensees, and maximize upfront investment and innovation potential, the FCC should use a transitional approach to developing and

[1] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, 29 FCC Rcd 4273 (2014) ("Further Notice").

[2] Further Notice at ¶ 24.

[3] CTIA – The Wireless Association®, Reply Comments, GN Docket No. 12-354, at 3 (Dec. 20, 2013) ("CTIA PN Reply Comments").

implementing its three-tiered framework. The transitional approach can be phased out after the framework is proven to be workable in practice;

- ***Refine the proposed PAL licensing scheme***. The FCC should take further steps to incent PAL investment by issuing larger licenses with fixed frequency assignments, a minimum five-year term, a renewal expectancy, and flexible power limits for outdoor PAL use that support greater flexibility;

- ***Significantly reduce the size of the proposed exclusion zones***. The proposed exclusion zones will vitiate the band's commercial utility by rendering large swaths of the country unable to use 3.5 GHz devices. The FCC should work with NTIA, government incumbents, and other stakeholders to reduce the zones; and

- ***Minimize Spectrum Access System ("SAS") complexity by focusing on core functions***. SAS should determine available frequencies, register devices, enforce interference protections, and ensure secure SAS-device transmissions – not control PAL network operating power or other technical parameters.

By taking these steps, the Commission can achieve its goals of "maximiz[ing] the utility of existing spectrum resources," "mak[ing] new spectrum bands available for broadband access," and "driv[ing] greater productivity and efficiency in spectrum use."[4]

CTIA looks forward to working with the Commission to advance a regulatory framework that enables more intensive use of the 3.5 GHz band and promotes innovative sharing opportunities. While freeing up additional spectrum below 3 GHz for clearing and exclusive-use licensing should remain a top Commission priority,[5] CTIA supports Commission efforts to facilitate spectrum access in higher bands like the 3.5 GHz band where government incumbents cannot be fully relocated.

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[4] Further Notice at ¶¶ 1-3.

[5] *See* CTIA – The Wireless Association®, Comments, GN Docket No. 12-354, at 1-2, 6-10 (Feb. 20, 2013).

II. A TRANSITIONAL FRAMEWORK WILL FOSTER EARLY INVESTMENT IN THE 3.5 GHz BAND WHILE PROTECTING INCUMBENTS AND ALLOWING PARTIES TO DEVELOP AND VALIDATE THE NEW SHARING REGIME

The FCC's proposed three-tiered regulatory framework creates a novel spectrum access regime in a shared use environment, but it relies on untested sharing elements that create near-term challenges for the 3.5 GHz band's prospects. As discussed below, in the near term the FCC can maximize the potential for a successful spectrum sharing paradigm by adopting a transitional approach that provides greater certainty while continuing to allow parties to develop and demonstrate the viability of the three-tier framework.

The challenges posed by the three-tiered framework are well known. In particular, the proposed framework relies on untested and unproven sharing elements; new control and security technologies need to be developed to avoid "rogue or unauthorized emissions" by GAA devices; and unique enforcement issues have to be solved.[6] As the Further Notice concedes: "Managing real time interactions between a large number of potential [PAL] licensees and GAA Users while ensuring that Incumbent Users … are protected from harmful interference could present novel enforcement challenges for the Commission to address."[7] Absent carefully constructed rules, these challenges likely will deter investment in the PAL tier by commercial operators, manufacturers, developers, and others, and also create uncertainty for government incumbents grappling with sharing in the band.

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[6] *See, e.g.*, Verizon and Verizon Wireless, Comments, GN Docket No. 12-354, at 2-3, 8 (Dec. 5, 2013) ("Verizon PN Comments"); Stacey Black, AT&T Blog Team, *Spectrum Sharing: Let's Walk Before Running* (May 22, 2014), http://www.attpublicpolicy.com/fcc/spectrum-sharing-lets-walk-before-running/ ("AT&T, *Spectrum Sharing*"); T-Mobile USA, Inc., Comments, GN Docket No. 12-354, at 5-8 (Feb. 20, 2013); *see also* Qualcomm Incorporated, Comments, GN Docket No. 12-354, at 8 (Dec. 5, 2013) ("Qualcomm PN Comments").

[7] Further Notice ¶ 162.

While the SAS framework may well prove adept at managing access to spectrum with multiple tiers of users, at this point it is a concept ripe with uncertainty. Stakeholders interested in the PAL band have unanswered questions regarding how the SAS will function in the marketplace – questions that require thorough vetting. As Verizon has explained, until these questions are answered, "the business (e.g., time to market) and quality of service (e.g., rogue interference) risks to [PAL] operators are too high to justify making substantial investments in the context of the Multi-Tier Framework."[8]

For government incumbents, which include Department of Defense ("DoD") radar systems, the three-tiered framework presents heightened interference concerns. For example, allowing GAA access to all tiers across the band prior to full testing and integration of SAS sharing and management techniques expands the potential for unpredictable interference due to large numbers of individually operating GAA devices.[9] The Commission is proposing to mitigate interference concerns through the use of large exclusion zones, but the current exclusion zone proposal identified in the Further Notice would cover 60 percent of the U.S. population and, if adopted, would severely restrict the size of the addressable market in the U.S.[10] The increased

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[8] Verizon PN Comments at 8.

[9] *See* Rysavy Research, Complexities of Spectrum Sharing: How to Move Forward, at 18-19 (Apr. 2014) ("Rysavy Spectrum Sharing Paper"), http://www.rysavy.com/Articles/2014-04-Spectrum-Sharing-Complexities.pdf.

[10] *See* Further Notice at ¶ 12; CTIA PN Reply Comments at 8; Qualcomm PN Comments at 5; Verizon PN Comments at 4, 13-14; Letter from John W. Kuzin, Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354, at 1 (Apr. 15, 2014) ("Qualcomm *Ex Parte* Letter"); *see also* President's Council of Advisors on Science and Technology, Report to the President: Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth, at 51 (Jul. 20, 2012) ("PCAST Report"), http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

risk of interference posed by initial three-tiered sharing across the band could discourage federal incumbents from taking steps to shrink exclusion zones.

The FCC can ameliorate these concerns by adopting a transitional approach that provides greater certainty upfront while continuing to develop the three-tiered sharing model over time. A transitional approach would temporarily allocate the band into three blocks: PAL-only, shared use, and GAA-only.[11] The transitional approach will facilitate rapid commercial access and deployment. It will allow PAL licensees to develop products, invest in networks, and introduce 3.5 GHz chipsets into the user devices, all without fear of interference. The shared-use block would allow all users to collaborate and the SAS concept could be developed and tested. And for government incumbents, the transitional approach offers more certain interference protection as the Commission introduces shared uses into the band. This, in turn, may facilitate discussions to reduce the size of exclusion zones. The Commission can phase out the transitional approach, converting it to a three-tiered framework, once the SAS-controlled framework has been tested and validated.[12]

III. PAL LICENSING WITH MULTI-YEAR TERMS, LARGER GEOGRAPHIC AREAS, FIXED FREQUENCY ASSIGNMENTS, AND HIGHER POWER LEVELS WILL DRIVE INVESTMENT

PALs are the linchpin for driving investment and innovation in the 3.5 GHz band. By focusing first on the PAL-tier, "the Commission can kick-start the investment in the infrastructure, device ecosystem, and SAS database management techniques needed for the

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[11] *See* AT&T, *Spectrum Sharing*, *supra.*

[12] *See id*. ¶ 22; Verizon PN Comments at 3. In any case, the FCC itself has proposed to segment a portion of the band by proposing to allow Contained Access Users to request up to 20 megahertz of frequencies from the GAA pool for indoor use that may not be made available to the general public. *See* Further Notice at ¶ 60. Unlike the proposed Contained Access User set-aside, however, the transitional blocks would be used on an interim basis to provide the upfront certainty needed to incent commercial development of the band and protect incumbents.

ultimate success of the Multi-Tier Framework."[13] Accordingly, CTIA strongly supports the Commission's proposal to open up PAL eligibility, which will "promote more intensive use of the 3.5 GHz Band and … investment in new small cell technologies."[14] CTIA also supports the proposals to permit PAL licensees to aggregate multiple channels and for SAS administrators to assign a PAL licensee contiguous or adjacent frequencies.[15]

While these are important steps forward, additional measures are needed to incentivize investment in the infrastructure and device ecosystem and ensure success of the three-tiered framework. Specifically, by issuing PALs with longer terms, larger areas, fixed frequency assignments, and more flexible power limits, the Commission will better meet its goal of making PALs the "building blocks" that licensees can use to "meet diverse spectrum needs."[16]

The FCC should adopt multi-year PAL licensing with a renewal expectancy to facilitate investment. The proposed one-year license term with no right of renewal, even if such a term can be aggregated, raises the prospect that investors in the band will face stranded investments which, in turn, will diminish investment and innovation.[17] The reasons are clear: it can take several years to deploy a new network, with time and resources devoted to standardizing a new frequency band, developing and certifying equipment, and deploying infrastructure, at significant cost. These factors are magnified here given the great complexity that small cell

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[13] Verizon PN Comments at 2.

[14] Further Notice at ¶ 42.

[15] *See* Further Notice at ¶¶ 47-48.

[16] Further Notice at ¶ 43.

[17] *See* Further Notice at ¶¶ 49-52; T-Mobile USA, Inc., Comments, GN Docket No. 12-354, at 5 (Dec. 5, 2013) ("T-Mobile PN Comments"); Verizon PN Comments at 3, 8; Qualcomm PN Comments at 3; Alcatel-Lucent, Comments, GN Docket No. 12-354, at 3 (Dec. 5, 2013) ("Alcatel-Lucent PN Comments").

deployments will add to roll-out (*e.g.*, the need for new sites with backhaul and power services).[18] The proposal for only "short-term, non-renewable licenses" runs the substantial risk that "a number of potential bidders for PALs will simply stay away from this band."[19] A multi-year license term of at least five years, coupled with a renewal expectancy, would improve the business case to justify making substantial investments in 3.5 GHz network infrastructure and device functionality.[20]

The FCC should adopt traditional mobile area licenses or, at a minimum, licensing on a county basis. The Commission should revisit its proposal to issue PALs at the census tract level.[21] Census tracts are too small – equating to more than 74,000 license areas[22] – and come with significant downsides. The use of census tracts will result in a much more complicated licensing scheme for the new SAS to administer and manage, including the need to address licensed areas that shift as census tracts are modified;[23] a more burdensome licensing scheme for licensees themselves to manage;[24] more instances of interference given the vastly more extensive

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[18] *See* Alcatel-Lucent PN Comments at 3; *see also* Ericsson, Comments, GN Docket No. 12-354, at 7-8 (Dec. 5, 2013) ("Ericsson PN Comments") ("[I]nfrastructure investment certainty and [quality of service] … typically require multi-year planning and deployment horizons (e.g., to obtain site permissions, ensure coverage, provide contiguous mobility) and additional time thereafter to yield reasonable returns to long-term infrastructure investors.").

[19] Alcatel-Lucent PN Comments at 4; *see* T-Mobile PN Comments at 5.

[20] *See, e.g.*, Alcatel-Lucent PN Comments at 4; Qualcomm PN Comments at 3; T-Mobile PN Comments at 5-6; Verizon PN Comments at 10; *see also* Rysavy Spectrum Sharing Paper at 4 (recommending the assignment of "longer-term" spectrum assignments to PAL licensees).

[21] Further Notice at ¶¶ 44-46.

[22] U.S. Department of Commerce, Census Bureau, 2010 Census Tallies of Census Tracts, Block Groups & Blocks, https://www.census.gov/geo/maps-data/data/tallies/tractblock.html.

[23] *See, e.g.*, Alcatel-Lucent PN Comments at 5; T-Mobile PN Comments at 6; Verizon PN Comments at 7.

[24] *See* T-Mobile PN Comments at 6.

border areas;[25] and, ultimately, a licensing scheme incongruous with likely PAL deployments that will use the 3.5 GHz spectrum as part of wide-area commercial mobile broadband offerings.[26] These downsides compel use of traditional commercial mobile license areas or, at a minimum, licensing on a county basis.

The FCC should adopt fixed PAL frequency assignments to facilitate investment, certainty, and network management. Rather than the proposal to have the SAS dynamically assign 10 MHz PAL channels in real time,[27] carriers, manufacturers, and analysts all support fixed spectral locations.[28] And for good reason. Dynamic spectrum assignments are incompatible with modern LTE networks that require complex frequency-specific tuning.[29] While the Commission theorizes that dynamically assigning spectrum will promote efficient spectrum use,[30] in fact just the opposite is true – dynamic spectrum assignments will defeat the efficiencies of using contiguous spectrum blocks to improve capacity.[31] Given the complexity and uncertainty that already exists related to PAL licensees sharing spectrum with incumbents and operation of the SAS, there is no need to add further complications by making PAL spectrum assignments dynamically variable.[32]

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[25] *See* Verizon PN Comments at 7.

[26] *See* CTIA PN Reply Comments at 5.

[27] *See* Further Notice at ¶ 48.

[28] *See* AT&T PN Comments at 5; Ericsson PN Comments at 7; T-Mobile PN Comments at 7, 10-11; Rysavy Spectrum Sharing Paper at 20.

[29] *See* T-Mobile PN Comments at 10-11; Rysavy Spectrum Sharing Paper at 20.

[30] *See* Further Notice at ¶ 48.

[31] *See* T-Mobile PN Comments at 11.

[32] *See also* Qualcomm PN Comments at 8 ("[T]he FCC is already engaged in a novel use of the 3.5 GHz band, that is, dynamic spectrum sharing between mobile users and incumbent naval radar operations, and adding on top of that a completely novel licensing scheme for the mobile

The FCC should adopt more flexible technical parameters to ensure that a wide variety of innovative services can be deployed in the 3.5 GHz Band. The power levels proposed in the Further Notice are low for small cell deployment,[33] and the FCC should provide some flexibility in order to promote reasonable coverage and efficient spectrum use. While such low power levels may be appropriate for GAA users, who presumably will be using spectrum on a more localized, indoor, opportunistic basis, they do not support important use cases that PAL licensees may be especially interested in. In particular, higher power levels – but still relatively low base station transmit power levels – are needed for outdoor PAL use in order to achieve reasonably good coverage, especially in dense urban areas (for example, small cell deployment on the street). By establishing more flexible power limits, the Commission will "encourage rapid network deployment, promote the development of a robust device ecosystem, and help to ensure the long-term viability of the band."[34]

Further study is required before making "unused" PAL spectrum available for opportunistic GAA use. The FCC proposes to allow GAA users to access "unused" PAL spectrum,[35] and proposes a rule to allow such use "as determined by the SAS."[36] In essence, the Commission seeks to create an opportunistic underlay in the spectrum auctioned and licensed to PAL users. Many issues need to be studied, however, before the Commission concludes whether safe and interference-free opportunistic sharing is possible. Entire proceedings have been

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licensee(s) heightens … concerns …. To the extent the FCC decides to experiment with novel spectrum licensing concepts, it should do so in another band that is not already complicated by the spectrum sharing environment that will be present at 3.5 GHz.").

[33] *See* Further Notice at ¶¶ 74-76.

[34] Further Notice at ¶ 74.

[35] Further Notice at ¶¶ 36-37.

[36] *See* 47 C.F.R. § 96.33(b) (proposed).

devoted to this concept,[37] and the FCC should not delegate an issue of this importance to the SAS.

The FCC's proposed geo-location reporting accuracy standards for 3.5 GHz devices are not feasible. Finally, the FCC has proposed that all 3.5 GHz devices report the location of their antennas to the SAS with an accuracy of ±50 meters (horizontal) and ±3 meters (vertical).[38] These thresholds mirror those proposed by the FCC with respect to its proposed E-911 indoor location accuracy rules,[39] but CTIA has explained in that proceeding that there is no evidence that any location technology solution is capable of meeting the proposed requirements today or can be deployed across wireless networks within the proposed timelines.[40] Based on experience in the E-911 context, location accuracy proposals should be grounded in verified data of technologically and economically feasible solutions, not aspirational target-setting.[41]

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[37] *See, e.g.*, *Promoting More Efficient Use of Spectrum through Dynamic Spectrum Use Technologies*, Notice of Inquiry, 25 FCC Rcd 16632 (2010) (examining ways to facilitate opportunistic spectrum uses); *Unlicensed Operation in the TV Broadcast Bands*, Second Memorandum Opinion and Order, 25 FCC Rcd 18661 (2010) (adopting rules following a multi-year proceeding that permit unlicensed radio transmitters to operate in broadcast TV white spaces where spectrum is not being used by licensed services); *Fostering Innovation and Investment in the Wireless Communications Market*, Notice of Inquiry, 24 FCC Rcd 11322 (2009) (exploring whether to offer underlay or secondary use licenses or spectrum sharing through devices that enable opportunistic spectrum use); *Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation*, Notice of Inquiry and Notice of Proposed Rulemaking, 18 FCC Rcd 25309 (2003) (exploring new approaches to interference control and management to promote more efficient spectrum use and create new spectrum use opportunities); *Spectrum Policy Task Force Report*, 2002 FCC LEXIS 5864 (Nov. 2002) (suggesting dynamic assignment of spectrum usage rights that would provide access to unused or underused spectrum through time-sharing of spectrum).

[38] Further Notice at ¶¶ 62-63.

[39] *Wireless E911 Location Accuracy Requirements*, Third Further Notice of Proposed Rulemaking, 29 FCC Rcd 2374, 2376 ¶ 3 (2014).

[40] *See* CTIA – The Wireless Association®, Comments, PS Docket No. 07-114, at 4, 7-10 (May 12, 2014).

[41] *Id*. at 10-11.

IV. SIGNIFICANTLY REDUCING THE SIZE OF THE EXCLUSION ZONES IS CRUCIAL TO THE SUCCESS OF THE 3.5 GHz BAND

The proposed exclusion zones are too large, and will render large swaths of the country – representing an area roughly 200 miles inland around the entire U.S. coastline, and home to 60 percent of the U.S. population – unable to use 3.5 GHz devices.[42] Excluding such large areas from commercial use will "largely destroy the attractiveness of the 3.5 GHz band"[43] and render it essentially non-viable for commercial purposes.[44] The Commission should continue to explore ways to reduce the size of the proposed exclusion zones that will be used to protect federal Incumbent Access tier operations.[45]

CTIA welcomes the Commission's commitment to continue to "reassess" these zones,[46] which the record shows are not necessary to protect federal incumbents. The proposal is based on the models suggested in the 2010 NTIA Fast Track Report,[47] but those models assumed the use of higher-powered macro cells and not lower-powered small cells.[48] As the 2012 PCAST Report explained, "[d]edicating the 3550-3650 MHz band to small cell, low power use could

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[42] *See* CTIA PN Reply Comments at 8; Qualcomm PN Comments at 5; Verizon PN Comments at 4, 13-14; Qualcomm *Ex Parte* Letter at 1; *see also* PCAST Report at 51.

[43] Verizon PN Comments at 13.

[44] Qualcomm *Ex Parte* Letter at 1.

[45] *See* Further Notice at ¶¶ 5, 138-42.

[46] Further Notice at ¶ 5.

[47] Further Notice at ¶ 5 (citing NTIA, An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands (rel. October 2010) ("Fast Track Report"), http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf).

[48] *See* Fast Track Report at App. B; *see also* Qualcomm Comments at 17; *Amendment of Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, 27 FCC Rcd 15594, 15617 ¶ 67 (2012).

allow for significant reduction or even elimination of the exclusion zones."[49] Indeed, data submitted in the record by Qualcomm shows that NTIA's exclusion zones can be reduced dramatically for small cell deployments – from a maximum of 346 miles to less than 10 miles in one area studied.[50] Given these circumstances, the FCC should work closely with NTIA, government incumbents, and other stakeholders to shrink the size of the zones to the minimum necessary to protect government incumbents from the planned low-powered small cell deployments in the band.

The wireless industry has been working closely with government representatives through the Commerce Spectrum Management Advisory Committee ("CSMAC") process to identify ways to reduce exclusion zones, including through better modeling.[51] We are appreciative that the FCC, NTIA, and DoD continue to have significant discussions concerning ways to improve the technical modeling used to define those areas.

Another opportunity to reduce exclusion zones is through the DoD procurement process. DoD has issued a strategic "call to action" to improve the use of its spectrum resources, and that strategy includes procuring more efficient, flexible, and adaptable systems.[52] The Navy is currently seeking to replace its Air Surveillance Radar,[53] and the policymakers should use that

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[49] *See* PCAST Report at 7 n.33, 51.

[50] *See* Qualcomm Comments at 17.

[51] *See, e.g.*, Commerce Spectrum Management Advisory Committee, Working Group 1 – 1695-1710 MHz Meteorological-Satellite, Final Report (July 23, 2013), http://www.ntia.doc.gov/files/ntia/publications/wg1_report_07232013.pdf

[52] Department of Defense, Electromagnetic Spectrum Strategy: A Call to Action (2013), http://www.defense.gov/news/dodspectrumstrategy.pdf.

[53] *See* Department of the Navy, AN/SPN-43C Air Surveillance Radar, Solicitation Number: N00019-13-R-0041, https://www.fbo.gov/index?s=opportunity&mode=form&id=dd80b48ba87dffbce7e756c7b72a29eb&tab=core&_cview=1.

process to encourage an efficient replacement, consistent with the DoD strategy, that can allow for reduced exclusion zones.

V. SAS COMPLEXITY SHOULD BE MINIMIZED AND FOCUSED ON CERTAIN CORE FUNCTIONS, NOT NETWORK MANAGEMENT

While the Commission envisions an expansive role for the planned SAS to manage sharing between federal incumbents and new commercial users,[54] its functionality should avoid unnecessary complexity that could undermine sharing in the 3.5 GHz band.[55] The SAS holds promise where shared access is necessary, but it presents tremendous near-term uncertainty – and buy-in from all participants, including government incumbents, commercial providers, and manufacturers, is essential for the novel spectrum access regime to succeed. The SAS has been described as "the most complex spectrum management system ever developed, involving new architectural concepts, protocols, interfaces, stringent security, and policy-enforcement methods."[56] Such complexity comes with risks. As AT&T cautions, "[a]s history has recently shown with other complex systems, … if this PCAST model is rushed to market, it could have disastrous consequences and could actually set progress back."[57]

The Commission should mitigate these risks. "Limiting the scope of sharing in initial stages will simplify what will be a multi-year development process" and "increase the likelihood of its ultimate success," whereas unrealistic goals or mandates "risk[] slowing and adversely

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[54] *See* Further Notice at ¶ 95.

[55] *See* T-Mobile PN Comments at 11.

[56] Rysavy Spectrum Sharing Paper at 3; *see also* Further Notice at ¶ 93 (recognizing the "complexity of the proposed SAS framework").

[57] AT&T, *Spectrum Sharing*, *supra*.

affecting our progress towards sustainable and industrially scalable sharing solutions.[58] To maximize success, SAS system complexity should be focused on certain core functions, namely:

- Determining available frequencies at a given geographic location for PAL licensing or GAA use;[59]
- Registering and authenticating devices;[60]
- Enforcing exclusion zones to protect incumbents;[61]
- Protecting PALs from harmful interference from GAA users;[62] and
- Ensuring secure transmission of information between the SAS and devices.[63]

Thus, the SAS should not be responsible for issuing dynamic PAL frequency assignments; rather, as noted above, the FCC should adopt fixed assignments for PALs.[64] Nor should the SAS control the operating power or other technical parameters of a PAL network;

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[58] *See* Rysavy Spectrum Sharing Paper at 3, 20-21; *see also* Jill Nolin, *Simplicity Is Key to Successful Spectrum Sharing, Rysavy Says*, Urgent Comms., Jun, 3, 2014 ("I think the best way forward is to always take the smallest step possible and to not overreach and create a scenario where the issues are so complex that people just walk away from them…. There are so many ways that sharing can be thwarted that, unless we keep it straightforward …, then we will just be undermining our efforts.") (quoting technology consultant Peter Rysavy), http://urgentcomm.com/spectrumfrequency-coordination/simplicity-key-successful-spectrum-sharing-rysavy-says.

[59] *See, e.g.*, T-Mobile PN Comments at 3, 6, 11-12 ("[T]he SAS should be limited to identifying when spectrum is available for use by either a PAL licensee or GAA devices"); *see also* AT&T PN Comments at 6-7 & n.12; Verizon PN Comments at 13-14.

[60] *See, e.g.*, AT&T PN Comments at 7 ("[D]evice certification and registration are critical components of a successful spectrum access system. For example, by using device certification and SAS registration to assign frequencies dynamically, interference mitigation should improve in those instances where the geographic location of incumbent users is known").

[61] *See* Further Notice at ¶ 95.

[62] *See, e.g.*, AT&T PN Comments at 6-7 ("GAA equipment must be required to register with the SAS in order to avoid interference with incumbent tier users and Priority Access operations …."); T-Mobile PN Comments at 11-12 ("The Commission must … limit the role of the SAS to identifying … any applicable protection requirements ….")

[63] *See, e.g.*, Verizon PN Comments at 5-7.

[64] *See* AT&T PN Comments at 5, 8; T-Mobile PN Comments at 10-11;

instead, PAL operators should have the flexibility to determine how best to deploy their 3.5 GHz operations as part of managing their network within the limits set forth in Commission rules.[65] This last point is of some significance. As T-Mobile has explained:

> Carriers, and any entity likely to seek PAL rights, carefully plan and dynamically adjust the parameters under which their networks operate, often on a real-time basis in order to achieve the most efficient and intensive use of spectrum they are permitted to use. That careful planning would be frustrated by having a third party like an SAS be able to dictate the operating parameters of any component of a network.[66]

The Commission should ensure that the SAS does not direct the licensee's network management operations.

VI. CONCLUSION

For the reasons discussed above, the Commission should adopt a transitional approach to implement a sharing framework for the 3.5 GHz Band; adopt a more stable PAL licensing framework; work with NTIA and other stakeholders to significantly reduce the size of the proposed exclusion zones; and minimize SAS system complexity by focusing on certain core functions. By taking these steps, the Commission can lay the groundwork for an environment of

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[65] *See* Rysavy Spectrum Sharing Paper at 20 ("[T]he SAS itself should not exercise direct control over the networks, such as controlling transmit power levels.").

[66] T-Mobile PN Comments at 7.

short-term and long-term stability and predictability that fosters investment and innovation in the 3.5 GHz band.

Respectfully submitted,

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Dated: July 14, 2014